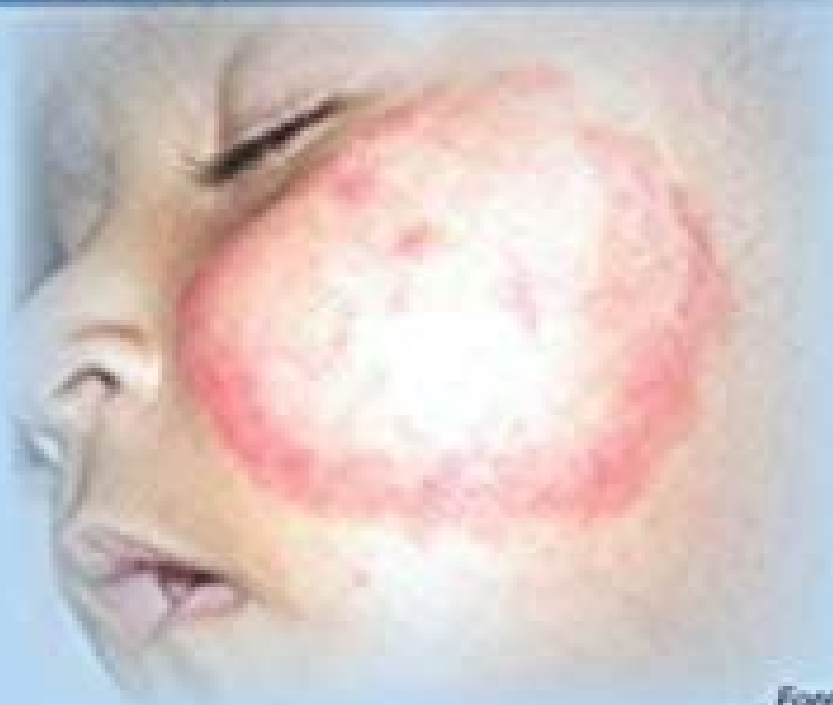
THIRD EDITION

Color Atlas & Synopsis of Pediatric Dermatology



Sandipan Dhar

Foreword
Celia Moss
Deepak Parikh

COLOR ATLAS AND SYNOPSIS OF
PEDIATRIC DERMATOLOGY

COLOR ATLAS AND SYNOPSIS OF PEDIATRIC DERMATOLOGY

Third Edition

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Forewords

Celia Moss

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Color Atlas and Synopsis of Pediatric Dermatology

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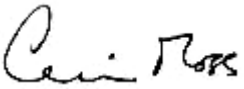
Dedicated to

All those innocent children who bear
the stigma of untouchability of skin diseases,
silently tolerating the humiliation and
ostracism of the civilized society…in whom
the blemish disappears with time
but the scar lingers in the mind…

Foreword

Babies and children with skin disorders comprise a substantial proportion of a dermatologist's workload, not just in numbers but in complexity. Birthmarks come in all colors, shapes and sizes, while exanthems and papulosquamous disorders may look the same to the uninitiated. Infantile eczema turns out to be not a single condition but a heterogeneous group. Infections are theoretically straightforward but regularly trip up the unwary. Genetic disorders are the hardest of all because of their rarity and limited therapeutic options. Our priority is the child, but we also have to consider parental expectations and the influence of the extended family, benign or otherwise. Sadly, we must remain alert to the possibility that the child's skin condition may reflect damage by others.

Dr Sandipan Dhar comes to our rescue with this authoritative and richly illustrated textbook, now a classic in its third edition. In response to feedback as well as advances in the field of pediatric dermatology, he has added new conditions, new concepts and new solutions. All who have lost sleep over challenging problems in young patients will appreciate Dr Dhar's practical, balanced, holistic and thoughtful approach. How much more important for the child with vitiligo to dispel prejudice and myths about dietary restrictions than to embark on cosmetic surgery. He brings a wealth of experience and knowledge to this masterful work, which dermatologists, pediatricians and others managing the pediatric skin problems will soon learn to consult as their essential diagnostic reference, and to browse for new insights. His position as a leader in this growing subspecialty is confirmed by this masterly contribution.



Celia Moss

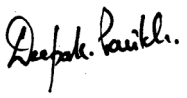
MBBS (London) MA DM (Oxon) MRCPCH FRCP
Consultant Dermatologist
Birmingham Children's Hospital, UK
Honorary Professor
University of Birmingham, UK

Foreword

Dear Readers,

We, at Indian Society for Pediatric Dermatology (ISPD), have been receiving constant request from pediatricians, post-graduates and dermatologists alike, for an 'easy-to-read' reference book on Pediatric Dermatology. The Indian Society for Pediatric Dermatology has decided to take such an initiative and who else other than Dr Sandipan Dhar can accomplish a major project like this! He has worked very hard to bring out the third edition of *Color Atlas and Synopsis of Pediatric Dermatology*. Every input, suggestions from you all have helped to make the book more user-friendly. I am sure you will receive the book with same love and affection that you all have showered on the previous two editions.

Happy reading!



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Mumbai, Maharashtra, India
Chairman
Indian Society for Pediatric Dermatology

Preface to the Third Edition

Copy from one, it's plagiarism; copy from two, it's research

—Wilson Mizner

The second edition has evoked spontaneous and overwhelming response, much more than the first edition. I have received innumerable emails containing valuable feedback about the book from various pediatricians and dermatologists across the country. In fact, the book ran out of print and a huge void was felt. These have inspired me to update the book and come up with the third edition. In the current edition, chapters on structure of skin, morphology of skin lesions and baby skin care, sexual abuse of children and sexually transmitted diseases have been incorporated. A very important aspect of pediatric dermatology practice is 'patient/parents' education and counseling. It has been included in the current edition. Approximately, 80 new entities and 450 new illustrations have been added to it. The bibliography has been updated. I am sure, now the book will be even more useful to the pediatricians, dermatologists and all those involved in pediatric skin care. I believe, still there is a lot of scope of further improvement of the book. I shall appreciate feedback (*drsandipan@gmail.com*) from the esteemed readers in this direction.

Happy Reading!

Sandipan Dhar

Preface to the First Edition

Dermatology in relation to children has far-reaching new connotations. There have been extensive researches and rapid developments in the field of pediatric dermatology in the last two decades. It is now recognized as a separate subspecialty in most countries. Nearly 50 percent of all skin problems pertain to pediatric age group.

Diseases such as atopic dermatitis, vitiligo and other pigmentary disorders are to be seen in a different light in relation to children as they are not intellectually mature to deal with the psychological aspect of the diseases. The concept of pediatric dermatology is a unifying one where the subjects of pediatrics and dermatology shake their hands for a better understanding of the skin diseases in infants, children and adolescents. There are a number of textbooks and color atlases on pediatric dermatology published from UK and USA which obviously do not address the difference in presentation of pediatric dermatoses in types IV and V skins. Therefore, there has been a growing need for such a color atlas among the pediatricians in particular (as I have been insisted by my pediatrician friends and colleagues). That is why, I have taken up this endeavor.

The chapters compiled in the book make an attempt to give a visual impression and important clues to diagnose a dermatosis. Most of the common (and some rare) skin diseases have been incorporated.

The book is basically meant for the pediatricians, beginners in dermatology and all those involved in the care of children. I am sure that the book will serve its purpose. The 'quotable quotes' have been incorporated to provide relief in-between the serious readings. Despite my best possible efforts, there may be some unwanted errors, some shortcoming in this book, which I promise to rectify in its future edition.

You may give your valuable feedback about the book to me (*babyd@vsnl.net*).

Sandipan Dhar

Acknowledgments

I am deeply indebted to a host of individuals who have made innumerable contributions towards the completion of the book, some identified below and others, with apologies, perhaps unwillingly overlooked.

First, I wish to extend my sincere thanks to Subhra, my best friend and wife. But for her active support and help, the book would have remained in the realm of unreality. I sincerely thank my little daughter Mitul for being patient, understanding and holding out for me for more than one and half years.

I express my heartfelt thanks to all my friends and colleagues who were kind enough to contribute some of the topics and illustrations for the book. I sincerely acknowledge the contribution of Dr Subrata Malakar, Dr Arun Inamadar, Dr Saumya Panda, Dr Priyankar Pal (ICH), Dr Samipa Mukherjee, Dr Abhijit Saha, Dr Joly Seth, Dr Sahana Srinivas, Dr Tarang Goyal, Dr Resham Vasani and Dr Samujjala Deb.

I want to record my deep respect and gratitude for Late Dr Surinder Kaur and Dr AJ Kanwar for evoking my interest in the subject of Pediatric Dermatology.

I like to convey my warm regards and sincere thanks to Dr Apurba Ghosh, Professor of Pediatrics and Director, Institute of Child Health (ICH), Kolkata, West Bengal, India, for giving me all liberty to work on Pediatric Dermatology. Many of the illustrations are contributed by him. I hereby gratefully acknowledge Dr (Mrs) Maya Mukhopadhyay, Dr Ritabrata Kundu, Dr Nupur Ganguly, Dr Arunaloke Bhattacharya, Dr Swapan Roy, Dr Jaydeep Chowdhury of ICH, Kolkata, West Bengal, India, for always being kind and supportive to me.

I would like to extend my gratitude to my soul-mate in Pediatric Dermatology, Dr Deepak Parikh. I have been fortunate to get a number of good friends while preaching and practicing the subject and I would like to thank Dr Raghubir Banerjee, Dr Rajib Malakar, Dr Manish Shah, Dr Rajesh Jadhav and Dr S Criton.

I take this opportunity to thank Dr AK Bajaj and Dr Koushik Lahiri for being always supportive in all my academic endeavors including this. Sincere thanks to Mr Tapas Kayal for compiling new set of ‘quotable quotes’ for the book.

Contents

1

Basics of Skin and Neonatal Dermatoses

STRUCTURE OF SKIN

Skin is the largest organ of the body. It is a very complex structure composed of three layers viz., epidermis, dermis and subcutaneous tissue (Fig. 1.1). It is also composed of various appendages. The outermost layer or the epidermis is further composed of four layers, e.g. stratum corneum, stratum granulosum, stratum spinosum and stratum basale. There are melanocytes situated at the basal cell layer and Langerhans cells throughout the epidermis.

The dermis is predominantly composed of collagen and fibroblasts. There are elastic fibers also. Various structures situated in the dermis are composite structure of hair follicle with sebaceous gland known as pilosebaceous apparatus, eccrine or sweat glands. Beneath the dermis there is a layer of fat known as subcutaneous tissue. In the dermis there are dermal capillaries and venules which comprise dermal vasculature. There are also lymphatics situated in the dermis.

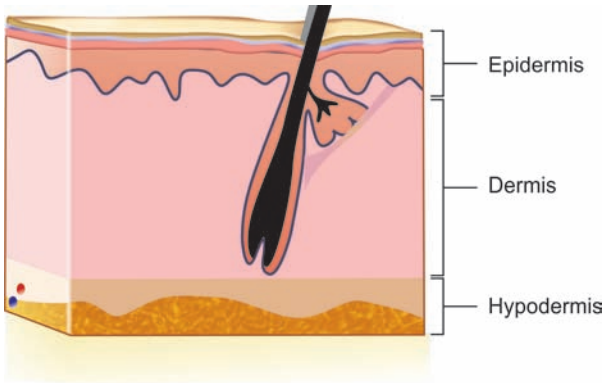

Fig. 1.1 Structure of skin

FUNCTIONS OF SKIN

The outermost layer or stratum corneum performs the barrier function and maintains the hydration of skin. It also prevents the penetration of irritants, toxins and organisms through the epidermis into the dermal capillaries from the environment. The rest of the epidermis act as protective layer. Melanocytes of the epidermis confers color of the skin by transferring melanin to the basal keratinocytes. It also protects the skin from deleterious effect of ultraviolet light. Langerhans cells present antigen to the immunological unit of the skin. Hence, it is considered as the first line of immunologic defence.

The collagen, elastic fibers act as a tough, leathery, mechanical barrier against cuts, bites, abrasions, bruises. Its collagenous matrix provides structural support for various cutaneous appendages. Hair grows from follicles placed in the deep dermis and imparts beauty to the individual. It also protects the scalp from the sunlight and various environmental allergens. Sebaceous glands produce oily secrertions and lubricate the skin and contribute to the protective function of epidermal barrier. Eccrine glands produce sweat and secrete on the skin surface through eccrine ducts. Thus it acts as an important organ responsible for thermoregulation. Cutaneous capillaries, venules and lymphatics act as perfusion unit of skin. The skin also contains specialized receptors for heat, pain, touch and pressure. Sensory inputs from these structures help to protect the skin surface against environmental trauma and noxious agents. The subcutaneous fat acts as a protective cushion for the skin and stores energy and provides insulation to the body. To summarize, various functions of the skin are as follows:

- *Protection:* It protects the body from physical, chemical and biological injuries.
- *Perception:* It perceives various sensations like pain, touch, temperature and vibration.

"A vision without the ability to execute is probably a hallucination."—Stephen M Ease

- *Temperature regulation:* Eccrine sweat glands and dermal vasculature play important role of thermoregulation.
- *Barrier function:* Skin acts as a permeability barrier that regulates the diffusion of substances particularly water and electrolytes, etc.
- *Secretory functions:* Synthesis of vitamin D_3 is an important secretory function with the help of sunlight.
- *Storage functions:* The dermis and subcutaneous fat act as a storage center for energy and other compounds.
- *Excretory functions:* Some of the harmful substances are excreted through the skin.
- *Immunological function:* Recognition of antigens and elicitation of immunological response is done by skin.
- *Cosmetic function:* Color and texture of skin along with the hair and nail play an important role in esthetic appeal of an individual.

SKIN TYPES AND SKIN COLOR

Skin color is of two types, constitutive skin color and facultative skin color.

Constitutive skin color is the basic skin color of an individual and is genetically determined. Facultative skin color is the skin color that results from ultraviolet ray (UVR) exposure. It is basically tanning of the skin. Depending on the response of the skin to UVR, various skin phototypes (SPT) have been described and different races with different SPTs possesses different types of skin color. Table 1.1 highlights color of skin and response to UVR in different skin phototypes.

Three types of melanin in humans have been demonstrated, eumelanin (brown-black melanin), pheomelanin (yellow-red melanin) and neuromelanin (black). While in most of the melanocytes there is a minimal admixture of pheomelanin and eumelanin, in red hairs exclusively pheomelanin is present. Neuromelanin is present in nerve cells. Neuromelanin is formed by an enzymatic pathway different from that of eumelanin or pheomelanin synthesis. Hence in oculocutaneous albinism (OCA) there is presence of pigment in substantia nigra.

Table 1.1 Skin types, color and response to ultraviolet ray

Skin phototypes	*Reaction to moderate sun exposure*	*Skin color*
I	Burn and no tan	Pale white
II	Burn and minimal tan	Pale white
III	Burn but good tan	White
IV	Severe tan but no burn	Light brown
V	Moderate tan but no burn	Brown
VI	Minimal tan but no burn	Dark brown

BASIC MORPHOLOGY OF SKIN LESIONS

Various morphology of the lesions have been divided into 3 types, primary lesions, secondary lesions and special lesions.

PRIMARY LESIONS

Different types of primary lesions are:

- *Macule:* It is only the change of color of skin, texture remaining unaltered. A macule can be hyperpigmented, hypopigmented or erythematous.
- *Papule:* It is a circumscribed solid lesion measuring less than 1 cm in diameter. A papule can be erythematous, skin-colored or of any other color. The surface may be flat, verrucous or umbilicated.
- *Plaque:* It is a solid elevation more than 1 cm in diameter. There may be associated follicular plugging, telangiectasia, atrophy, etc.
- *Nodule:* It is a deep-seated solid three-dimensional lesion which may be hard, firm, soft, fleshy, tender or non-tender, fixed or mobile. The surface of the nodule can be smooth, keratotic, ulcerated or fungating.
- *Pustule:* It is a circumscribed elevated lesion containing free pus. Sometimes it may be sterile.
- *Vesicle and bulla:* A vesicle is a circumscribed raised lesion containing free fluid and less than 1 cm in diameter. A vesicle is circumscribed raised lesion containing free fluid, less than 1 cm diameter. Vesicles may be tense or flaccid and on rupture leave behind raw area.
- *Wheal:* It is a transient or evanescent elevated plaque-like lesions with erythema, edema and central pallor.
- *Cyst:* It is a sac that contains liquid or semisolid material.
- *Abscess:* It is a collection of pus either in the dermis or subcutaneous plane or both.

SECONDARY LESIONS

Secondary lesions are lesions which are basically modified primary lesions by scratching, rubbing or secondary bacterial infections. Various secondary lesions are:

- *Scales* are formed as a result of increased or abnormal keratinisation. They may be fine powder-like or large silvery white or even fish like.
- *Crust* is a collection of dried exudates, dead tissue and microorganisms. Crust may be brown/brownish-yellow, may be adherent or friable.
- *Excoriation or scratch marks* are predominantly seen in pruritic disorders.
- *Erosion* is a superficial ulceration covered with serous exudates and heals without scarring.

- *Ulcer* is the result of breach in the continuity of skin with loss of epidermis and a part of dermis. Ulcer always heals with scarring.
- *Lichenification* is thickening, increased criss-cross markings and mild hyperpigmentation. It is the end result of chronic eczema.
- *Atrophy:* It is thinning of skin which appears shiny wrinkled with prominent blood vessels underneath.

SPECIAL LESIONS

Some of the lesions are pathognomonic of certain diseases as follows:

- *Burrow* Tunnel-like serpiginous lesions seen in the superficial part of the skin.
- *Comedones* are the result of plugging of the pilosebaceous duct by internal secretion. Comedones may be open (black) or closed (white).
- *Milia* are the small superficial cysts 1–2 mm in diameter commonly seen on the face.
- *Telangiectasia* means distinctly visible superficial blood vessels as a result atrophy of skin.

CONFIGURATION OF THE SKIN LESIONS

Characteristic configuration of lesions may suggest a diagnosis. Some classical are:

- *Linear:* Lesions are present in a line.
  Examples: Epidermal nevi, lichen striatus, warts, psoriasis, incontinentia, etc.
- *Dermatomal:* Lesions are present in a dermatome.
  Examples: Herpes zoster, vitiligo, nevus depigmentosus, port-wine stain.
- *Serpiginous:* Lesions follow a serpiginous track.
  Examples: Cutaneous larva migrans, elastosis perforans serpiginosa.
- *Annular*
  Examples: Tinea, granuloma annulare, erythema annulare centrifugum, erythema marginatum.
- *Herpetiform:* Grouped lesions or clustered lesions.
  Examples: Herpes simplex infection, herpes zoster, dermatitis herpetiformis.
- *Reticulated:* Means ripple-like.
  Examples: Cutis marmorata, livedo reticularis, erythema ab igne.
  Filiform: Means thread-like.
  Examples: Filiform warts, dermatosis papulosa nigra, skin tags/acrochordons.
- *Geographic*
  Examples: Geographic tongue, psoriasis, erythema annulare centrifugum.

NEONATAL DERMATOSES AND CARE OF NEWBORN SKIN

MONGOLIAN SPOT (Figs 1.2 and 1.2A to C)

This presents as macular blue-gray pigmentation at birth on the sacral area in normal infants of darker-skinned races. The patches are usually rounded or oval in shape, up to 10 cm

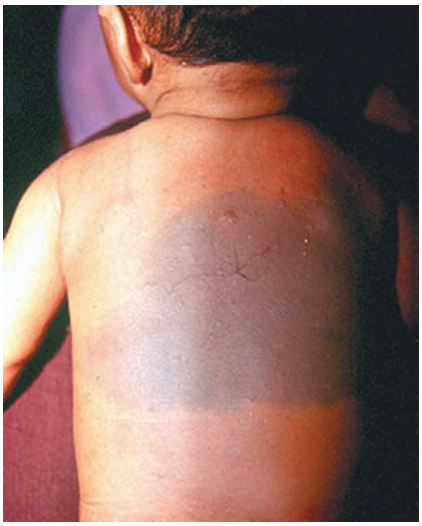

Fig. 1.2 Bluish black hyperpigmented patch of mongolian spot over back

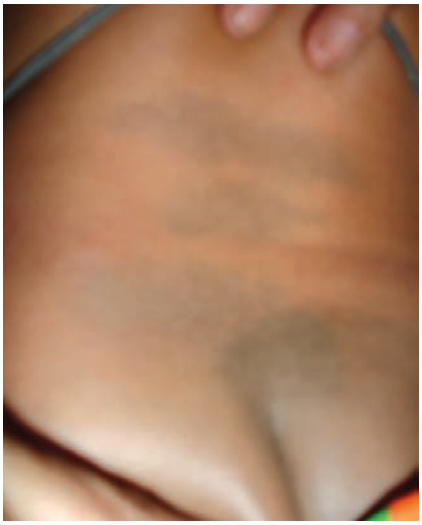

Fig. 1.2A Mongolian spots over back in a newborn

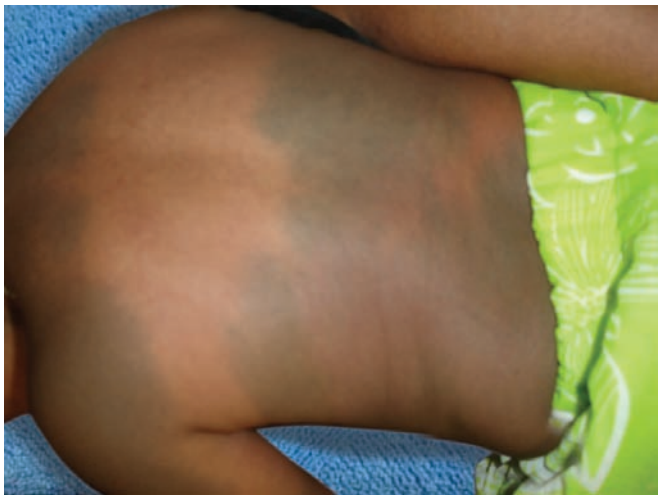

Fig. 1.2B Mongolian spots over back

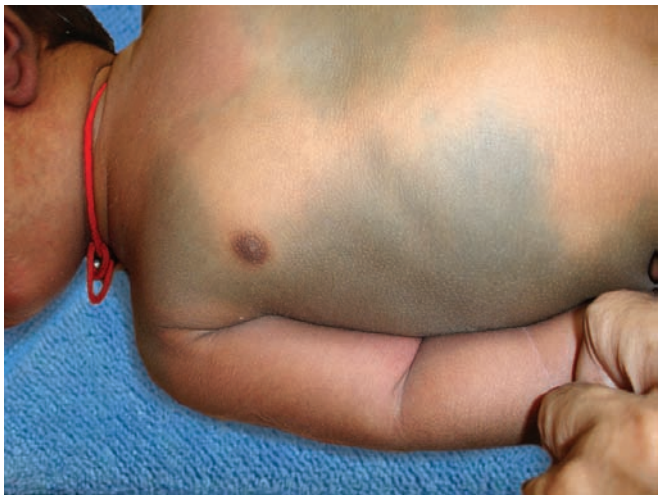

Fig. 1.2C Extensive Mongolian spots

in diameter and usually single. Other than the lumbosacral region, the buttocks, flanks or even shoulders may be affected in extensive lesions. The pigmentation develops in fetal life, increases in depth for a period after birth and then diminishes. It usually disappears in the first decade.

Natural History

It is considered as one of the physiological skin changes of the newborn. When Mongolian spots are associated with bilateral nevus of Ota, they take much longer time to disappear spontaneously.

Management

Explanation of the condition and its natural history to the parents helps to reassure them.

NEONATAL ACNE (Figs 1.3 to 1.5A)

The sebaceous glands of neonates produce a considerable amount of sebum in first few weeks of life influenced by maternal androgen. Neonatal acne mostly affects male infants and face is affected almost exclusively.

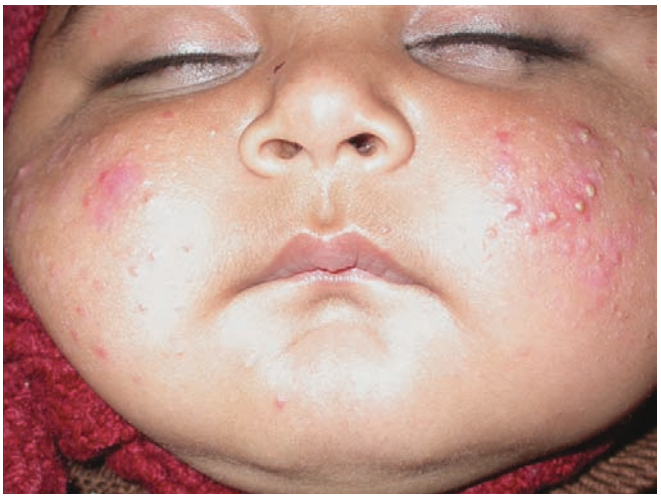

Fig. 1.3 Neonatal acne (inflammatory papules and pustules)

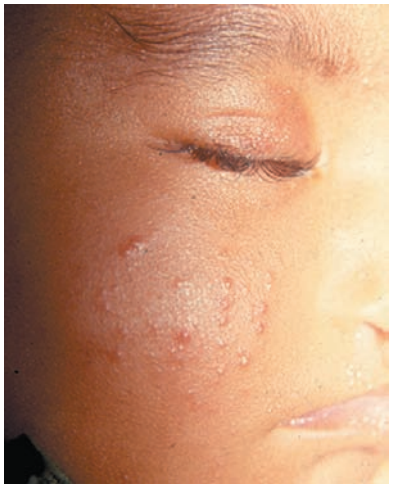

Fig. 1.4 Close-up of neonatal acne

"Give a man fish and feed him for a day; teach him to use the net and he won't bother you for weeks."—Chinese proverb

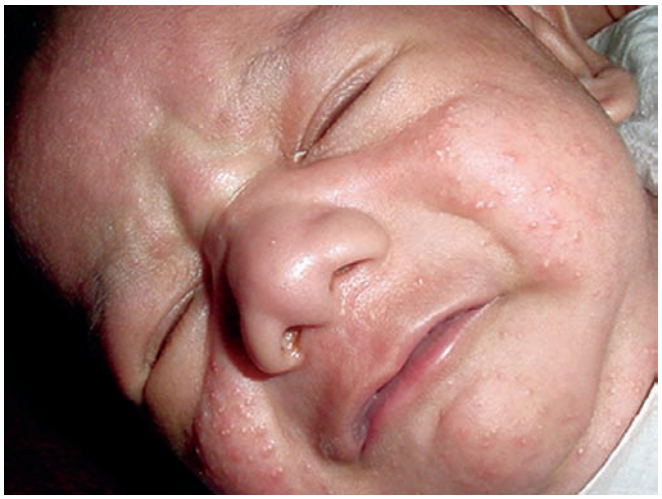

Fig. 1.5 Neonatal acne (closed comedones)

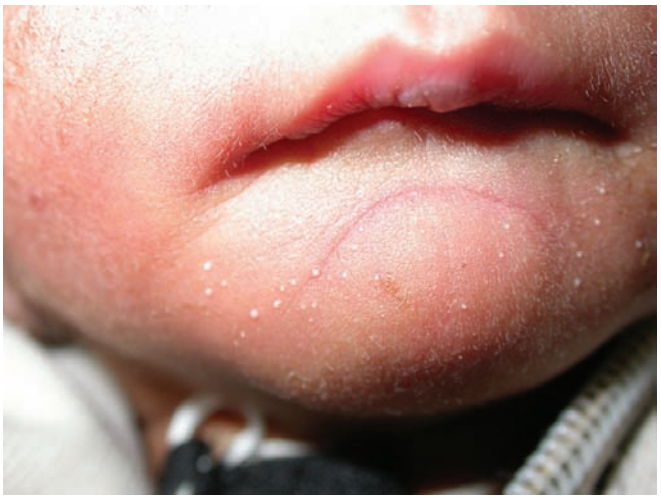

Fig. 1.6 Neonatal milia

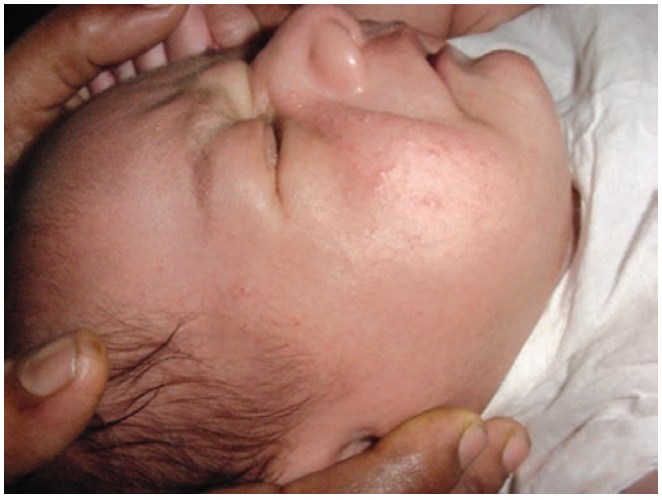

Fig. 1.5A Neonatal acne

Management

Lesions present as comedones and inflammatory papulas over cheeks. The lesions tend to subside by 2–3 weeks and require no treatment.

NEONATAL MILIA (Fig. 1.6)

Milia are one of the most common transient findings in the cutaneous survey in neonates. These consist of 2–3 mm white or yellow papules on the nose, chin, cheeks and forehead. Milia are epidermal cysts derived from the pilosebaceous follicle.

Natural History

They are normally spontaneously extruded in a few weeks.

TOXIC ERYTHEMA OF THE NEWBORN (Figs 1.7 to 1.8A)

The cause of toxic erythema of the newborn is unknown. In majority, the onset is during the first 48 hours after birth. The eruption appears as blotchy macular erythema, their number varying from one to several hundred, most profuse on the anterior trunk, and may also affect the face and thighs. In severe cases urticarial papules develop which in 10 percent cases are surmounted by pustules, 2–4 μm in diameter. Recovery occurs rapidly, usually within 3 days.

Differential Diagnosis

These lesions have to be distinguished from miliaria, transient neonatal pustular melanosis, incontinentia pigmenti, herpes simplex virus infection, varicella, and impetigo.

Diagnosis

Toxic erythema can be distinguished from all of these by microscopic examination of a smear of pustule contents stained with Giemsa and by bacterial and viral culture. The smear in case of toxic erythema reveals cluster of eosinophils. This is in sharp contrast to bacterial infections where cluster of neutrophils are seen.

"If one does not know to which port one is sailing, no wind is favorable."—Seneca

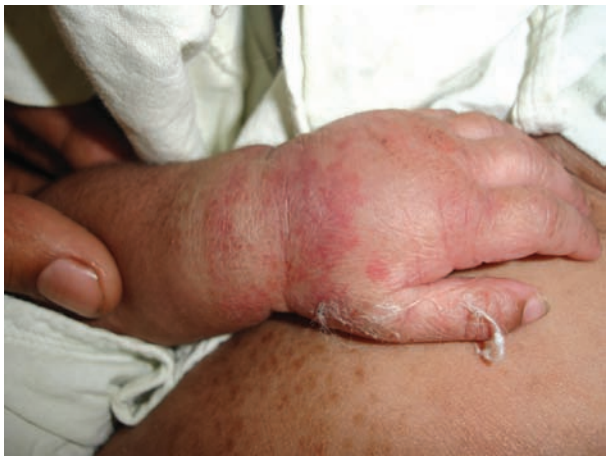

Fig. 1.7 Blotchy macular erythema and satellite pustules of toxic erythema of newborn

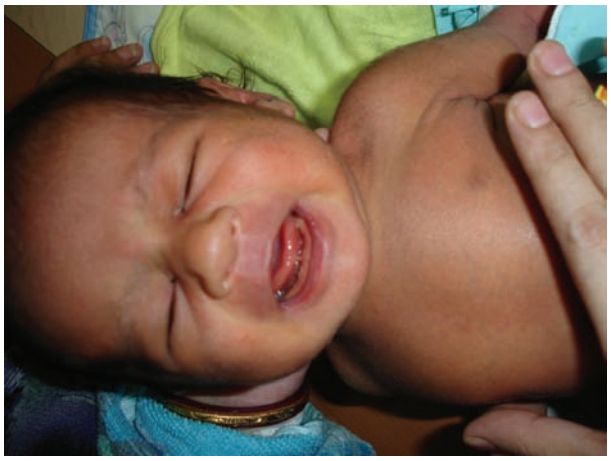

Fig. 1.8 Toxic erythema of newborn

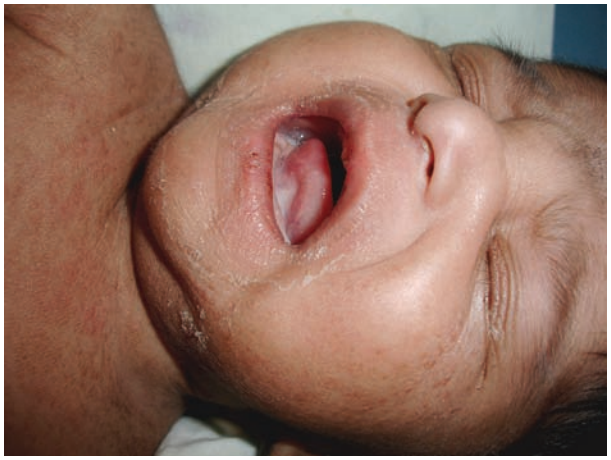

Fig. 1.8A Close-up of toxic erythema of newborn

Treatment

As the condition is a benign self-limiting and asymptomatic one, no treatment is required.

INTERTRIGO (Figs 1.9 to 1.9D)

Intertrigo is a term applied to an inflammatory dermatosis that is more or less confined to the major body folds and provoked by moisture and constant friction between opposing skin surfaces. Obesity, poor hygiene, overwarm clothing, hot and humid climatic conditions are the predisposing factors. Relative obesity of well nourished infants accounts for the unusually high incidence during the early months of life. Intertrigo is likely to become colonized and secondarily infected by both bacteria and yeast, particularly *Candida albicans*. Clinically, it manifests as symmetrical areas of sharply marginated erythema confined to areas of skin apposition. In infants, the folds of the neck, the axillae, the genitocrural flexures and the intergluteal cleft are the predilection sites. Miliarial lesions are readily apparent within the affected area. When *C. albicans* infection supervenes, erythema takes on a deep red hue and the affected area may weep. Rarely it may become superinfected with group A streptococci and *Corynebacterium diphtheriae*.

A severe form of irritant dermatitis can result in burn in NICU set up either from phototherapy, heater, or undiluted antseptic.

Management

Cleaning the macerated areas with mild soaps and wet compresses help. Application of mild topical corticosteroids, e.g. clobetasone or hydrocortisone either alone or in

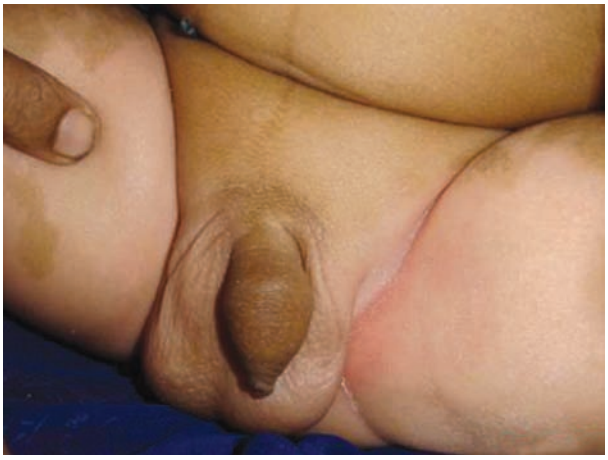

Fig. 1.9 Intertrigo of inguinal folds

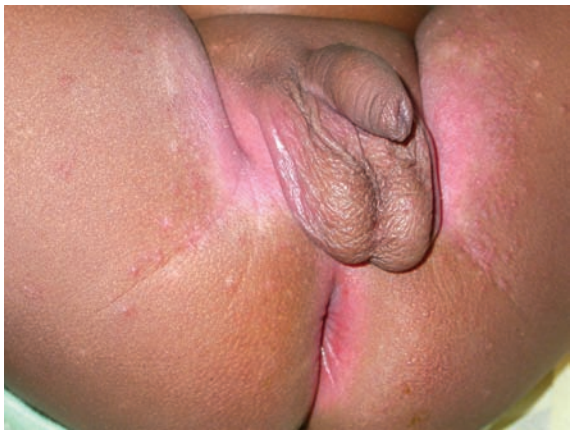

Fig. 1.9A Note erythema over inguinal and perianal area

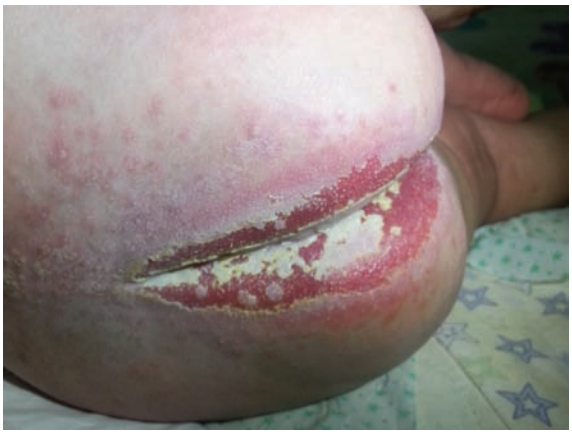

Fig. 1.9D Intertrigo, severe perianal involvement

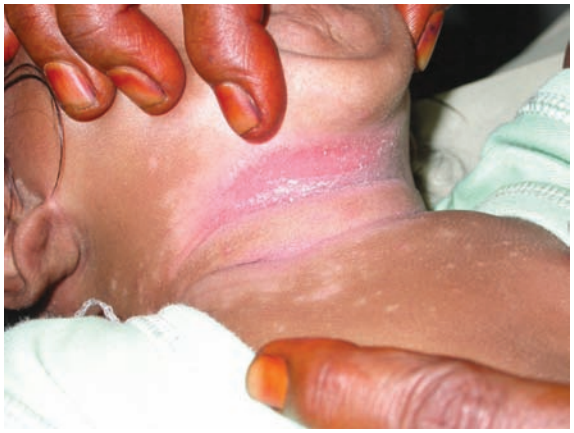

Fig 1.9B Note postinflammatory hypopigmentation surrounding erythema

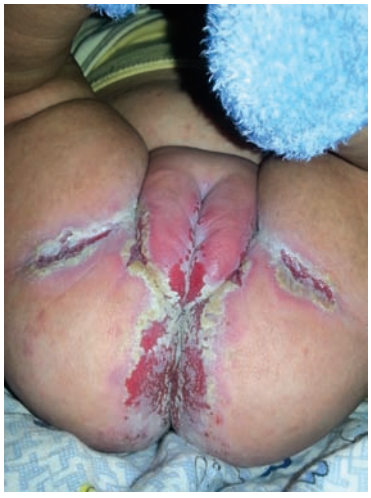

Fig. 1.9C Severe intertrigo

combination with an antifungal, e.g. miconazole or clotrimazole may be helpful. If bacterial superadded infection is evident, a topical antibacterial-like mupirocin may be useful. Application of antifungal powders can keep the areas dry because of the absorbent property of powder in addition to its antifungal action.

MILIARIA (Figs 1.10 to 10B)

Miliaria occurs when the flow of eccrine sweat is impeded by obstruction of the intraepidermal portion of the sweat duct. Miliaria crystallina appears to reflect obstruction of the sweat duct within the stratum corneum. Miliaria rubra occurs when there is sweat duct obstruction deeper in the epidermis.

Miliaria crystallina presents as crops of clear thin-walled, superficial vesicles, 1–2 mm in diameter without associated erythema on the head, neck and upper trunk, usually during the first two weeks of life. They rupture within 24 hours followed by branny desquamation.

Miliaria rubra, seen most commonly in the neonatal period comprises of erythematous papules and papulovesicled, about 1–4 mm in diameter on a background of macular erythema. Staphylococcal secondary infection of miliaria may lead to sweat gland abscesses. The symmetrical crops of miliaria rubra occurs most often in flexural areas, especially around the neck, in the groins and the axillae. The face, scalp and upper trunk are frequently affected. These lesions subside in 2–3 days but recurrences are common.

Differential Diagnosis

Miliaria crystallina is distinguishable from viral infections of the skin by the lack of background erythema and by the absence of inflammatory cells or giant keratinocytes on cytological examination of the vesicles. Miliaria rubra

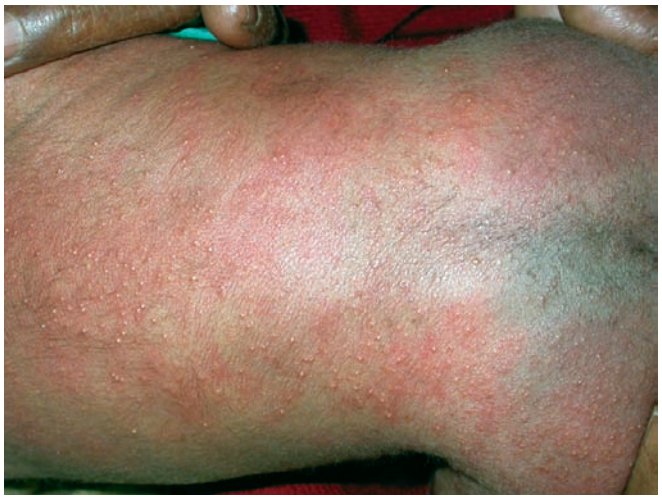

Fig. 1.10 Miliaria rubra and pustulosa in a newborn

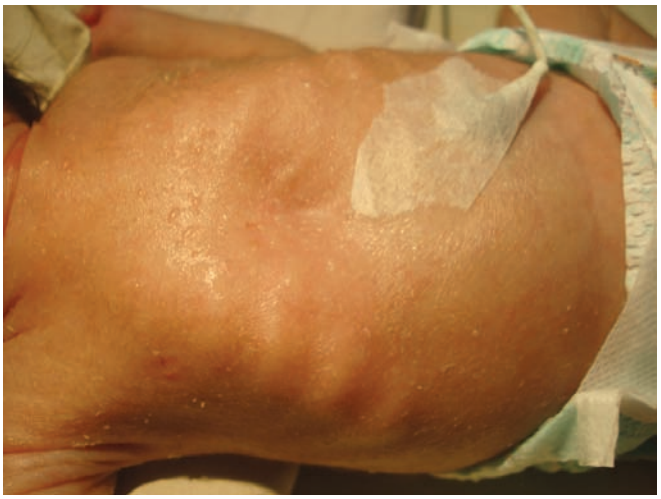

Fig. 1.10B Miliaria crystallina in newborn

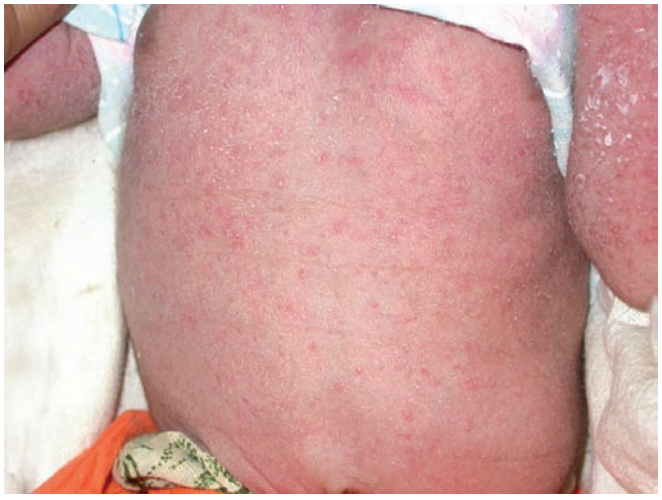

Fig. 1.10A Exfoliating miliaria rubra

can be distinguished from toxic erythema by its flexural predominance and by the frequent presence of vescicular lesions and by the tendency to recur.

Management

Avoidance of excessive heat and humidity is the most important aspect of management. Cool baths, light clothing and installation of air conditioner in the room are helpful. Topical application of ordinary spirit (or aftershave/deodorant/body spray) gives local cooling effect and drying up of miliaria lesions. Calamine lotion also helps in most of the cases. If itching is excessive, oral promethazine or chlorpheniramine syrup may be given for 7–10 days.

STAPHYLOCOCCAL SCALDED SKIN SYNDROME (Figs 1.11 and 1.12)

Staphylococcal scalded skin syndrome (SSSS) is caused by an epidermolytic toxin elaborated by certain strains of *S. aureus*, commonly phage gr II. The condition is most commonly seen in the first 5 years of life. It is particularly common during the neonatal period occurring in association with purulent conjunctivitis or an upper respiratory tract infection. Sites of predilection are the central part of the face, the axillae and groins. The orange-red, scarlatiniform eruption spreads rapidly. Tenderness of the skin is an early and striking feature. The eruption gradually becomes extensive and turns to a confluent deep erythema and edema in the next 24–48 hours. The surface becomes wrinkled before starting to separate out leaving raw red erosions. The child is pyrexial and distressed. Recovery is usually rapid even without antibiotic therapy. The only differential diagnosis which poses a problem is toxic epidermal necrolysis, which is however, relatively rare in young children and is characterized by marked mucosal involvement.

Diagnosis

The diagnosis of SSSS can be established by isolation of coagulase positive *Staphylococcus aureus* from the pyogenic skin lesions or from nostril and areas around eyes.

Prognosis

The condition has a mortality of approximately 5 percent and fatalities occur mostly in newborns and debilitated infants.

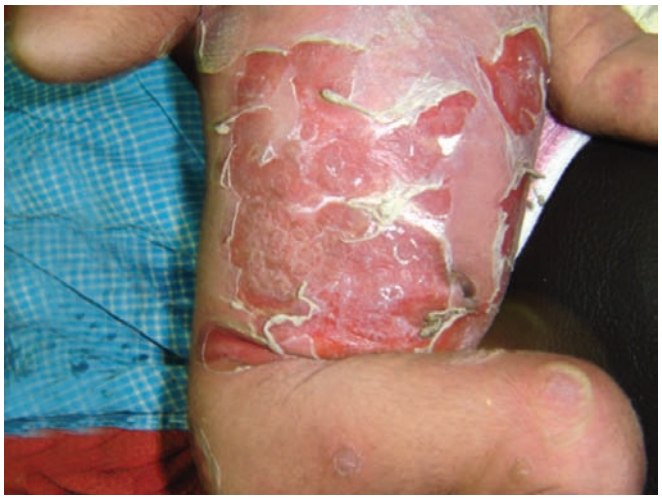

Fig. 1.11 Staphylococcal scalded skin syndrome in a 10-day old newborn

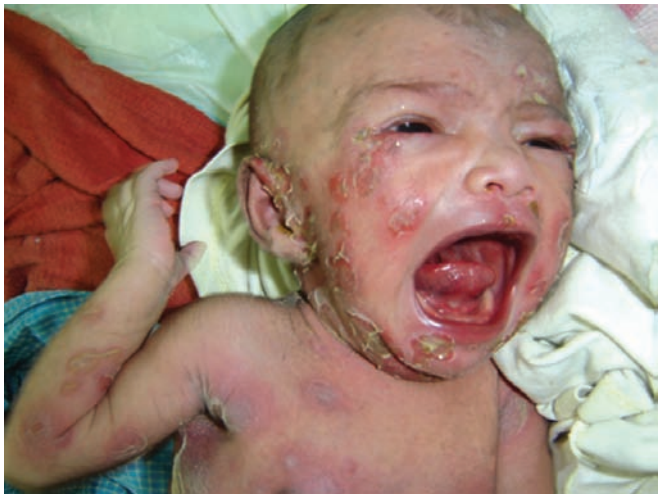

Fig. 1.12 Involvement of face and upper extremities in staphylococcal scalded skin syndrome

SUCKLING BLISTER (Fig. 1.13)

Suckling blisters are seen in newborns at birth due to vigorous suckling by the fetus *in utero* of several areas of the body. Bullae or erosions of 0.5–2 cm are seen over the dorsal aspect of the fingers, thumbs, wrists, lips, etc.

Differential Diagnosis

These lesions need to be differentiated from a host of conditions, e.g. bullous impetigo, epidermolysis bullosa, neonatal herpes simplex, etc.

Treatment

Topical application of antibacterial creams may help drying up of the lesions.

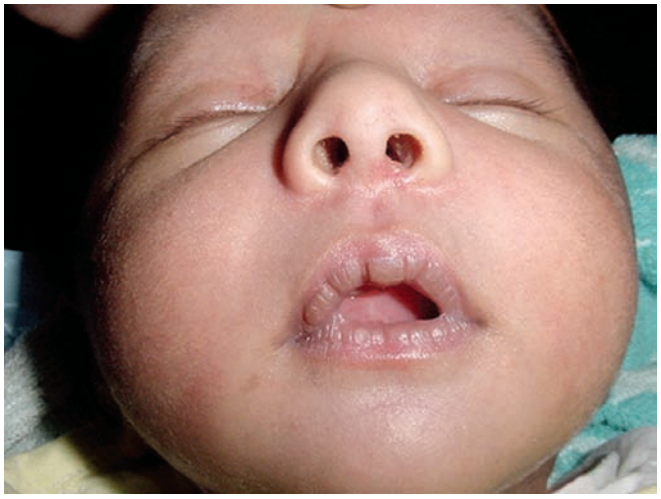

Fig. 1.13 Suckling blisters over upper lip in a newborn

Management

Treatment should be started promptly with a penicillinase resistant antistaplylococcal antibiotic like cloxacillin or a combination of amoxicillin and clavulanic acid or cefadroxil orally. Parenteral antibiotics may be required in cases of extensive skin lesions or severely ill patients. Local cleaning of the skin with distilled water or normal saline soaked cotton is sufficient. Antiseptic cleaning is better avoided, so also application of topical antibiotic for fear of emergence of resistant strains of *Staphylococcus aureus*.

NEONATAL HERPES SIMPLEX (Figs 1.14 to 1.16)

Infection of the neonate by herpes simplex virus is a serious condition with high mortality. The majority of these infections result from transmission of HSV1 and HSV2 by genital tract secretions during delivery. Over 70 percent of an infection with neonatal HSV have skin or mucosal lesions. Pneumonia and/or encephalitis are frequent complications. In 10 percent of the cases, the disease remains confined to the skin. Skin manifestations are in the form of multiple grouped

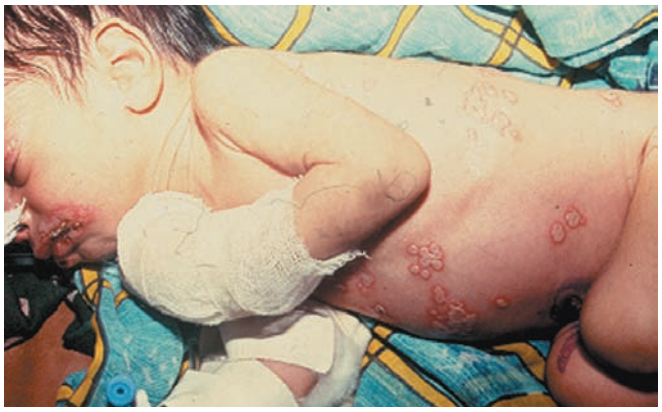

Fig. 1.14 Grouped vesicles of herpes simplex on erythematous patches over trunk

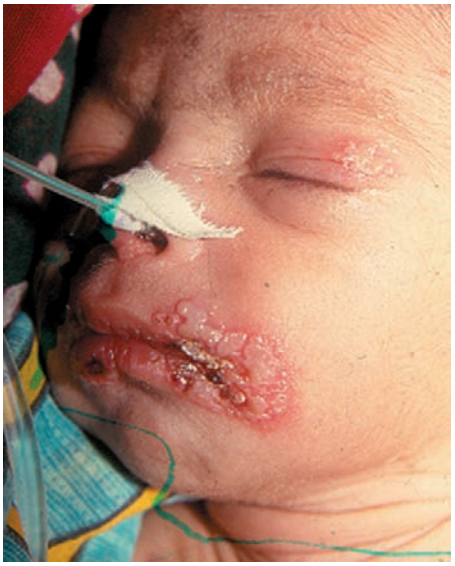

Fig. 1.15 Same baby (close-up)

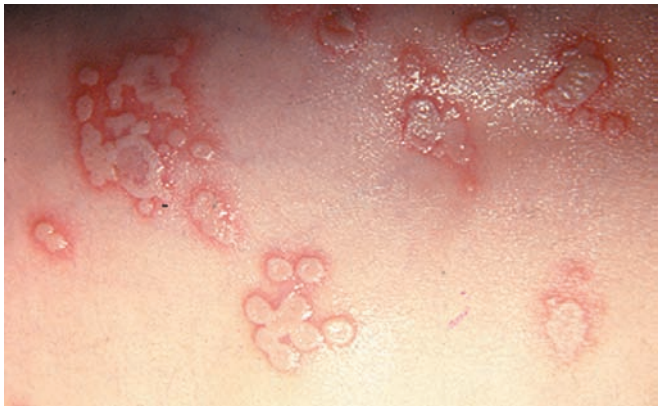

Fig. 1.16 Mucocutaneous localization of herpes lesions

vesicles on erythematous patches distributed randomly over the scalp, face trunk and extremities. The vesicles have a tendency to localize over mucocutaneous junctions. Onset is between 2 and 20 days. Oral lesions in the form of erosions of the tongue, palate, gingivae and buccal mucosa are also common. Primary neonatal herpes simplex is a devastating life-threatening infection which must be diagnosed and treated with antiviral drugs promptly.

Diagnosis

Diagnosis can be coestablished with the help of Tzanck smear preparation, viral culture, use of monoclonal antibodies and nucleic acid hybridization techniques.

Management

The neonates should be isolated. Ophthalmologic examination should be performed. Prophylactic ophthalmic topical preparations, e.g. trifluridine or vidarabine are to be used. Intravenous acyclovir is the treatment of choice. It is given in a dose of 30 mg/kg/day in 3 divided doses for 14–21 days. There is no role of topical acyclovir ointment application over the lesions.

UMBILICAL POLYP (Figs 1.17 and 1.18)

It presents as a bright red shiny polypoidal growth over the umbilicus at birth and is the result of a partially patent omphalomesenteric duct. The lesions are usually asymptomatic and secrete serous, mucoid, and rarely serosanguinous exudate. Polyps may be accompanied by potentially serious internal omphalomesenteric remnant, such as Meckel's diverticulum attached to the umbilicus by obstructing fibrous bands.

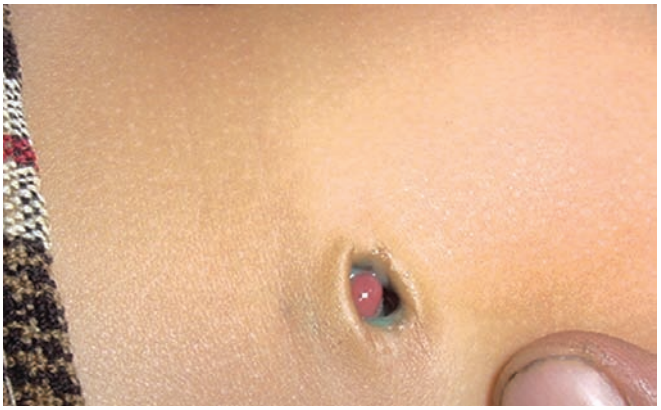

Fig. 1.17 Shiny exudative lesion of umbilical polyp

"It is terrible to speak well and be wrong."—Sophocles, Greek Tragic Poet

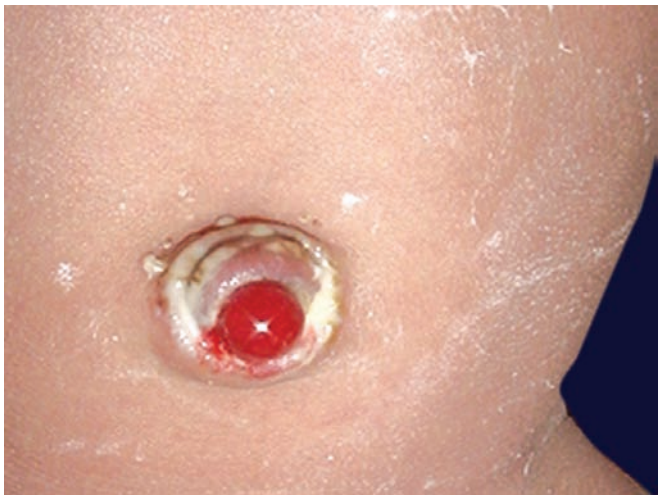

Fig. 1.18 Umbilical polyp, note cherry red color of the growth

Treatment

The condition is treated by surgical excision. However, underlying intestinal and urinary tract abnormalities are to be ruled out.

UMBILICAL GRANULOMA (Fig. 1.19)

It is basically a granuloma pyogenicum of the umbilicus. It presents as a red raw granulomatous growth over the umbilicus with purulent discharge.

Treatment

Treatment is cauterization with either silver nitrate solution, 20 percent potassium hydroxide or phenol.

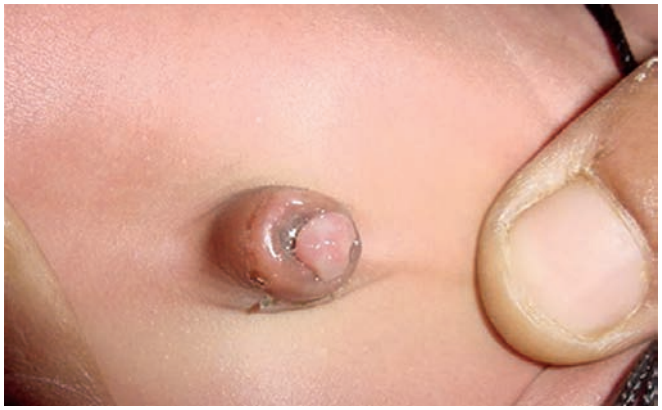

Fig. 1.19 Granulomatous lesion of umbilical granuloma

CONGENITAL SYPHILIS (Figs 1.20 and 1.21)

In congenital syphilis, the fetus becomes infected with the spirochete, *Treponema pallidum* by way of placenta. The clinical manifestations of early congenital syphilis (those occurring before 2 years of age) are anemia, fever, wasting, hepatosplenomegaly, lymphadenopathy, rhinitis, mucocutaneous eruptions, edema, desquamation and pseudoparalysis. Of these rhinitis or snuffles is the first sign to appear. It manifests between the 2nd and 6th week of life and is the result of an ulcerous lesion of the nasal mucosa. The cutaneous lesions are seen in 1/3rd to ½ of infants affected by this disorder and appear as maculopapular or papulosquamous lesions most prominent on the face, dorsal surface of the trunk and legs, diaper area and at times palms and soles. The eruptions generally develop slowly, is bright pink or red, gradually fades to copper brown. It disappears spontaneously over 1–3 months leaving hypo- or hyperpigmented areas. The rare vesiculobullous, hemorrhagic lesions, when seen on the palms and soles, are

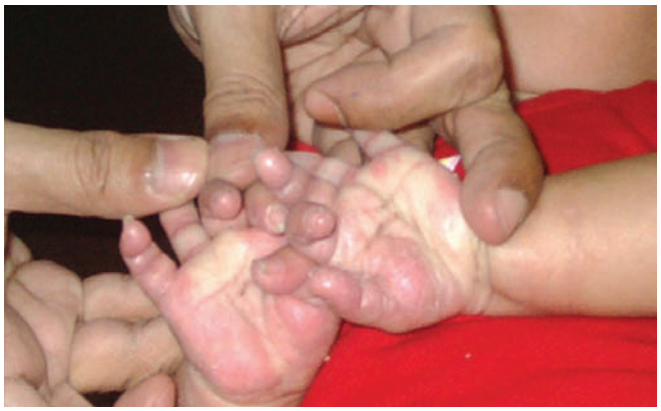

Fig. 1.20 Red shiny scaly lesions over palms of congenital syphilis

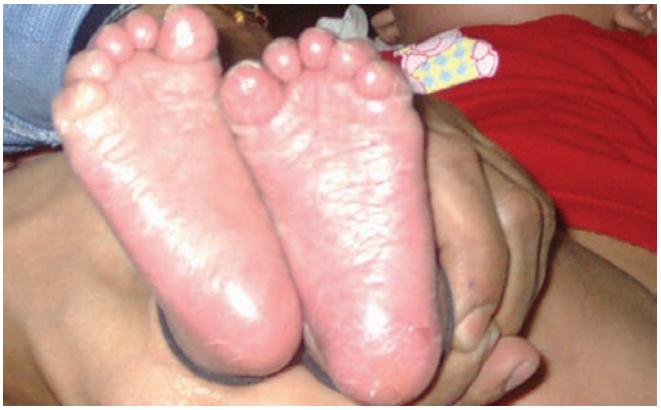

Fig. 1.21 Congenital syphilis, similar lesions over soles

"We're different; we're the same—Richard David Bach (1936–)."—Author; Jonathan Livingston Seagull

highly diagnostic of this disorder. The palms and soles may be fissured, erythematous and indurated. Desquamation of the skin in large dry flakes may occur over the entire body. Mucous membrane lesions, seen in 1/3rd of the infants, are seen as weeping lesions or fissures at mucocutaneous junctions which extend out from the lips in a radiating fashion over the skin. When deep, they leave residual scars (rhagades) in the adjacent circumoral region. Raised, flat, moist wart-like lesions of condylomata lata are seen commonly over the anogenital regions, around the nares and at the angles of the mouth. About 90 percent of the infants show radiologic evidence of osteochondritis and periostitis after the first month of life, most frequently affecting the long bones.

In late congenital syphilis, the disease persists beyond 2 years of age. It includes various signs and stigmata of congenital syphilis in infants in whom the diagnosis was overlooked or those who were inadequately treated early in the course of the disease. These include dental changes manifested in the form of Hutchinson's incisors, Moon's mulberry molars, gummas affecting the bones in the skull or tibias, syphilitic arthritis, paroxysmal cold hemoglobinuria and ocular changes.

Treatment

Penicillin is the treatment of choice for all forms of congenital as well as acquired syphilis. Treatment should be started immediately after the diagnosis with aqueous crystalline penicillin G in a dosage of 100,000 units to 150,000 units/kg administered intravenously every 8–12 hours or procaine penicillin G in dosage of 50,000 units/kg administered IM once daily for 10–14 days. Patients with congenital syphilis should have repeat quantitative, nontreponemal tests 3, 6 and 12 months after treatment.

SUBCUTANEOUS FAT NECROSIS (Figs 1.21A and B)

It is a benign self-limiting dermatosis which affects apparently healthy full-term newborns and young infants. It presents as sharply circumscribed areas of indurated and nodular plaques of skin over back, buttocks, thighs and arms. Its exact etiology is not known but proposed hypotheses are pressure on bony prominenes during delivery, fetal asphyxia or hypothermia. It is also seen in infants delivered by cesarean section and infants born to diabetic mothers. The onset of fat necrosis usually occurs in the first few days to weeks of life. The lesions at times may get calcified. However, most of the lesions undergo spontaneous resolution within 2–4 weeks.

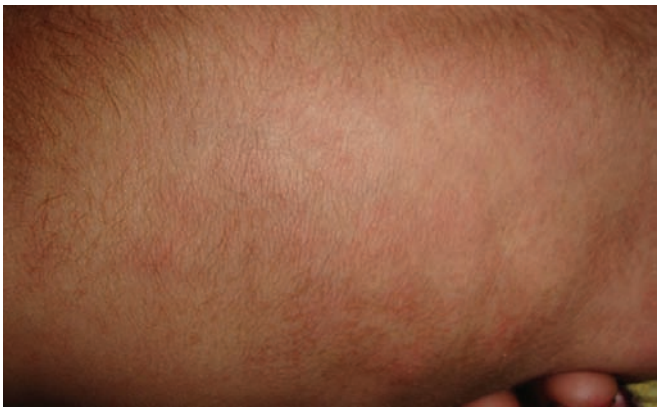

Fig. 1.21A Erythematous indurated plaques of subcutaneous fat necrosis in a newborn

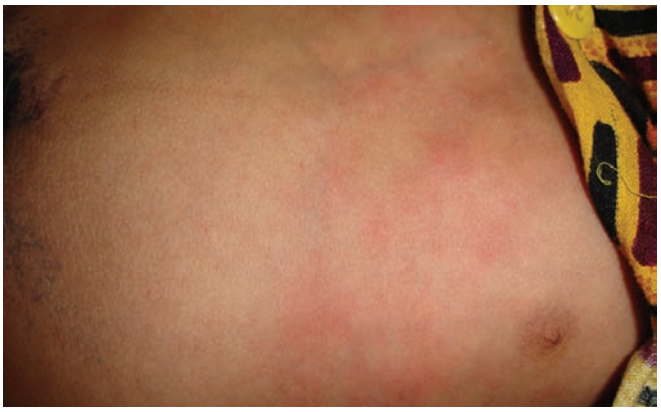

Fig. 1.21B Close-up of the lesions

Differential Diagnosis

The condition needs to be differentiated from sclerema neonatorum which primarily occurs in newborns with sepsis, severe diarrhea, respiratory failure or dehydration and is a fatal condition with high mortality rate.

Management

Subcutaneous fat necrosis in most newborns resolve spontaneously and requires no specific therapy. Fluctuant lesions in cases of calcification should be aspirated to prevent their spontaneous rupture and secondary infection. In rare cases of hypercalcemia, restriction of calcium and vitamin D intake, systemic corticosteroids may be required.

SCLEREMA NEONATORUM (Figs 1.22 and 1.23)

It is a diffuse, fast spreading, wax-like hardening of the skin and subcutaneous tissue that occurs in premature baby or debilitated infants during the first few weeks of life. This disorder is associated with a serious underlying conditions like sepsis, respiratory distress, dehydration or diarrhea, congenital heart disease and it is characterized by a diffuse nonpitting woody induration of the involved tissues. This disease is usually starts on buttocks and legs and most of the time it progresses to involve all areas except soles, palms and genitalia. When the disease spread, the skin becomes mottled, cadaver-like, cold, stony hard and yellowish white. At that time the face acquires a fixed mask-like expression and the limbs become immobile. The infants feed poorly, show clinical signs of shock, sluggish movements and in maximum cases the baby often die. Although the etiology of this disorder is unknown, it appears to represent a nonspecific sign of grave prognostic significance rather than a primary disease. In this disorder babies are usually small, premature, lethargic, cyanotic and debilitated. Near about 25 percent of cases the mothers are ill at the time of delivery. Exposure to cold, peripheral chilling with vascular collapse, hypothermia and an increase in the ratio of saturated to unsaturated fatty acids in the triglyceride fraction of the subcutaneous tissue have been hypothesized, but lack confirmation, as possible causes for this disorder.

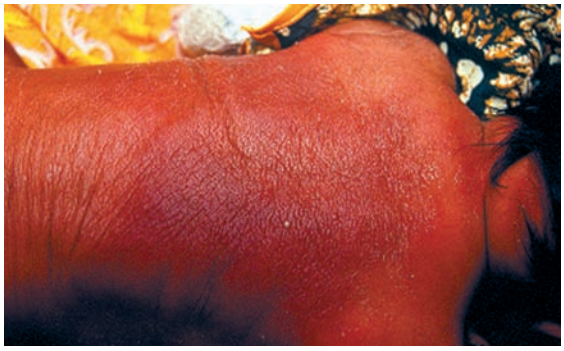

Fig. 1.22 Yellow indurated plaques of skin over back in sclerema neonatorum

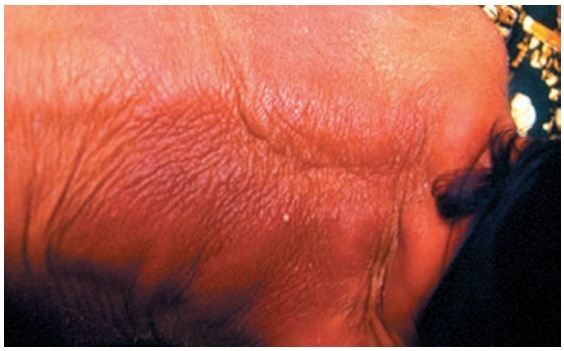

Fig. 1.23 Same infant (close-up)

Prognosis

Mortality occurs in 50–75 percent of affected babies. Death is commonly due to debilitation, inanition, and the associated underlying pathologic disorders. The infants, who survive this disease, resolve without residual sequelae.

Management

Sclerema neonatorum has not any specific therapy. Supportive care with heat and administration of oxygen, control of infection, treatment of the underlying disorder, and intravenous therapy for correction of fluid and electrolyte imbalance are essential. Although indications for their use are not clear and controlled studies fail to confirm their efficacy, systemic corticosteroids in addition to antimicrobial agents have been advocated for infants with this disorder.

HAIRY PINNA (Fig. 1.24)

It is a Y-chromosome mediated trait.

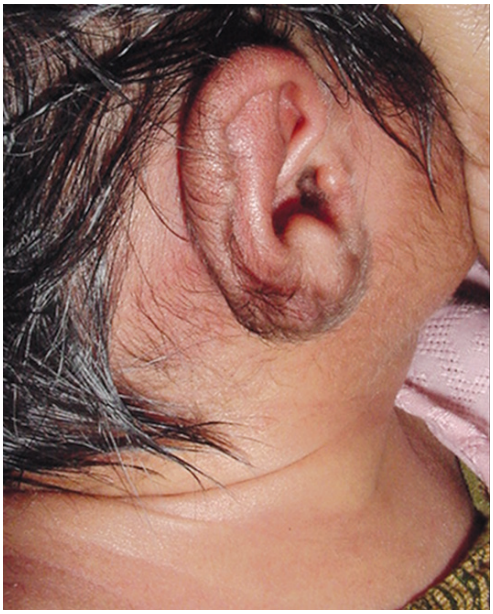

Fig. 1.24 Hairy pinna in a newborn

"History is the version of past events that people have decided to agree upon."—Napoleon Bonaparte

POLYTHELIA (SUPERNUMERARY NIPPLES) (Fig. 1.25)

Supernumerary nipples are the remnants of the embryological milk line which runs from the anterior axillary fold to the inner thigh. Most often they are distributed over the anterior chest wall and upper abdomen as pink, umbilicated or elevated papules surrounded by a pigmented areola. A nipple may also be seen without areola, and vice versa. Usually there is only a single lesion, but multiple or bilateral nipples are possible. It has been shown to be on the higher side being located on the left side and male gender. Accessory nipples have been reported to be associated with malformations of the urinary tract, in particular the kidneys. The association has been questioned recently.

Treatment

The accessory breast tissue may underlay the nipple and enlarge at puberty or in pregnancy. In such cases, complete excision is recommended because of the risk, of malignant change.

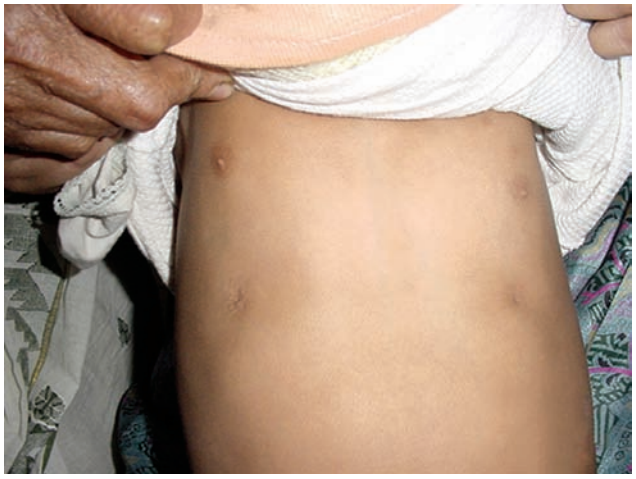

Fig. 1.25 Multiple accessory rudimentary nipples along the milk line

PHYSIOLOGICAL EXFOLIATION OF NEWBORNS (Figs 1.26 to 1.26B)

Also known as neonatal desquamation. This is mostly seen in postmature neonates. The exact pathophysiology of it is not known. The baby at birth may present with a membrane-like sheet around it like a collodion baby. But soon it sheds the membrane and there is scaling all over the body starting from head to toe. However, there is no ectropion, eclabion or gloved appearance. The scaling gradually subsides over a period of 4–6 weeks.

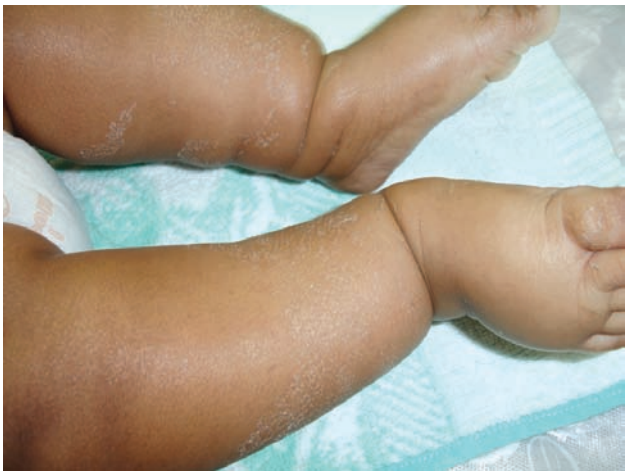

Fig. 1.26 Physiological exfoliation of newborn

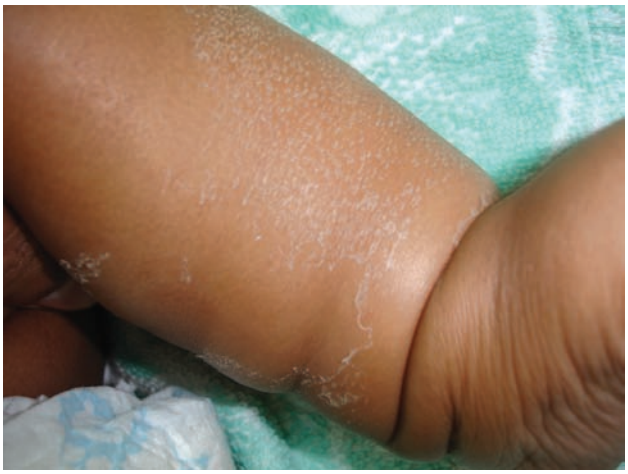

Fig. 1.26A Close-up of neonatal exfoliation

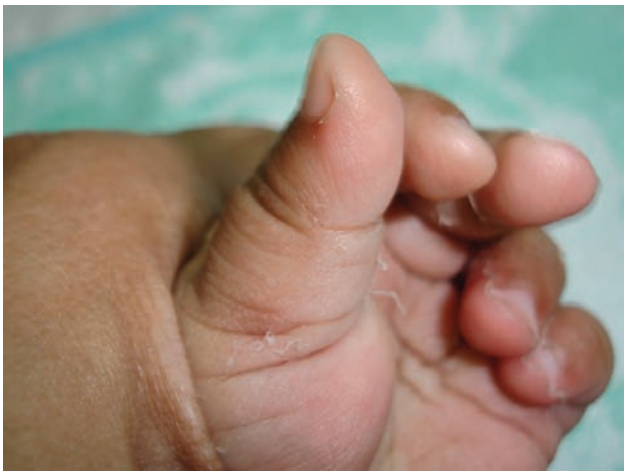

Fig. 1.26B Note exfoliation over thumb and fingertips

Treatment

Application of oil and emollient (white soft paraffin) help to reduce scaling and moisturise the skin of the babies.

CUTIS MARMORATA (Figs 1.27 to 1.27B)

Cutis marmorata presents as reticulated bluish mottling of the skin seen on the trunk and extremities of newborn and infants. This phenomenon is a physiologic response to chilling with resultant dilatation of capillaries and small venules. It usually disappears as the infant is rewarmed. Although a tendency to cutis marmorata may persist for several weeks or months, this disorder bears no medical significance and no treatment is usually required. In some children cutis marmorata may tend to recur until early childhood. In patients with Down's syndrome, trisomy 18, and Cornelia de Lange syndrome, this reticulated marbling pattern may be persistent. In some infants a white negative pattern of this phenomenon (cutis marmorata alba) may be created by a transient hypertonia of the deep vasculature. It is known as cutis marmorata alba. It is a transitory disorder and appears to have no clinical significance.

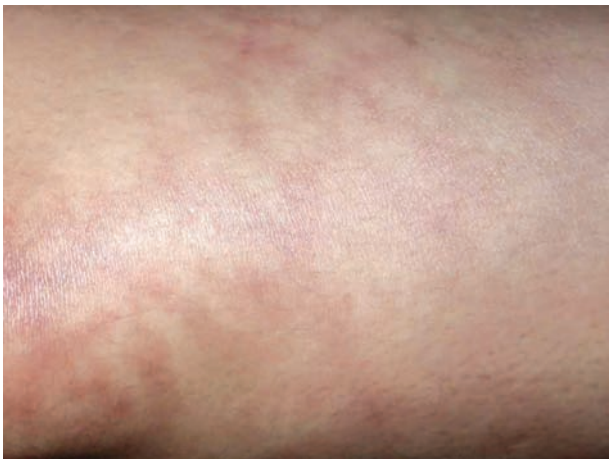

Fig. 1.27B Cutis Marmorata, close-up

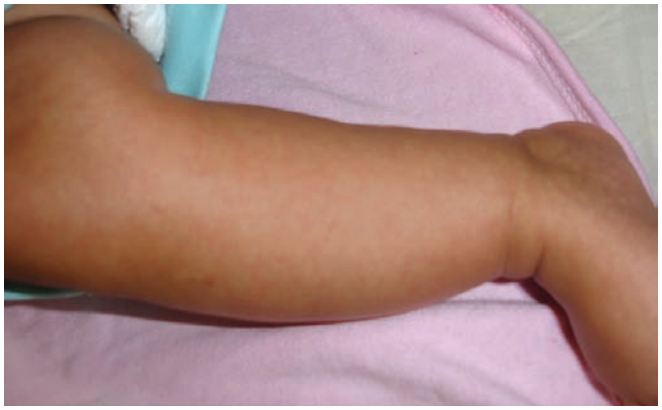

Fig. 1.27 Cutis marmorata telangiectasia in a newborn baby

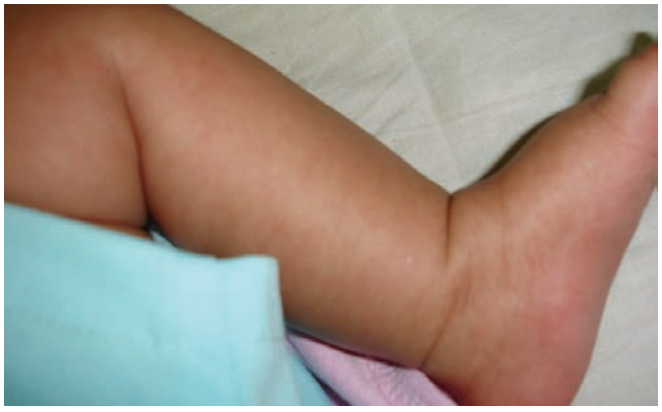

Fig. 1.27A Same baby, note net-like telangiectasia

Treatment

No treatment is required for this physiological condition in newborns and infants. Reassurance and counseling of the parents is important.

CUTIS MARMORATA TELANGIECTASIA CONGENITA (Figs 1.27C and D)

It is a condition which closely simulates cutis marmorata telangiectasia (CMT) but does not disappear on rewarming. The condition presents at or shortly after birth.

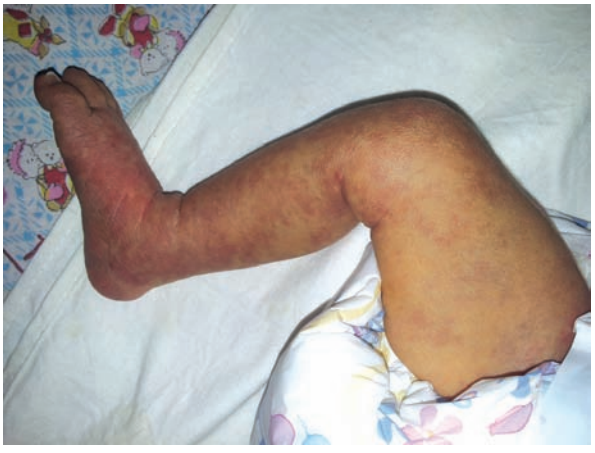

Fig. 1.27C Cutis marmorata telangiectasia congenital (CMTC)

"Twenty years from now you will be more disappointed by the things you didn't do than by the ones you did do. So throw off the bowlines, Sail away from the safe harbor. Catch the trade winds in your sails. Explore. Dream. Discover."—Mark Twain [Samuel Langhorne Clemens] (1835–1910)

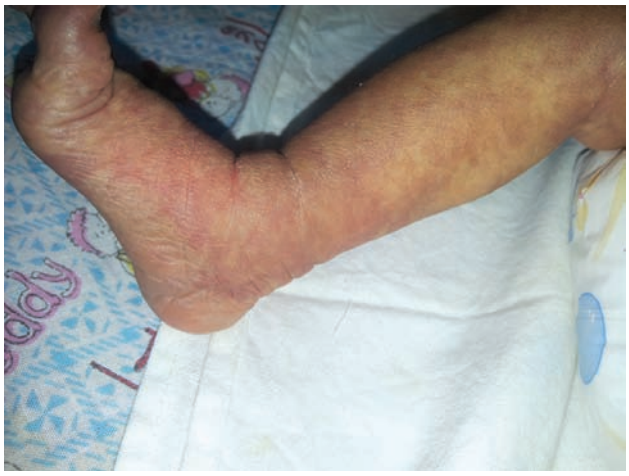

Fig. 1.27D Same baby, close-up

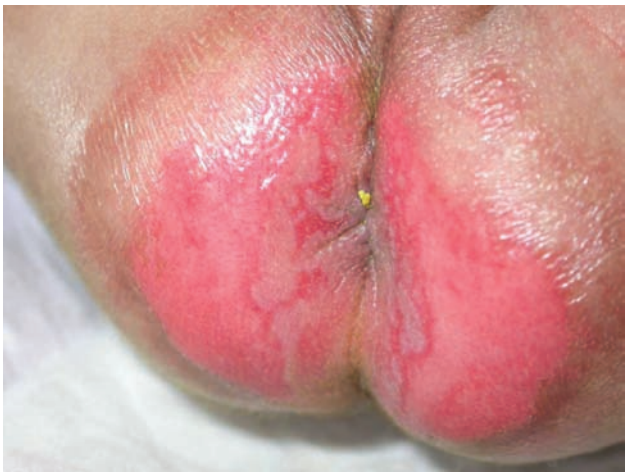

Fig. 1.28 Acute irritant dermatitis, note glazed erythema

The pigmentation presents as red marbled mottled patches. The changes may be limited to a localized part of the body. The skin changes get accentuated by decrease in ambient temperatre. Contrary to CMT or livedo reticularis, there may be atrophy or ulceration of the skin. There may be associated limb hypoplasia, hyperplasia or vascular abnormalities, e.g. port-wine stain, Sturge-Weber syndrome, etc. Various associated neurological disorders like macrocephaly, seizures, hydrocephalus and ocular abnormalities like glaucoma, retinal pigmentation and retinal detachment have been associated. A condition named Adams-Oliver syndrome is characterized by CMTC with aplasia cutis congenital and distal tranverse limb defects.

Within first 2–3 years of life CMTC gradually improves on its own. When the lesions are present over face, ophthalmologic check up is necessary. When there is neurological symptoms, referral to a neurologist is necessary.

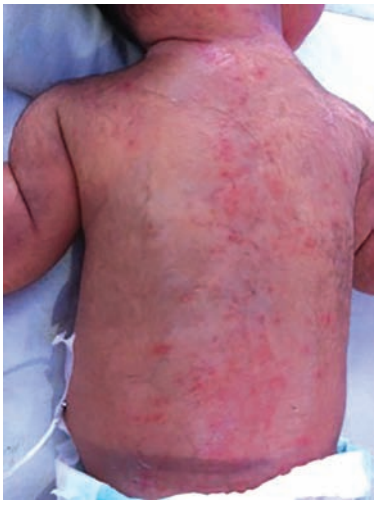

Fig 1.28A Irritant dermatitis over back

NEONATAL IRRITANT DERMATITIS (Figs 1.28 and 1.28A)

Irritant dermatitis develops within 24–48 hours of exposure to irritant chemicals. In newborn babies often various antiseptic cleansers and lotions cause dermatitis of the soft and sensitive skin.

Diagnosis

Intense erythema with formation of papules and vesicles over the areas of contact with the offending agents is seen. The newborn baby becomes restless and irritable.

Treatment

Avoidance of offending agent should be prompt. Cleaning of skin with distilled water or normal saline is to be done. Application of emollient viz., white soft paraffin 2–3 times a day for 7–10 days clears the dermatitis in most of the newborn babies. Occasionally mild topical steroids, e.g. hydrocortisone or clobetasone butyrate may be required.

HARLEQUIN COLOR CHANGES

It is usually seen in premature babies but occasionally in term babies also. Due to immaturity of hypothalamic centers that control the peripheral vasculature.

"If you want to make enemies, try to change something."—Woodrow Wilson (1856–1924)

Diagnosis

The affected newborn lying on one side of body shows reddening over the side in contact with bed and blanching over the other half of the body with clear line of demarcation. The color change comes as frequent attacks in newborns on 2nd to 6th days and may last for 20 seconds to 20 minutes.

Treatment

The condition needs to be explained to the parents and they are to be reassured.

EPSTEIN'S PEARLS AND BOHN'S NODULES

Clinically these are counterpart of facial milia. These appear as multiple discrete 2–3 mm pearly white or yellowish papules over midline of hard palate (Epstein's pearls) or gum margins (Bohn's nodules).

Diagnosis

The characteristic appearance and location clinch the diagnosis.

Treatment

It is a physiological condition in newborns and usually disappears in 4–6 weeks. This very fact needs to be explained to the parents.

SEBACEOUS GLAND HYPERPLASIA (Fig. 1.29)

It manifests as yellowish-white pinpoint papules over nosetip in 2–10 days' old newborns. It is due to maternal androgen stimulation. It usually disappears within first few days of life.

Diagnosis

From its characteristic appearance and site

Treatment

Reassurance of anxious mother

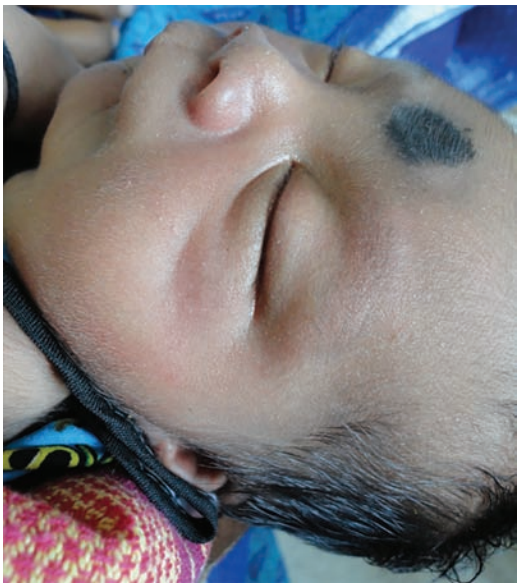

Fig. 1.29 Sebaceous hyperplasia

TRANSIENT NEONATAL PUSTULAR MELANOSIS (Figs 1.30 to 1.30B)

It is a benign self-limiting disease of unknown etiology. This rare condition is mostly seen in darker skin.

Diagnosis

Small sterile superficial vesiculopustular develop which rupture easily and evolve into hyperpigmentation. The commonly affected areas are forehead, area below chin, neck, lower back and shins. There is no systemic involvement. The condition usually disappears within 2–3 days.

Treatment

No treatment is required.

ACROPUSTULOSIS OF INFANCY

Acropustulosis of infancy is an idiopathic non-infective pustulosis affecting infants and small babies. Usually it occurs between 2 months to 3 years of age. The lesions appear as crops on a weekly or monthly basis and tends to subside by 3–4 years of age.

"I haven't failed, I've found 10,000 ways that don't work."—Ben Franklin

Fig. 1.30 Close-up of TNPM

Fig. 1.30B Transient neonatal pustular melanosis (TNPM), note hypopigmented macules suggesting healed pustules

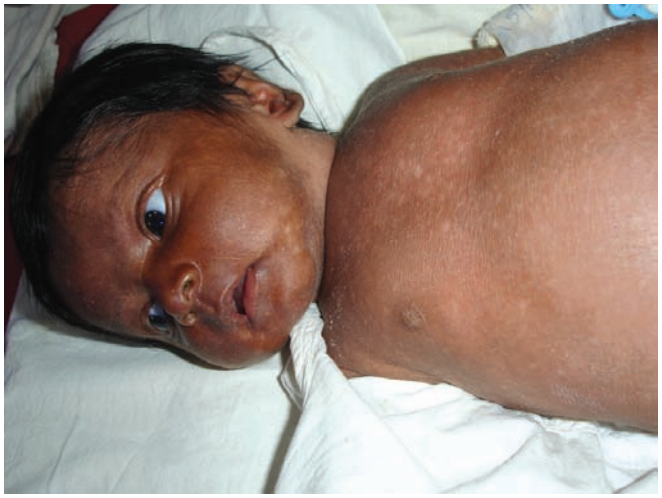

Fig. 1.30A Transient neonatal pustular melanosis

Diagnosis

The lesions typically appear as pinpoint erythematous papules which transform into pustules within 24–48 hours. Palms, soles, dorsum of hands and feet are the common sites affected. Usually it is associated with moderate to severe pruritus.

Differential Diagnosis

Various closely simulating conditions are scabies with secondary infection, impetigo, dyshidrosiform eczema, erythema toxicum nenatorum, neonatal pustular melanosis, etc.

Treatment

To control pruritus antihistamines, e.g. cetirizine, levocetirizine or hydroxyzine is required. Moderately potent topical corticosteroids like mometasone or fluticasone may be used for 2–3 weeks. In severe cases dapsone has also been used.

CONGENITAL EROSIVE AND VESICULAR DERMATOSIS

The condition presents as vesicles and ulceration in newborns, almost exclusively in premature babies. The exact cause is not known but intrauterine infection, amniotic membrane adhesion are proposed hypothesis. Essentially it is a nonhereditary condition.

Diagnosis

Extensive vesicles and erosions over extremities, trunk involving up to 75 percent of body surface during first month of life in premature babies is the usual presentation. The lesions soon get crusted and subsequently heal with rippled scars. The scars over the trunk have a cobblestone-like appearance. There may be associated scarring alopecia and ulceration over the tongue. Nails may be either absent or hypoplastic. Sweating is absent over the scarred areas and the baby may present with hyperthermia. Rarely neurological defects may be seen.

Differential Diagnosis

The condition needs to be differentiated from epidermolysis bullosa (EB). Lack of involvement of face, hands and feet, characteristic rippled scars on healing and progress of lesions characterize the condition and differentiates it from EB.

Treatment

It is symptomatic and essentially care of the wound. Reassurance of parents is extremely important.

INFANTILE GLUTEAL GRANULOMA (Figs 1.30C and D)

Also known as granuloma gluteale infantum, is basically a peculiar tumor response of newborn skin to topical potent steroids. Usually there is co-presence of candidal infection.

Diagnosis

The disease characteristically presents as multiple erythematous to violaceous papulonodules over external genitalia, inner thighs and lower abdomen in infants. Usually a preceding history of potent topical steroid application is forthcoming.

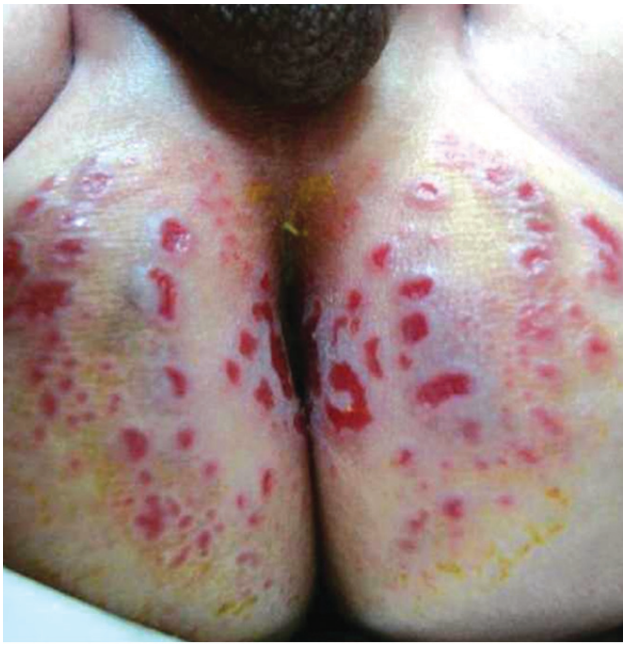

Fig. 1.30C Infantile gluteal granuloma

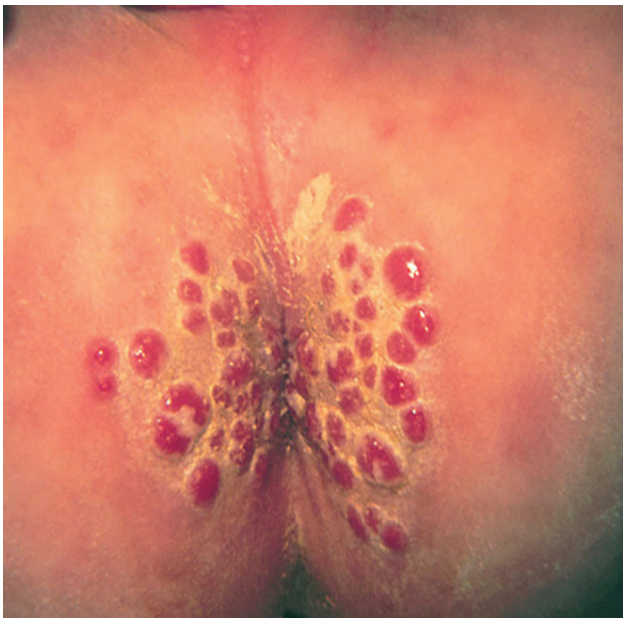

Fig. 1.30D Infantile gluteal granuloma, close-up

Treatment

Stoppage of topical steroid application is the first thing to be done. If there is any evidence of candidal infection, topical ketoconazole or clotrimazole should be prescribed. Otherwise the lesions subside very slowly without any treatment over a period of 3–13 months. Reassurance of parents and their counseling is of paramount importance.

TRICHOSTASIS SPINULOSA (Fig. 1.30E)

It is a common disorder characterized by comedon like papule which represent horny plug with 25–50 telogen vellus hair embedded within it. The basic defect is infundibular hyperkeratosis of hair follicle which prevents shedding hence retention of telogen vellus hair originating from a single hair matrix. This entity can be classified into two variants. Classically the disease represents as comedon like papules resembling black head distributed mainly over nose and forehead in elderly individuals. Other variant characterized by pruritic follicular papule resembling keratosis pilaris distributed over the trunk and extremities of young individuals or newborns. Pathological condition commonly associated with this entity is renal failure. Diagnosis can be established with the use of dermoscope and microscope. Various treatment modalities are depilation, keratolytic, topical and systemic retinoids and hydroactive adhesive pads. Pulsed diode laser shows encouraging result.

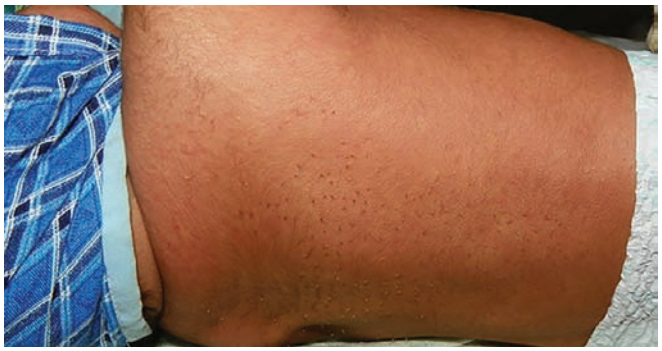

Fig. 1.30E Trichostasis spinulosa

APLASIA CUTIS CONGENITA (Figs 1.31 to 1.31C)

It is the congenital absence of skin in newborn babies, a congenital defect. Histologically there may be absence of either epidermis, dermis or subcutaneous tissue. It usually affects scalp but face, trunk or extremities can also be affected. Most of the cases of aplasia cutis congenita (ACC) are sporadic. Antithyroid drug methimazole given to a pregnant mother is likely to produce ACC in newborn babies. However, the issue is far from being conclusive.

Diagnosis

Aplasia cutis congenita (ACC) classically presents as single (occasionally two or more) sharply demarcating granulating ulcerations over scalp. The size of the lesions usually vary from 1–3 cm. Occasionally lesions may look like either a membrane or keloid.

Associations

Although most infants with ACC are otherwise well, various associated anomalies reported are cleft lip, cleft palate, hemiatrophy of limbs, ocular abnormalities, gastrointestinal malformations, spinal dysraphism, hydrocephalus, seizures, mental retardation, trisomy 13, vascular anomalies, etc.

Differential Diagnosis

Forcep injury or other types of birth injury need to be differentiated.

Treatment

By and large ACC with small defects (up to 3 cm) do not require any treatment. Proper cleaning of the area daily with betadine is required in cases of granulating lesions. Prevention of infection is very important. Most of the lesions heal with scarring by 6 weeks to 6 months, occasionally, 12 months. The scars gradually become less conspicuous over next 4–5 years. However, for bigger defects (more than 3 cm), plastic surgery is advisable.

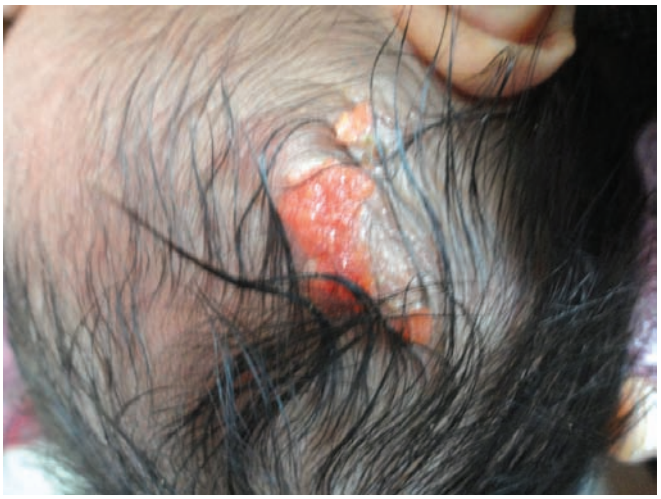

Fig. 1.31 Aplasia cutis congenita at birth

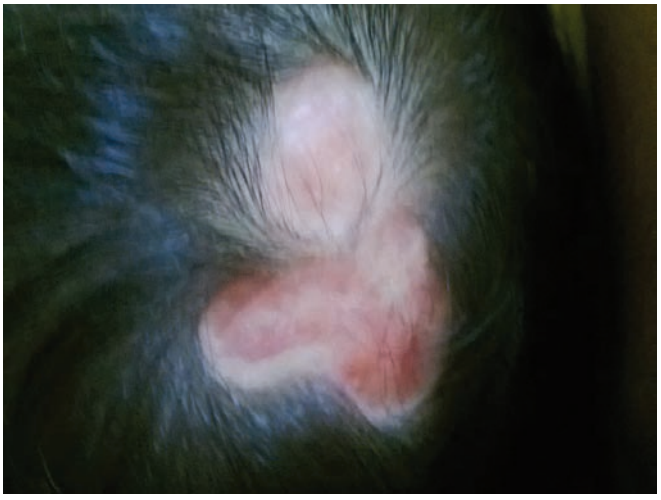

Fig. 1.31A Aplasia cutis congenita in a newborn

Venous Prominence Over Bridge of the Nose

This physiological condition is seen in 1 in 10,000 live births. A transverse superficial vein remains prominent over the bridge of the nose. This condition is usually seen in 3–9 month old babies mostly. Subsequently it disappears. Similar prominent veins over the chest of babies are seen admitted in neonatal intensive care unit (NICU) with respiratory distress.

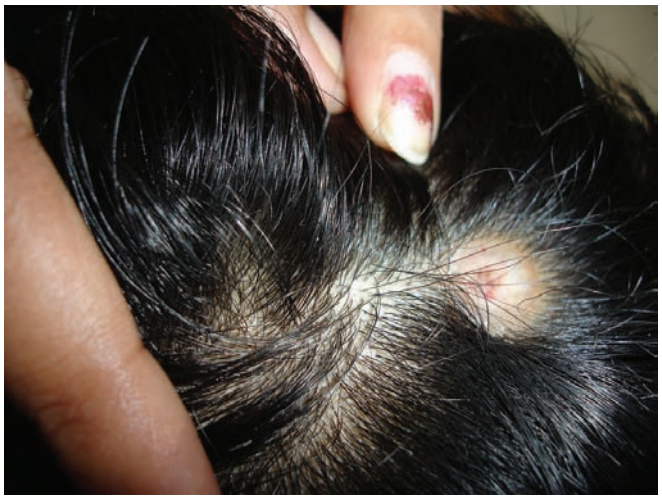

Fig. 1.31B Close-up of ACC, note prominent visible blood vessels

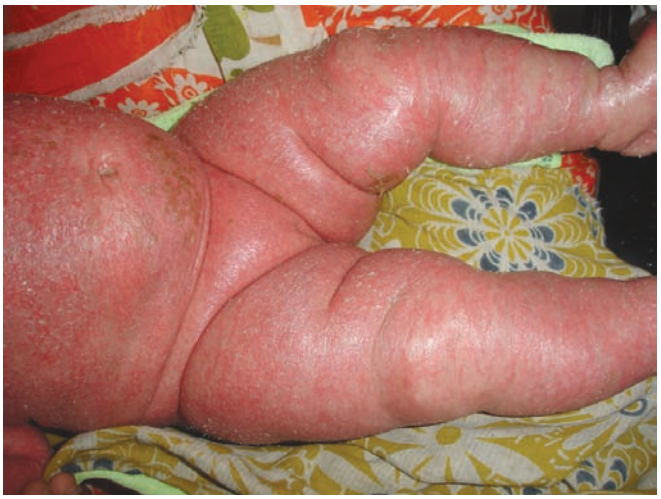

Fig. 1.32 Appearance justifies nomenclature of neonatal erythroderma as 'red baby'

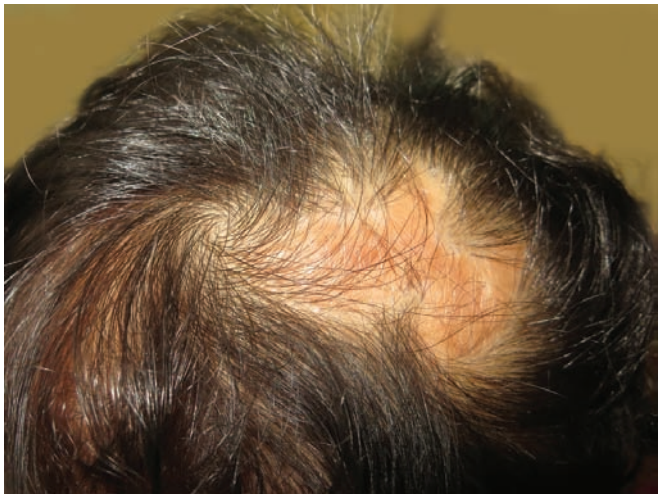

Fig. 1.31C Hairless patch of ACC over scalp

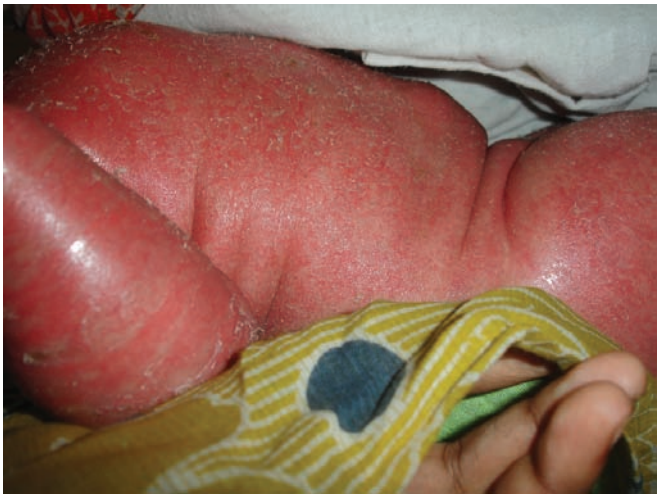

Fig. 1.32A Close-up of 'red baby'

Treatment

Explaining the condition and its benign self-limiting nature to the anxious mother is all that is necessary.

NEONATAL ERYTHRODERMA (Figs 1.32 to 1.32D)

Erythroderma a life-threatening entity during the first one month, and many a time, a manifestation of genodermatosis, immune deficiency, psoriasis, metabolic diseases, and infections. Atopic dermatitis presenting as erythroderma is usually observed later and hence not a common differential for neonatal exfoliative dermatitis. Various causes of neonatal erythroderma are:

Cutaneous Disorders

- Infantile seborrheic dermatitis
- Atopic dermatitis
- Psoriasis
- Pityriasis rubra pilaris
- Generalized mastocytosis
- *Ichthyosis:* Nonbullous ichthyosiform erythroderma, Conradi-Hünermann syndrome, bullous ichthyosiform erythroderma

"Smooth seas do not make skilful sailors."—African proverb

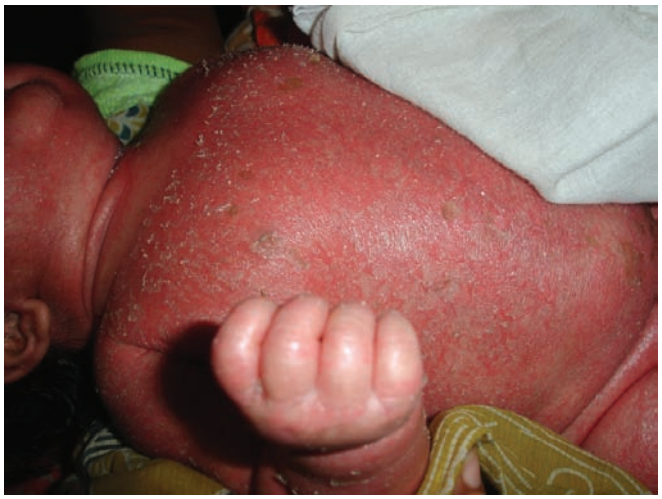

Fig. 1.32B Another view of 'red baby' close up

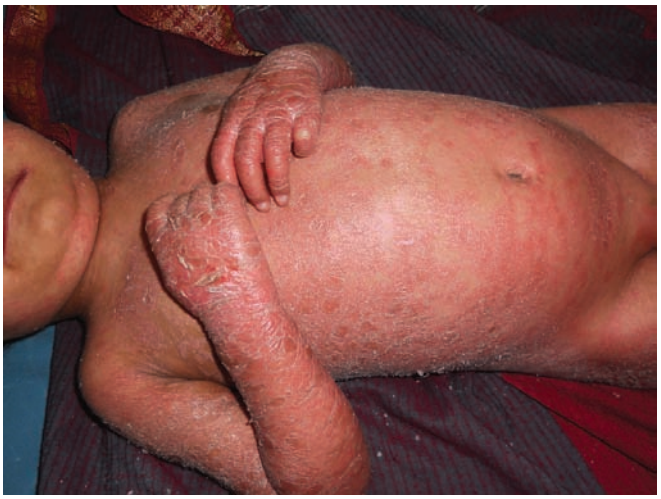

Fig. 1.32D Note scaling and glazed erythema all over body

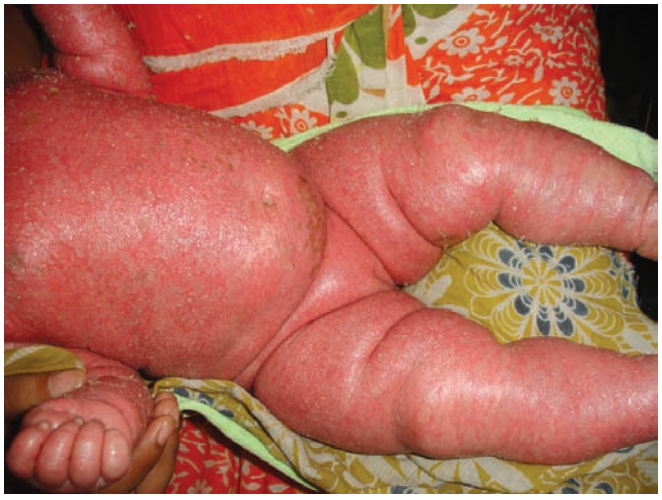

Fig. 1.32C Neonatal erythroderma

- Netherton syndrome
- Toxic epidermal necrolysis, ectodermal dysplasia.

Infections

- Staphylococcal scalded skin syndrome (SSSS)
- Toxic shock syndrome
- Candidiasis.

Immunodeficiency

- Omenn syndrome
- Graft-versus-host reaction.

Metabolic Disorders

- Disorders of biotin metabolism
- Essential fatty acid deficiency
- Acrodermatitis enteropathica
- Leiner's disease.

Drugs

- Ceftriaxone
- Vancomycin.

Diagnosis

Infantile seborrheic dermatitis(isd) which manifests in the neonatal period, usually presents with greasy scales on the scalp (cradle cap), skin folds like the axilla, neck, retroauricular, and diaper areas. Atopic dermatitis may have its onset in the first month; however, it is rarely erythrodermic in neonates. The lesions usually are vesicular and exudative in nature. Sometimes there is a significant overlapping between infantile seborrheic dermatitis and atopic dermatitis.

Neonatal psoriatic erythroderma is a rare entity and it commonly presents as recalcitrant diaper dermatitis which may become generalized with a widespread pustular form of the disease. This is accompanied by periodic high fever, and the child becomes very toxic with recurrent crops of superficial pustules appearing on erythematous plaques.

Psoriasis and pityriasis rubra pilaris may look similar with erythematous scaly plaques which may enlarge and become generalized to produce erythroderma. Heavy infiltration of the entire skin with mast cells results in diffuse cutaneous

mastocytosis. The skin undergoes lichenification and is erythematous, producing urtication and bulla formation on mild trauma. Diarrhea, flushing, and respiratory symptoms are the common accompaniments. Darier's sign, a wheal which flares on stroking the skin, is often positive. Although a life-threatening condition, it improves with age. Several varieties of ichthysoses can manifest as erythroderma. Patients of nonbullous congenital ichthyosiform erythroderma have finer scales and are more inclined to develop erythroderma. The newborns have a collodion membrane which desquamates, revealing the erythroderma. It fades in mild disease but in the severe classic form, large platelike scales with erythema persist. Harlequin ichthyosis infants with hyperkeratotic fissured plates often die due to respiratory problems; if they survive with treatment, they manifest generalized erythroderma. Epidermolytic hyperkeratosis or bullous ichthyosis have widespread denuded areas which resolve slowly, manifesting underlying erythroderma. Netherton syndrome presents with features of generalized erythroderma, fragile hair with trichorrhexis invaginata (bamboo hair), and severe rhinorrhea, asthma, anaphylaxis due to food, and so on. Erythroderma at birth is often the onset and it is a diagnostic dilemma where sparse hair with shaft defects may take several microscopic examinations, especially of eyebrows and lashes, before clinching the diagnosis. These patients are atopic and often have intercurrent infective episodes with high rates of mortality. The serum IgE levels are markedly raised and are even more than seen normally in atopic subjects.

Because of the protective effect of maternal immunity, congenital immunodeficiency syndromes are rarely symptomatic at birth. Graft-versus-host reaction from maternal engraftment can, however, occur even during intrauterine development. Omenn syndrome is a familial reticuloendotheliosis with eosinophilia having erythroderma, failure to thrive, lymphadenopathy, and recurrent infections. Marked leukocytosis, eosinophilia, anemia, and hypogammaglobulinemia are some of the findings in this histiocytic disorder. Hypogammaglobulinemia can start with diarrhea and periodic fever together with erythroderma. Dermatitis begins by four weeks of age and rapidly generalizes. DiGeorge syndrome and severe combined immunodeficiency may also present with eczematous dermatitis leading to erythroderma.

Graft-versus-host reaction may occur in T cell immunodeficiency or as a result of transplacental transfer of maternal lymphocytes as a sequela of exchange transfusion. An erythematous nonspecific morbilliform rash may lead to erythroderma and epidermal sloughing. Neonatal cutaneous T cell lymphoma can present with congenital ichthyosis with atypical Sezary-like lymphoid cells in skin and lymph nodes and other immunological abnormalities.

Metabolic and nutritional disorders are suspected when the infant has failure to thrive and the dermatitis manifests periorificially at the onset before it generalizes. Severe protein malnutrition during infancy can present with widespread erythema, edema, erosion, and desquamation of the skin. Deficiency of zinc due to malabsorption as in acrodermatitis enteropathica or low concentration of zinc in breast milk can begin with psoriasiform dermatitis in circumoral or periorificial areas which may crust and spread to involve other areas; this has also been reported in children with acquired immunodeficiency syndrome. Diarrhea, failure to thrive, irritability, and photophobia can accompany such dermatitis. Essential fatty acids, mostly found in dairy products and vegetable oils, are supplemented in the diet. Diffuse desquamation, lichenification, and intertriginous dermatitis can develop in such situations. Cystic fibrosis dermatitis presents with psoriasiform diaper rash not responsive to topical steroids or antifungals. This dermatitis may spread and is associated with growth failure and irritability. Deficiency of holocarboxylase synthetase manifests with neonatal erythroderma. The children have alopecia, secondary cutaneous candidiasis, dehydration, and ketoacidosis which can lead to a fatal outcome. Deficiency of holocarboxylase synthetase in skin fibroblasts clinches the diagnosis. Deficiency of biotinidase presents with patchy alopecia and acrodermatitis enteropathica-like skin lesions. These conditions encompass the group of 'multiple carboxylase deficiency' disorders. Penicillins, aminoglycosides, and cephalosporins often produce erythematous maculopapular skin lesions, but rarely erythroderma. Ceftriaxone and vancomycin in neonates may produce erythroderma, and vancomycin may also induce hypotension on account of histamine release.

Leiner's disease is literally a clinical phenotype of acquired erythroderma, diarrhea, and failure to thrive. Desquamative generalized erythema and dermatitis with weight loss was thought to be common in breast-fed infants due to the deficiency of biotin. Cases of generalized dermatitis in seborrheic pattern due to immunodeficiencies were also included in this category.

Treatment

Managing neonatal erythroderma is a therapeutic challenge as it is very difficult to treat this potentially life-threatening situation. Careful monitoring of the vital signs, maintenance of fluid and electrolyte balance, and prevention of hyperpyrexia are mandatory in the management. Application of emollients, wet dressings, topical steroids, and systemic antibiotics are the other modalities. Maintaining the skin barrier and proper hydration is the key to managing most of the conditions.

CARE OF THE NEWBORN SKIN

The skin is the first barrier of the newborns to counter various noxious factors/agents of the environment once the baby comes out of the safe and secured intrauterine life to the external world. Various aspects of newborn skin care will be discussed under different headings.

Need for Special Skin Care for Babies

Baby's protective but delicate cover needs to be kept in a healthy condition and it should be disturbed as little as possible. Topical agents are more rapidly absorbed into infant skin due to deficient intercellular bridges. Besides, greater body surface area to weight ratio than adults also facilitates easy absorption and toxicity of topically applied substances. Infant skin cannot withstand the toxicity of most substances as they make this delicate skin more susceptible to electrolyte imbalance, fluid imbalance and thermal instability. Infant skin is particularly very sensitive to cleansing agents as they contain stronger chemicals and may be drying. Hence the product should be guaranteed of safety for use on babies.

Skin problems pertaining to dryness are common in babies due to inadequacies in the epidermal barrier. The skin irritation potential towards topical applicants is also more. Maintaining skin integrity and preventing exposure to toxic substances in childhood assures healthy skin for several years ahead.

Care of the Newborn Skin

Skin of the newborns performs the most challenging task as it is the outermost cover of the body. Moreover, it is confronted with various factors, viz, temperature changes, friction, microbes, etc of the external world once the baby is born. As the structure and functions of the skin depend on whether a child is born at term or prematurely, skin care is related to gestational age.

At birth, microbial colonization of newborn skin is almost nil. But over a few days, aerobic flora occupies skin at different concentrations at different sites, e.g. mostly over groins, axillae and scalp. Coagulase negative staphylococci (*Staphylococcus epidermidis*) are the most commonly found microorganisms. *Staphylococcus aureus* appears only as contamination, usually from mother or nursing staffs.

Skin Care at Birth

Removal of Vernix Caseosa

At birth the baby's skin is coated with vernix caseosa, blood, meconium and cellular debris. Vernix caseosa contains both epidermal (triglycerides and cholesterol) and sebaceous (squalene and waxes) fat. Premature infants tend to have less of vernix than term babies and postmature babies have little vernix. There is considerable interindividual variation in the quality of vernix caseosa.

Washing and Bathing

A bath is an ideal means of cleaning an infant completely. A bath in infant should not last for more than five minutes. The bath for more than 5 minutes increases the hydration of skin and, thereby, reduces the threshold for friction. Infants can be bathed immediately after birth irrespective of the falling of the umbilical cord stub. But usually the first bath is not given till 3rd/4th weeks of life. If there is history of premature rupture of membrane and the baby is meconium-stained, immediately the baby should get the bath. The water should be boiled and the temperature should not be exceeding 37°C for bathing newborns. A solid or liquid cleanser or a syndet can be used to clean baby skin. Bubble bath can also be given but not for too long or too frequently as can it can cause irritation. After bath, infants must be dried thoroughly, particularly over skin creases, groins and axillae.

Napkin Changes

Napkin should be changed frequently, at least at each nursing and feeding time. It should be carefully washed in lukewarm water and then rinsed off and dried thoroughly.

The diaper area is specifically vulnerable because it is a closed environment suitable for microorganisms and with frequent wetting, it is more often moist and dry; hence the skin becomes prone to maceration and increases its permeability to other irritants.

The skin here is constantly in contact with strong alkalinizing agents, e.g. urine and feces and the pH here is prone to high alkalinity that damages the skin integrity. It is, thus, very important to be well-aware of the need to change nappies and the range of products that are available to prevent any rash or irritation in the nappy area.

Nappy rash can be reasonably prevented by reducing moisture by the frequent changing of nappies. This would reduce contact between urine, feces and the skin. However, this does not seem feasible at most instances. In such cases, using partially occlusive agent like mineral oil on the buttocks can help to form a physiological barrier that minimizes this interface. As far as possible, air exposure should be increased by allowing the child to move around the house bare-bottomed. Plastic pants should be avoided as they reduce the air circulation to the skin. Warm water and soft cotton wool should be used to wipe the nappy area. Feces have a tendency to stick and scrubbing only worsens the status of the delicate skin. Here, the use of an emulsion like baby lotion can ease

the removal by reducing the surface tension and cleaning the debris. Skin should then be thoroughly dried each time the diaper is changed by exposing it for a few minutes. The bottom should be wiped from front to back to avoid fecal matter from reaching the genitals. After each wash, powder should be applied in the skin folds to prevent friction due to wetting as well as to avoid candidal colonization due to excess moisture in the area. Soaps should be mild and should be used very rarely if a rash has developed.

In general, the nappies should be made of cotton cloth and should be home laundered with mild detergents. Disposable diapers should be avoided as far as possible. However, some newer diapers allow the moisture to stay away from the baby's bottom. They keep the skin relatively dry and reduce the risk of developing the rash. Nappy pads with cotton padding are more suited.

Scalp

Shampoo helps to remove scales and crust from the scalp (cradle cap). If the first sign of seborrheic dermatitis appears, application of mineral or vegetable oil limits the spread of lesions.

Nails

Nail should be regularly cut and kept short and clean.

Ears

Cotton swabs soaked in boiled water should be used to clean ears. Special care should be taken not to hurt auditory canals.

Umbilicus

After birth umbilical cord dries out and drops off within five to ten days. Certain products containing eosin or others stains are often used. However, they act more as drying agents rather than as antiseptics.

Skin Care in the Premature Infants

After birth, skin maturation proceeds rapidly in preterm infants. These infants are kept warm and nursed in closed incubators. Environmental conditions in these units are potentially harmful for infant skin, which is subject to scarring. Cosmetically or functionally, significant lesions may be caused by needle marks, central venous catheters, transcutaneous oxygen monitoring, chest drain insertion, extravasation of intravenous fluid or skin stripping due to adhesive tape. To reduce the frequency and severity of skin damage, neonatal staffs need to know that many routine procedures can lead to long-term scarring and atrophy. Heaters should be kept at a safe distance, otherwise skin burn can occur in NICU set up (Fig. 1.33).

Fig. 1.33 Antiseptic burn of skin in a neonate

Preventive Measures

Disinfection

The most common infective agents causing septicemia are coagulase-negative staphylococci in relation to catheter placement. For prevention, maintain hygiene by hand washing of the staff and parents. Cleaning with chlorhexidine-alcohol and povidone-iodine, two consecutive 10 seconds cleaning destroys more than a single 10 seconds wipe.

Incubator

Frequent change of infants' position in the incubator reduces the risk of skin erosion and impending bedsore. Fingers and toes must be kept visible. Catheters or needles should be secured with a transparent tape to allow easy detection of fluid extravasation. Scarring alopecia can develop following pressure ulcer. The occurrence of nonblanchable erythema and disruption of epidermis indicate impending ulcer. The occurrence of scarring alopecia has been reported in infants from pressure necrosis.

Transcutaneous Oxygen Monitors

Transcutaneous oxygen monitors should not be left in place for more than one hour without surveillance. Nonblanchable

erythema has been reported with keeping such electrodes for prolonged period. The use of karaya electrodes has been demonstrated to be effective in cardiorespiratory monitoring with decreased trauma to the neonatal skin. Placement of electrodes on the limbs, especially in very low birth weight infants, can eliminate the need to frequently remove these pads to facilitate auscultation or other assessment of the chest wall.

Minimal Use of Tape and Adhesive

The skin of the premature infants may be damaged by repeated attachment and removal of adhesive tapes to secure electrodes, IV cannulas, drains, etc. Adhesives should be used on small areas of skin and removed gently with warm water soaked gauze and diluted soap, but not alcohol, which may be irritant for baby's skin.

Emollients

Application of emollient is a safe and effective way to decrease neonatal peeling and scaling dermatitis. Vegetable oil (e.g., olive oil), lanolin, petroleum-based ointments applied gently to the skin, reduce scaling and fissuring as well as increase skin hydration.

Skin Care of the Term Baby and Infant

The large number of infant skin-care products available over the counter is at times confusing for the average consumers. These have been the gifts of media and so-called health magazines for the lay people with all rosy advertisements. By and large the principle followed by a doctor should be to advice the parents to go for a product marketed by a multinational company or a company of good repute and stature or a product, which has been in the market for a considerable period of time and thus has stood "the test of time". Several types of products are used; viz. soaps, shampoos, antiseptics, moisturizers, etc.

Detergents

The term 'detergent' designates a substance capable of cleaning the skin, i.e. of removing impurities (dust, grease organic secretions, microorganisms). Washing with water alone does not remove all the impurities on the skin surface. Some are only fat soluble, thus requiring the use of products capable of emulsifying the fatty substance into fine droplets, which can then, be carried away by rinsing. These products are known as surfactants, act by suppressing the surface tension, which allows fatty substances to remain on the skin surface. Detergents act by reducing the surface tension between water and air, creating a foaming effect not directly correlated with the cleaning properties of the product. As a rule, a higher foaming power increases the risk of damage to the skin. Detergents are classified as ionic or nonionic products. In infants detergents should be used cautiously, followed by a thorough rinsing. Too much removal of lipids from the stratum corneum would eliminate those essential to the surface ecosystem.

Soaps are the products of saponification, i.e. the action of alkali on a fatty substance. In hard water, soaps tend to precipitate.

Syndets or synthetic detergents do not have the theoretical disadvantages of soap but are subject to rapid disintegration. They can produce excessive dryness of skin, if moisturizers are not added to it. Antiseptic soaps are useful in preparation of an operative field, but are unsuitable for daily use in infants as they can cause irritation to infants' skin. Moreover, antiseptic soaps remove the commensal organisms from the skin surface, thereby, making the skin prone to attack by virulent pathogenic organisms from outside.

Bubble bath products attract the infants and their parents because of its colorings and perfumes and, thereby, mask the risk of prolonging a bath and irritating the genital mucosa.

Most baby shampoos in the market contain anionic surfactant which ensure adequate cleansing. The pH should be close to that of tears and, thereby, won't cause irritation to the eyes. Special ingredients, e.g. selenium sulfide, ketoconazole or zinc pyrithione may be added to the shampoos for seborrheic dermatitis or seborrhea scalp. The basic principles of use of various antiseptics and emollients in term babies and infants are essentially the same as in preterm babies.

Protective Creams

These are basically prepared to reduce the risk of irritation, particularly napkin rash, by isolating skin from numerous irritants for baby's skin. The creams contain a fatty phase, an aqueous phase, a surfactant, additives (zinc oxide), scents and preservatives. These creams can paradoxically cause increased occlusion and irritant dermatitis to its ingredients.

Powders

These are useful to absorb moisture during hot and humid weather. They can prevent maceration over the skin folds in infants. However, too much of their use can lead to blockade of sweat-duct pores resulting in miliaria formation.

Role of Massage

The act of touch fulfils the basic need to feel safe, comfortable and loved. Touch is also an intrinsic factor in child development. Touch is proposed to play a role in growth, development and overall well-being. Massage is one of the most beautiful and gentle methods of touch. It is practiced in most countries and has recently been researched extensively in western countries. Indian form of infant massage is appreciated all over the world. It has been seen that massage with oil is more beneficial as compared to massage without oil. It is important to note that the oil used in such a situation ought to be smooth, of optimum viscosity and friction free or else it would lead to abrasions on the skin surface. The oil should be nonocclusive so that it does not block the skin pores and allows the skin to breathe. It ought to be safe and mild to suit the baby's delicate skin and the ingredients should be thoroughly tested for their potential to cause contact sensitivity. Mineral oil is one of the best-known moisturizing ingredients ever found. It spreads easily and has a long lasting tactile effect, making it an extremely efficacious emollient. Omission of low molecular weight hydrocarbons alleviates risks of carcinogenicity while the large particle size renders it incapable of blocking pores making it noncomedogenic.

Massage should be started after one month and can easily continue till ten years and over. Benefits of massage are numerous. Appropriate knowledge of correct massage techniques is important in order to attain maximum therapeutic benefits from it. Complete head to toe massage should be a daily routine. But massage should be gentle and judicious. However, massage should be withheld for a few days in case either the baby has got any contagious infection of skin or the person offering massage has any infection over hands. Massage given by the mother increases the bondage between the mother and her baby. It helps in the physiological and psychological development of the babies.

"One loyal friend is worth ten thousand relatives."—Euripides, Greek playwright

2

Vascular, Melanocytic and Other Nevi

SALMON PATCH (Figs 2.1 and 2.1A)

Salmon patches are extremely common anomalies which have been observed in the neonatal period in 20–60% of children of all races. They take the form of irregular, dull, pinkish-red, macular areas often with fine linear telangiectasia. The neck followed by the face is the common site.

Natural History

Most of these lesions fade rapidly and disappear within a year. However, nuchal lesions may persist upto adult life. It should be noted that slight erythematous color may persist or reappear over subsided salmon patches during episodes of crying, coughing, physical exertion, etc. Nuchal lesions, although, tend to persist upto adult life in some cases do not pose cosmetic problem as they are usually covered by scalp hairs.

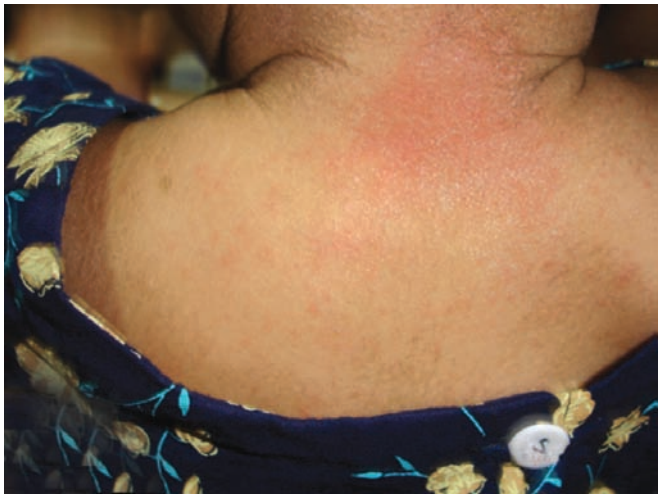

Fig. 2.1 Salmon patch over nape of the neck in a 2-year-old girl

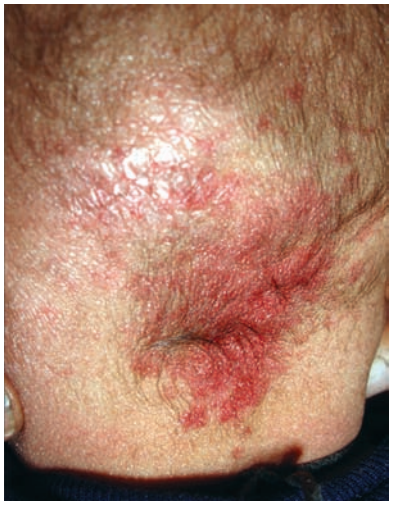

Fig. 2.1A Salmon patch in a newborn

Management

Maintenance of the serial photographs of the lesions, discussions with the parents of the children and their counseling form the essential aspects of management.

HEMANGIOMA (Figs 2.2 to 2.6J)

Infantile hemangiomas are benign developmental vascular tumors that appear during the first few months of life and which characteristically have an initial proliferative and a later involutional phase. They have a high incidence in premature infants. Infantile hemangiomas become apparent during the 1st month of life in about 90% of cases and virtually 100% by the ninth month. Approximately 65% of infantile

"Opportunities multiply as they are seized."—Sun Tzu

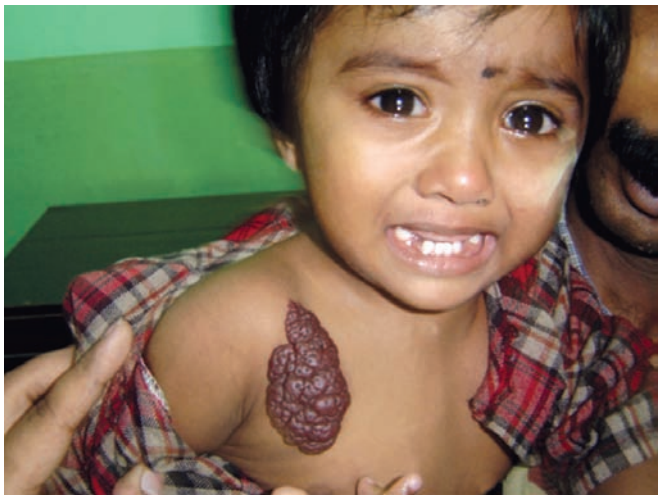

Fig. 2.2 Strawberry angioma over front of the chest in 3-year-old girl

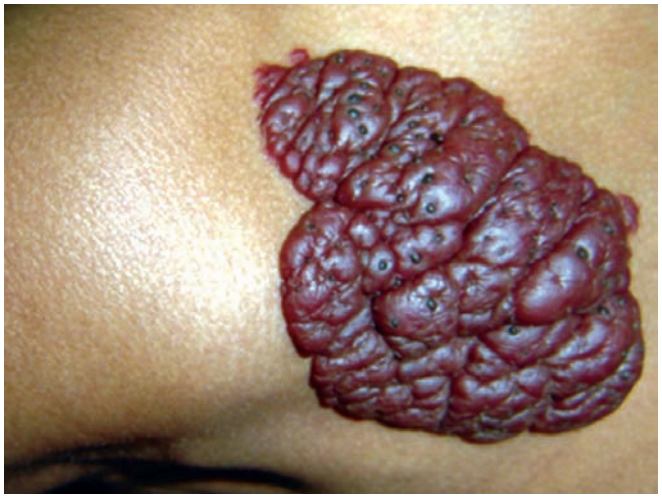

Fig. 2.3 Close-up of the lesion, note black comedones on the surface

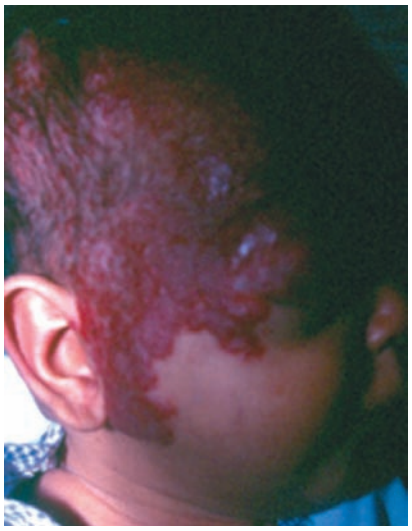

Fig. 2.4 Hemangioma over face

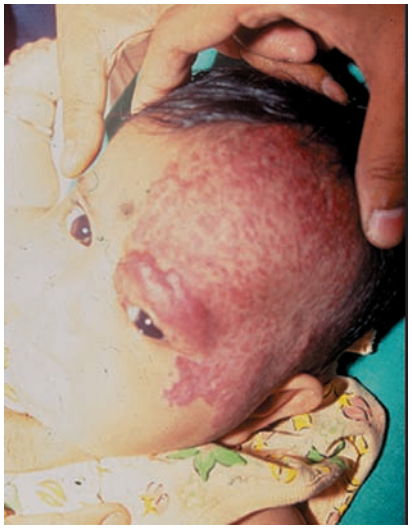

Fig. 2.5 Resolving hemangioma with oral corticosteroid

hemangiomas are superficial, 15% deep and 20% mixed. The superficial infantile hemangioma is most commonly known as a strawberry nevus or strawberry hemangioma on account of its clinical appearance in the form of a sharply circumscribed oval or round, soft, domed swelling of intense scarlet-red color. The most common site is the head and neck region followed by the trunk. In 80% of cases a single lesion is present. The ultimate size is reached within 3–6 months of their first appearance, the final diameter varying from 1–25 cm. Occasionally infants are born with multiple small infantile hemangiomas of the 'strawberry' type or develop these within the first few weeks of life, which vary in size between 2 mm and 2 cm. Strawberry hemangiomas usually combine superficial and a deep component.

Natural History

Virtually 100% of infantile hemangiomas undergo spontaneous regression which is complete or almost complete in about 95% of cases by 8–10 years of age. Most cases require no therapy because of the tendency of the hemangiomas to regress completely or almost completely. One must remember that the final result in untreated lesions are far superior to that obtained from any kind of therapeutic intervention.

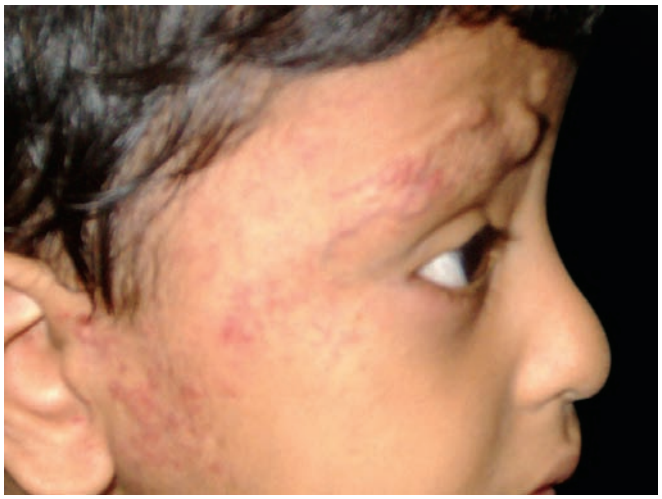

Fig. 2.6 The same boy at 5 years, note residual erythema and atrophy of skin at the healed site

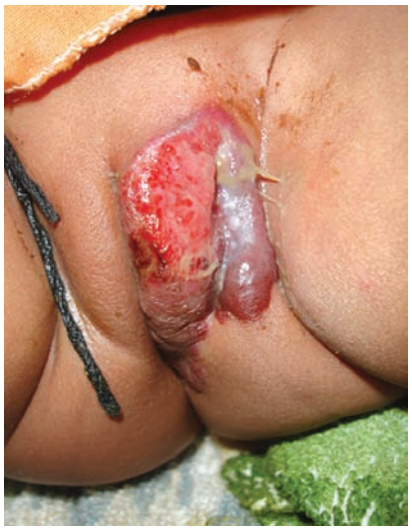

Fig. 2.6B Close-up of the lesion

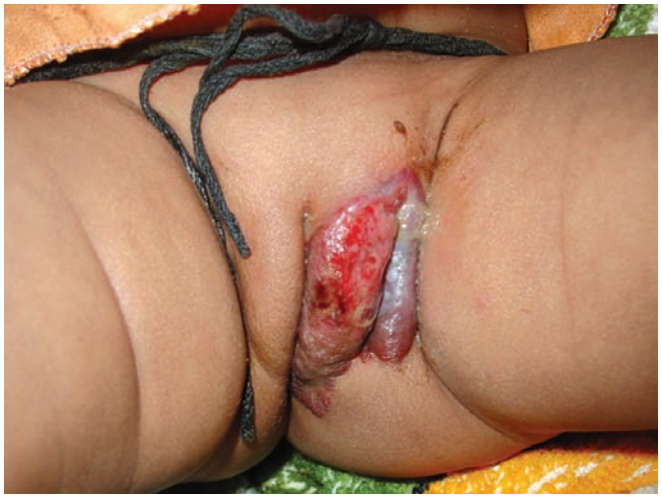

Fig. 2.6A Ulcerated hemangioma in a newborn

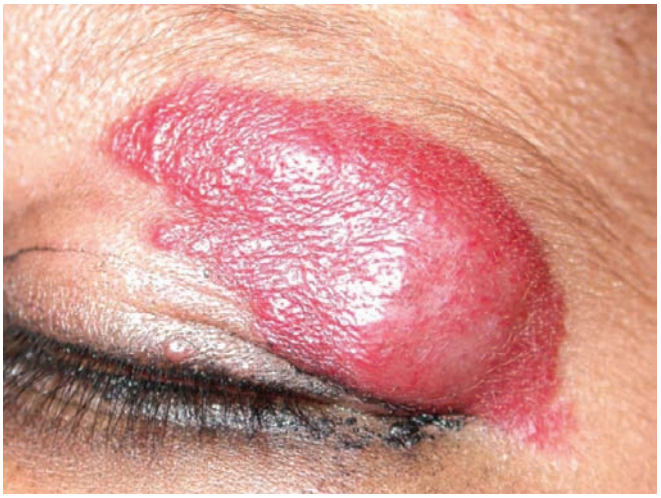

Fig. 2.6C Hemangioma over eyelid in a newborn

Management

Intervention is indicated for lesions which are rapidly growing, compromising function of vital structures viz, eye, nares, auditory canals, pharynx, larynx, large cavernous hemagima with associated thrombocytopenia and consumption coagulopathy, lesions susceptible to trauma, hemorrhage, ulceration and infection.

Oral prednisolone or injection triamcinolone acetonide may hasten the process of involution in cases intervention is necessary. Oral prednisolone is given at a dose of 2–4 mg/kg/day for 4 weeks followed by on alternate days for 4–6 weeks. Triamcinolone acetonide intralesional injection is given at a dose of 1–3 mg/kg, 2–3 injections at 2–3 weeks intervals.

Various other therapeutic modalities are light applications of dry ice or liquid nitrogen, tunable pulse dye laser therapy or Grenz ray therapy. Even compression with a pressure dressing and frequent massage often help resolution of hemangiomas.

"The art of politics consists in knowing precisely when it is necessary to hit an opponent slightly below the belt."—Konrad Adenauer

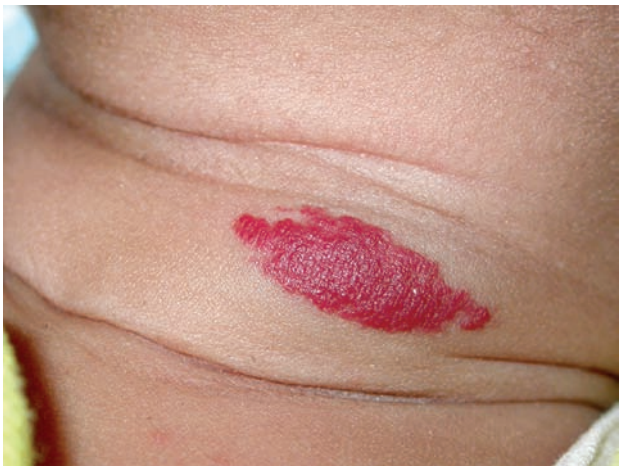

Fig. 2.6D Small hemangioma over neck

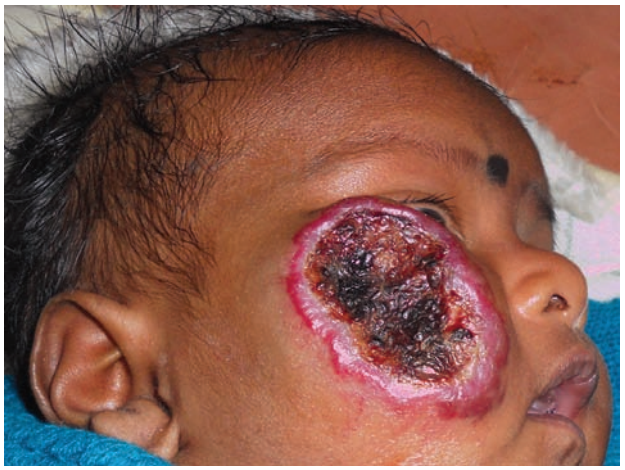

Fig. 2.6G Ulcerated hemangioma

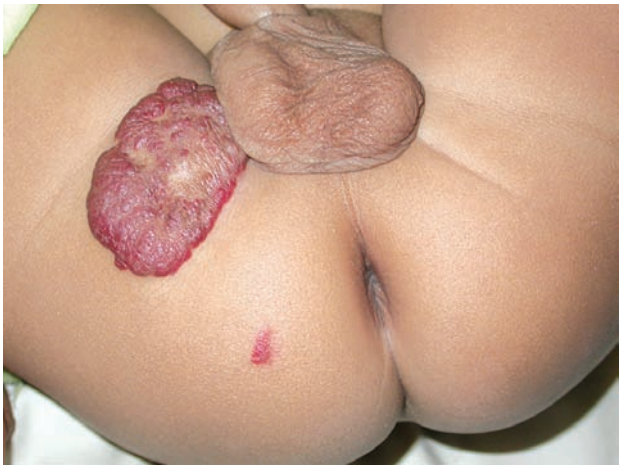

Fig. 2.6E Perianal hemangioma is susceptible to ulceration and infection

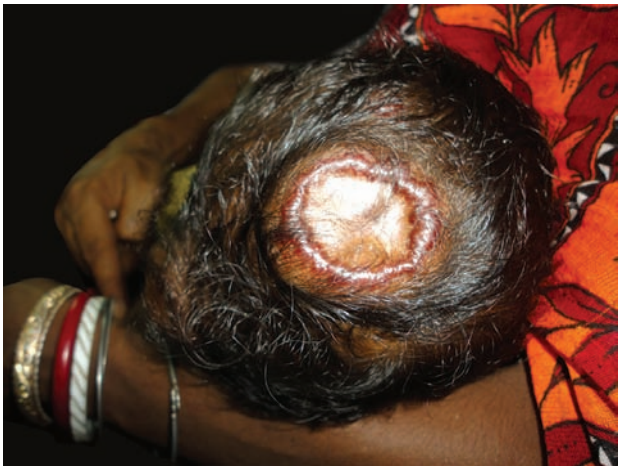

Fig. 2.6H Ulcerated hemangioma over scalp

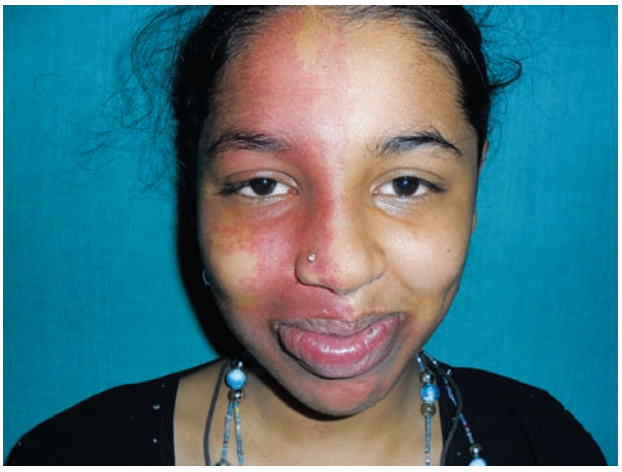

Fig. 2.6F Port wine stain

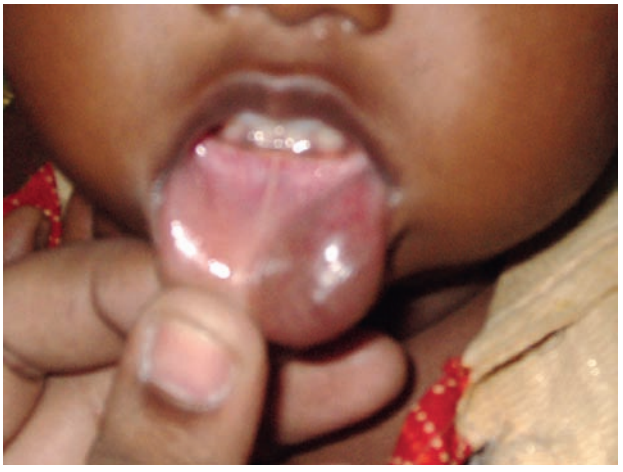

Fig. 2.6I Hemangioma of lip

"Friendship is love without his wings!"—Lord Byron

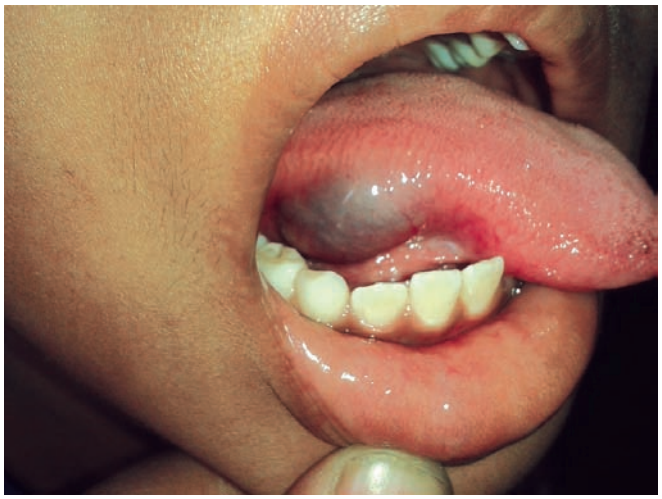

Fig. 2.6J Hemangioma of tongue

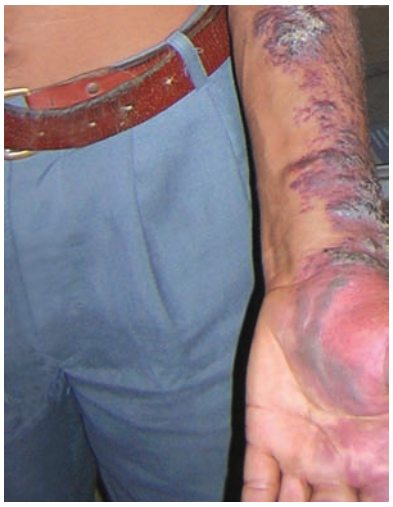

Fig. 2.8 Same 18-year-old boy, close-up

KLIPPEL–TRENAUNAY SYNDROME AND PARKES WEBER SYNDROME (Figs 2.7 to 2.9A)

Klippel–Trenaunay syndrome/disease (KTD) is triad of vascular malformation, venous varicosity and hyperplasia of soft tissue and bone. All these three malformations are usually distributed on the same extremity. When there is arteriovenous malformations, it is called Parkes-Weber syndrome. Parkes-Weber syndrome may have associated lymphatic malformations also in the form of lymphedema, lymphangiectasia, lymphangioma circumscriptum, etc.

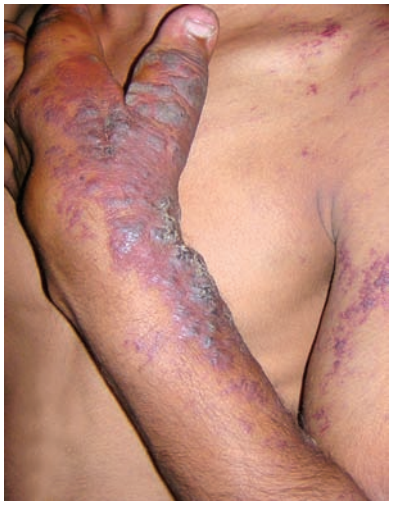

Fig. 2.7 Klippel–Trenaunay syndrome, note hypertrophy of forearm and hand

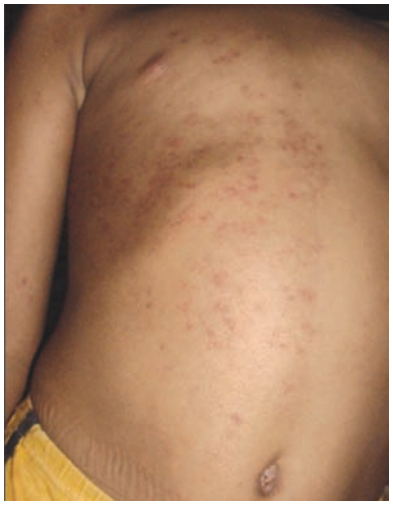

Fig. 2.9 Hemangiomatous malformation affecting the right half of the trunk

Complications

Recurrent thrombophlebitis, coagulopathy, congestive heart failure, pulmonary embolism, stasis dermatitis, cutaneous ulceration, bleeding. Various other complications are kyphoscoliosis, dislocation of hips, facial asymmetry, dental malocclusion.

Treatment

It is basically supportive. Compression bandages, laser therapy cutaneous vascular malformations. Orthopedic and surgical

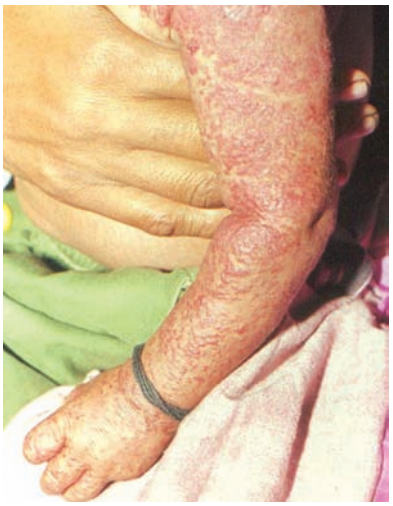

Fig. 2.9A Klippel–Trenaunay syndrome

interventions are required often. When there is a limb discrepancy, i.e. one limb is more than 2 cm after skeletal maturity, is the indication of surgical correction.

PHACES SYNDROME (FIG. 2.9B)

PHACES syndrome is an uncommon association with infantile hemangioma. It is a constellation of features that include central nervous system abnormalities (posterior fossa malformations), hemangioma, arterial anomalies, cardiac abnormalities (coarctation of aorta), eye abnormalities and sternal defect. 90% of the affected children are females. PHACES syndrome is commonly seen with large facial hemangiomas. Central nervous system abnormalities in PHACES syndrome include dandy-walker malformation, cerebellar hypoplasia and dysplasia. Seizures and developmental delay has been associated. Coarctation of aorta involves transverse aorta. Most common eye abnormalities seen are 'morning glory anomaly', increased vascularity, microphthalmia, congenital cataract and optic nerve hypoplasia. A child presenting with extensive facial hemangioma should be thoroughly examined and investigated for PHACES syndrome. Echocardiogram, MRI of brain and periodic ophthalmological and neurological assessment should be considered. Regular follow up of the child will prevent morbidities.

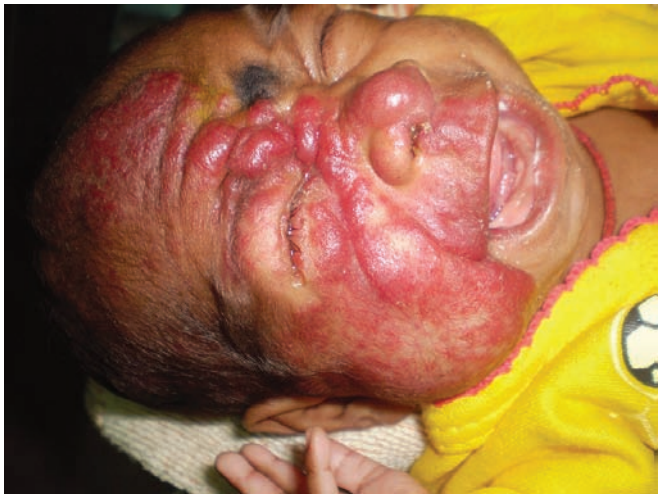

Fig. 2.9B PHACES syndrome

STURGE–WEBER SYNDROME (Figs 2.9C)

Sturge-Weber syndrome (SWS) clinically presents as triad of port wine stains over ophthalmic division of trigeminal (Vth) nerve, leptomeningeal hemangiomatosis manifesting as convulsion and ocular involvement manifesting as glaucoma.

Seizures often are common features of SWS and may start below 1-year of age. Port wine stain (PWS) almost always affects ophthalmic division of Vth nerve. However, with V1, V2 and V3 involvement the risk of SWS is more. Other features are headache, emotional behavioral problems. Leptomeningeal involvement is very common. Cerebral atrophy and intracranial calcification are usually picked by MRI.

Seizure is basically controlled with pharmacologic therapy. In intractable cases, hemispherectomy may be required.

ANGIOKERATOMA CIRCUMSCRIPTUM (Figs 2.10 and 2.11)

This condition is rare and characteristically takes the form of a fairly extensive hyperkeratotic vascular plaque usually present at birth. They are situated unilaterally on a lower leg or foot but can also occur on the thigh, buttock or elsewhere.

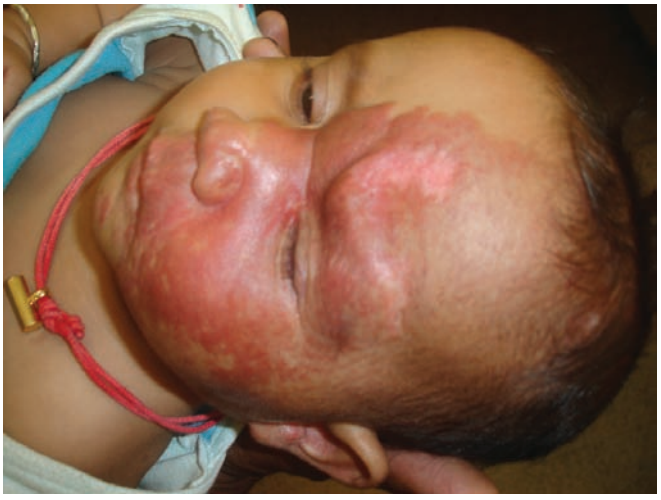

Fig. 2.9C Nevus Flammeus or port wine stain in Sturge-Weber syndrome

"I worship the quicksand he walks in."—Art Buchwald

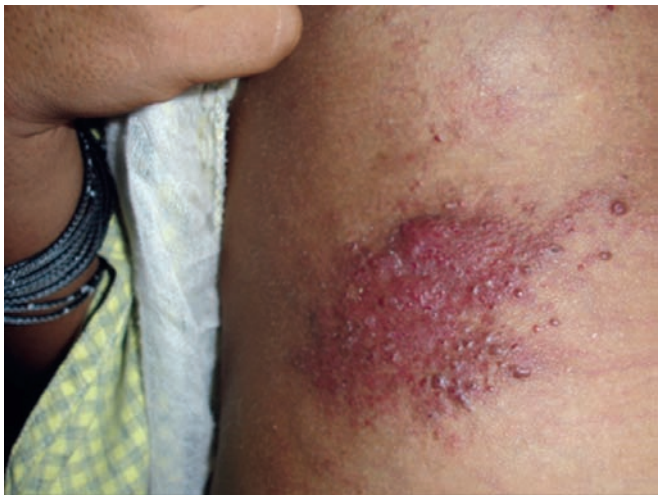

Fig. 2.10 Angiokeratoma lesions over the trunk, note clustering of lesions

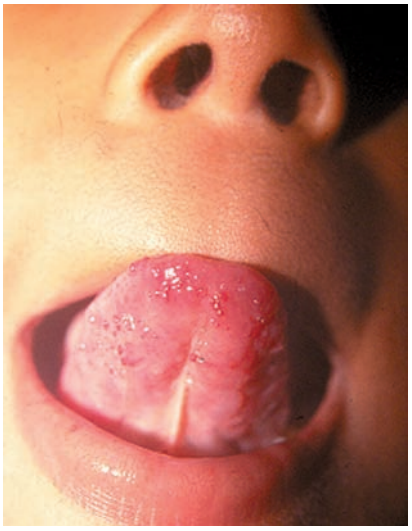

Fig. 2.11 Angiokeratoma circumscriptum over tongue (a rare presentation)

They are deep red to blue-black in color and tend to take on a streaky banded or zosteriform appearance. The lesions become increasingly studded with warty, keratotic papules or nodules and may bleed easily on trauma. Clinically these lesions may be confused with verrucous hemangiomas and lymphangioma circumscriptum.

Natural History

Angiokeratoma circumscriptum does not show a tendency to spontaneous resolution.

Treatment

For small lesions excision, electrodesiccation or pulsed dye laser are the therapeutic options. For large lesions, extensive excision surgery has to be done. Lesions over lips, tongue and oral mucosa may be treated with either electrodesiccation or laser.

PYOGENIC GRANULOMA (Figs 2.11A to B)

It is a common acquired vascular lesion which present as a small papule or papulonodular, sometimes with a peduncle. Usually it presents with single lesion. However, on rare occasions there may be multiple lesions. The lesions mostly develop following minor trauma. The common sites are fingers, hands, feet, toes and lips.

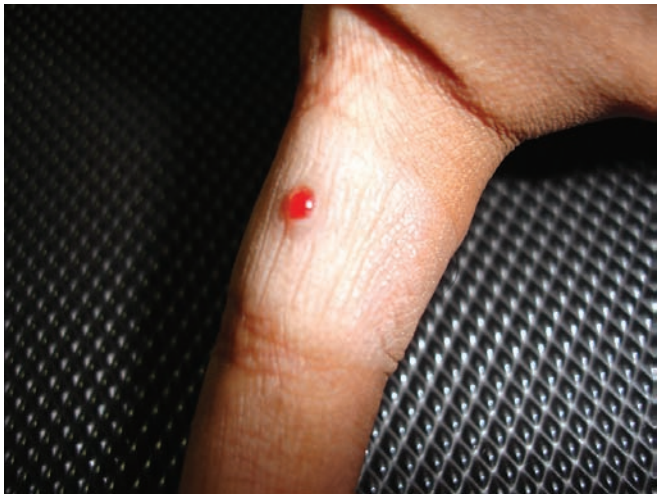

Fig. 2.11A Granuloma pyogenicum

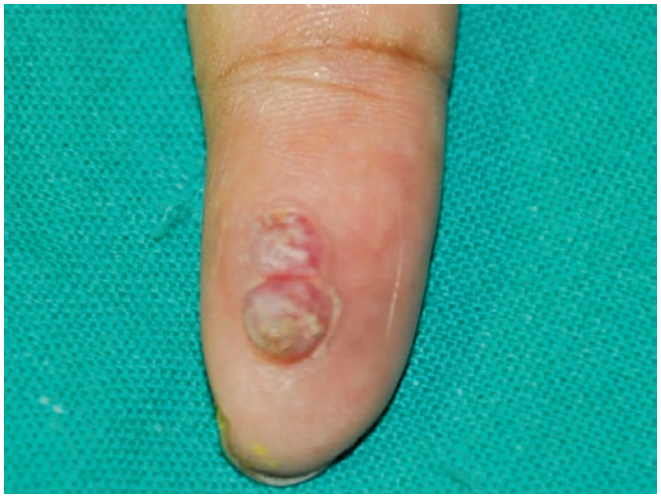

Fig. 2.11A(i) Granuloma pyogenicum over finger

"Deepdown, I am pretty superficial."—Ava Gardner

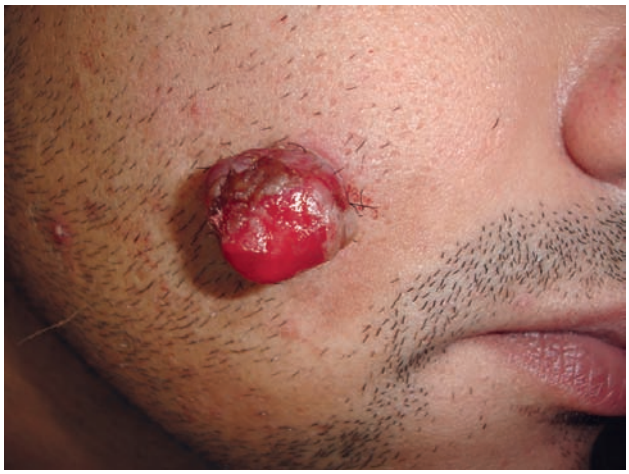

Fig. 2.11B Close-up of GP

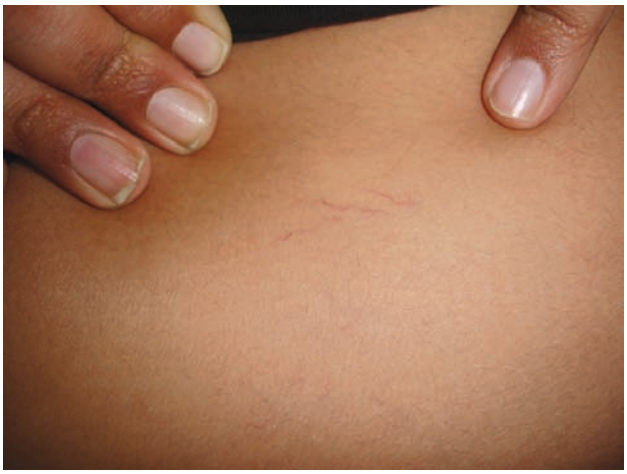

Fig. 2.11C Telangiectasia

Treatment

The lesions get nicely destroyed by electrodesiccation. However, pulse dye laser or carbondioxide laser may also be effective.

Glomus Tumor

It is a benign growth or hamartoma of 'glomus body'. Glomus body is the temperature regulating arterio-venous shunt (AV shunt). The 'glomus cells' which proliferate in this disorder are modified smooth muscle cells.

'Glomus tumor' presents as solitary or multiple bluish papules or nodules and look like venous prominences. Glomus tumor may be painful.

DIFFERENTIAL DIAGNOSES

- Leiomyoma
- Blue nevus
- Melanoma.

Treatment

Surgical excision is the main treatment for solitary glomus tumor. For multiple lesions, sclerotherapy, carbon dioxide laser are effective. Subungual glomus tumor is treated surgically.

TELANGIECTASIA (Figs 2.11C and D)

These are permanent dilatation of capillaries, venules or arterioles. On pressure with a glass slide the telangiectases blanch completely. This is called positive 'diascopy' test.

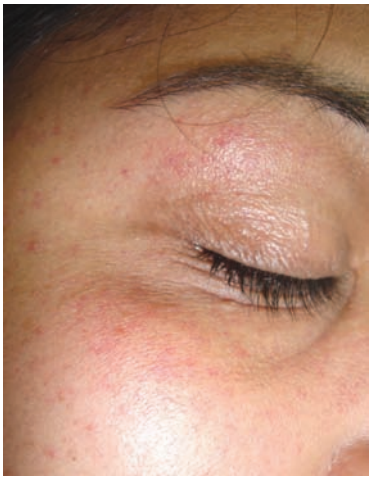

Fig. 2.11D Telangiectasia over face in an adolescent girl

The cause of telangiectases may be either primary defect or secondary to prolonged sun exposure, collagen vascular disorder diseases, chronic liver disease, etc.

GENERALIZED ESSENTIAL TELANGIECTASIA (Fig. 2.11E)

It is a disorder of multiple cutaneous telangiectases without a bleeding diathesis. The condition is usually widespread, progresses and permanent and girls are more commonly affected than boys. The lower limbs are usually affected. Involvement of oral mucosa and conjunctiva is very uncommon. The etiology is unknown. The treatment of this condition is usually not required. However, pulsed dye or Nd:YAG laser treatment may be helpful.

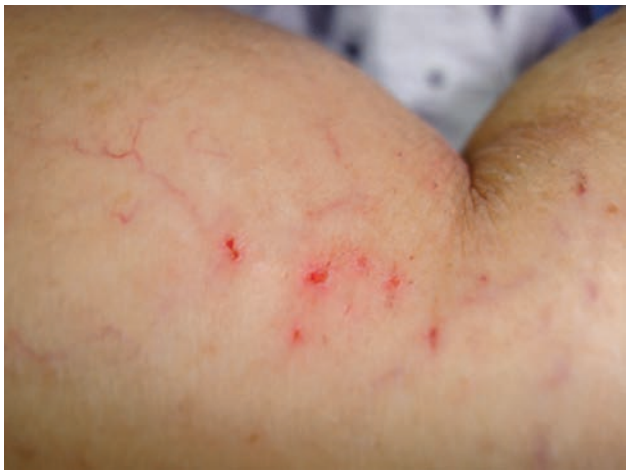

Fig. 2.11E Benign essential telangiectasia

Fig. 2.11G Close-up of conjunctival telangiectasia

ATAXIA TELANGIECTASIA (Figs 2.11F and G)

Ataxia telangiectasia, a syndrome of telangiectasias, progressive cerebellar ataxia, recurrent respiratory infections is transmitted as an autosomal recessive trait. The affected children are apparently normal until the second year of life when they are noticed to be clumsy and the ataxia becomes progressive so that by the age of 12 they are unable to walk without assistance. Nystagmus, slurred speech and mental deterioration may be observed. Telangiectasias usually develop between the ages of 3 and 5 years. They first appear on the bulbar conjunctiva and gradually involve the ear, eyelids, butterfly area of the cheeks and limbs. There may be some atrophy, dryness of skin and premature gray hair. Disturbances of pigmentation and eczematous lesions may also occur.

PIGMENTED PURPURIC DERMATOSES (Figs 2.11H to K)

This is a type of capillaritis and comprise a group of diseases which present as petechie, purpura and brownish hyperpigmentation around ankles and legs. These conditions, although occur mostly in adults, may affect children also. Rarely it may affect infants.

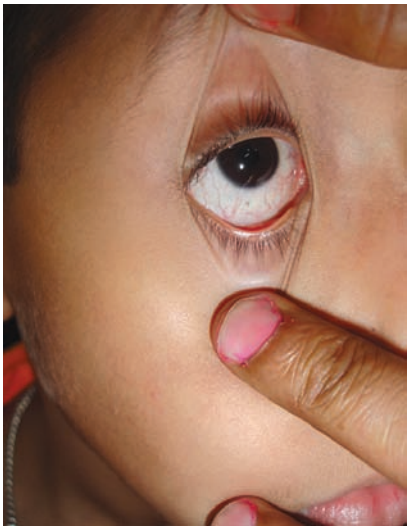

Fig. 2.11F Telangiectatic conjunctiva in a girl with ataxia telangiectasia

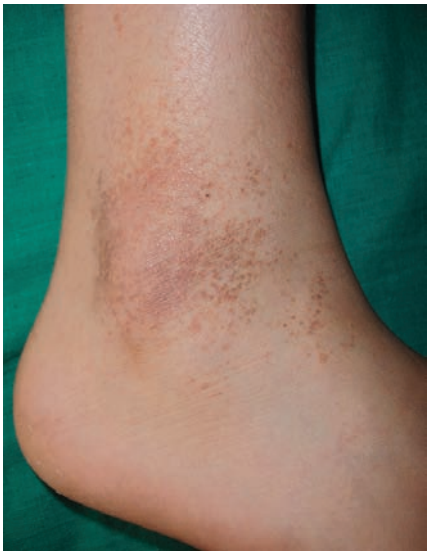

Fig. 2.11H Pigmented purpuric eruptions around ankle

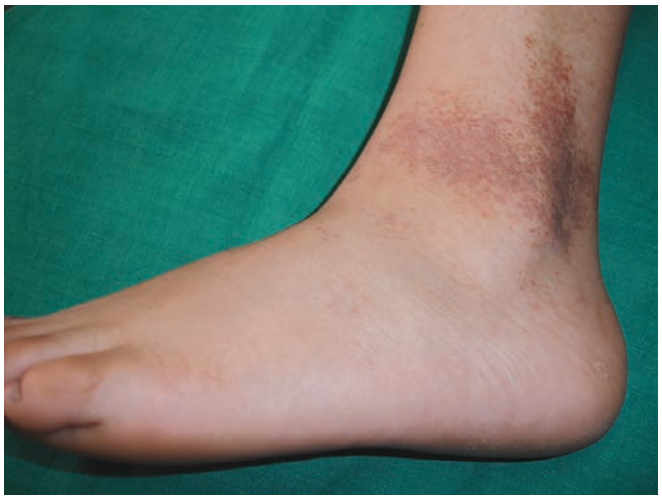

Fig. 2.11I Pigmented purpuric eruptions around ankle

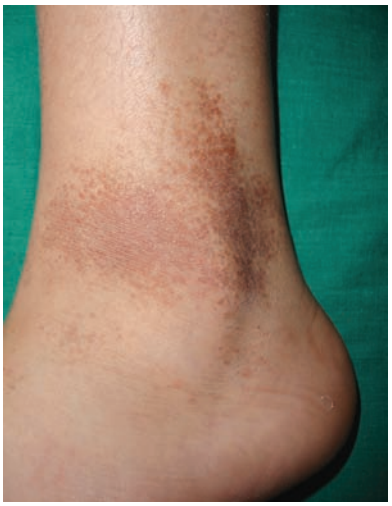

Fig. 2.11K Pigmented purpuric eruptions, close-up

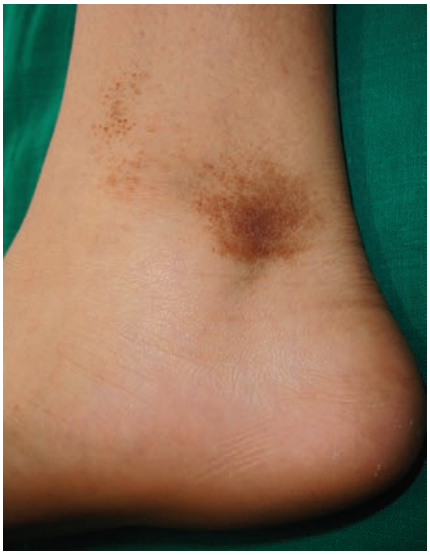

Fig. 2.11J Pigmented purpuric eruptions, note golden color and hemorrhagic appearance

Schamberg's disease is the prototype for pigmented purpuric dermatoses (PPD) in which there are red brown punctuate macules and many of them coalesce to form red-brown patches. There is no symptoms like itching, pain or burning sensation. Various other types are Majocchi disease or annular pigmented purpura, lichen aureus where lichenoid golden brown lesions are seen, eczematoid PPD or Dukas and Kapedonicus and lichenoid lesions of Gourgot and Blum.

Various treatment options are topical steroid, short course of oral steroid for rapidly spreading lesions. Oral pentoxyphylline can be given to children alone above 12 years of age.

PURPURA FULMINANS (Figs 2.11L and M)

It is an acute condition and characterized by development of hemorrhagic necrosis of skin with intravascular coagulation. It is more common in infants and children than adults and usually follow meningococcal infections, scarlet fever, varicella or pneumococcal infection.

The condition is related to the deficiency or absence of protein C or protein S, which are vitamin K dependent glycoproteins with antithrombotic properties.

The condition presents as ecchymosis particularly often with sharp irregular borders. The lesions are mostly located over legs and spread rapidly over thigh, buttocks and trunk. The condition is usually associated with high fever, prostration and features of toxicities.

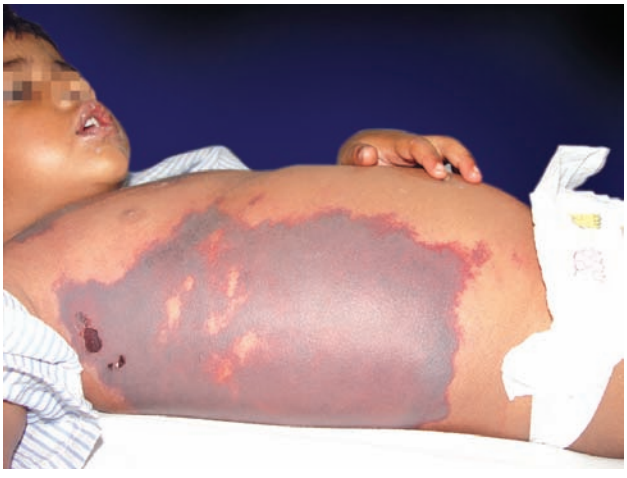

Fig. 2.11L Purpura fulminans

:We come to love not by finding a perfect person, but by learning to see an imperfect person perfectly."—Sam Keen, from To Love and Be Loved

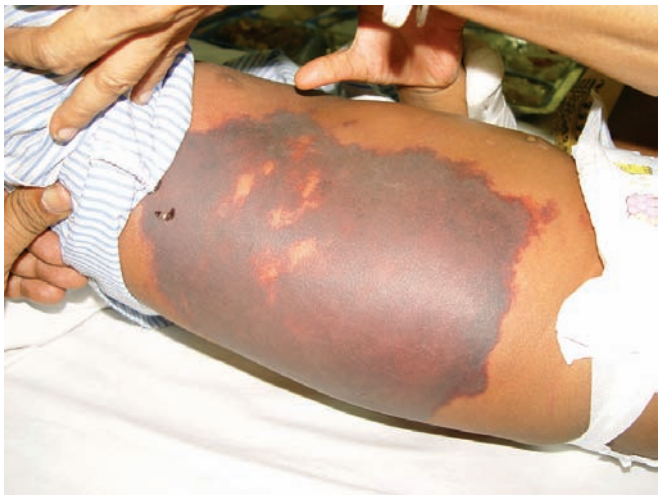

Fig. 2.11M Close-up, note jagged border of lesions

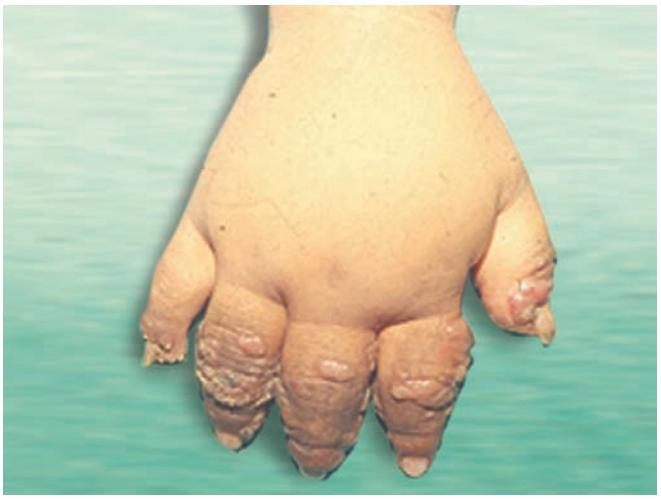

Fig. 2.12 Involvement of multiple fingers with gross swelling of hand

Laboratory investigations show thrombocytopenia and decreased fibrinogen. The prothrombin time and partial thromboplastin time are prolonged and fibrin degradation products are increased. Protein C, Protein S and Thrombin III levels are decreased.

The management of purpura fulminans is basically two folds. First is the resuscitation of the patient by ventilator support. If there is evidence of infections, proper antibiotics are to be given.

LYMPHANGIOMA CIRCUMSCRIPTUM (Figs 2.12 to 2.14A)

The term describes a lymphatic malformation which is localized to an area of skin, subcutaneous tissue and sometimes muscle. The lesions are usually noted at birth or appear during childhood. The common sites being axillary folds, shoulders, flanks, proximal parts of limbs and perineum. They present as fluid filled vesicles which bulge on the skin surface. The vesicles may be well defined and discrete or grouped into structures resembling 'frog spawn'. The lymphangiomas may be translucent when the over lying epidermis is very thin or they may vary in color from red to blue-black when containing blood. The presence of limb swelling suggests extensive underlying lymphatic abnormality. There may be associated hemangiomatous component in a good number of cases (Lymphangiohemangioma). In such cases the lesions may suddenly increase in size because of sudden bleeding into lymphatic spaces.

Treatment

Electrosurgery or cryosurgery are of little help in cases of lymphangioma circumscriptum.

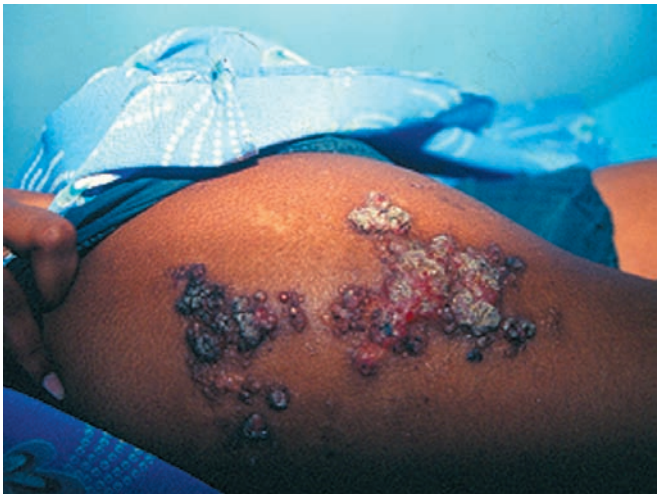

Fig. 2.13 Lymphangioma circumscriptum over buttock, note hemorrhagic lesions

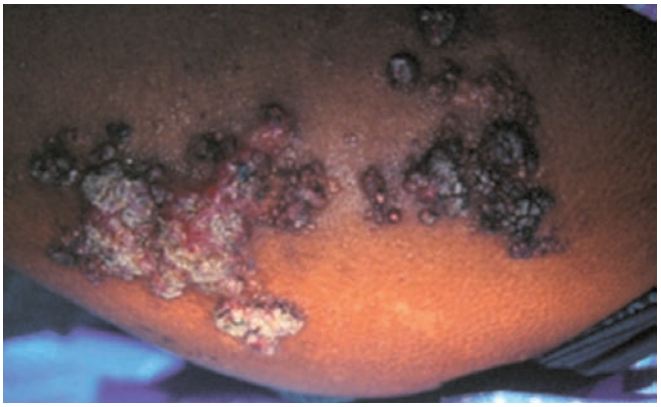

Fig. 2.14 Same patient (close-up)

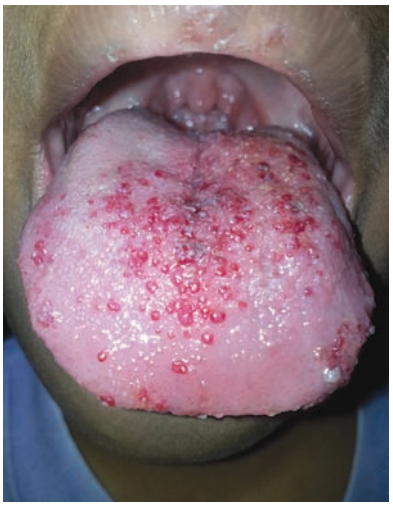

Fig. 2.14A Lymphangiohemangioma over tongue

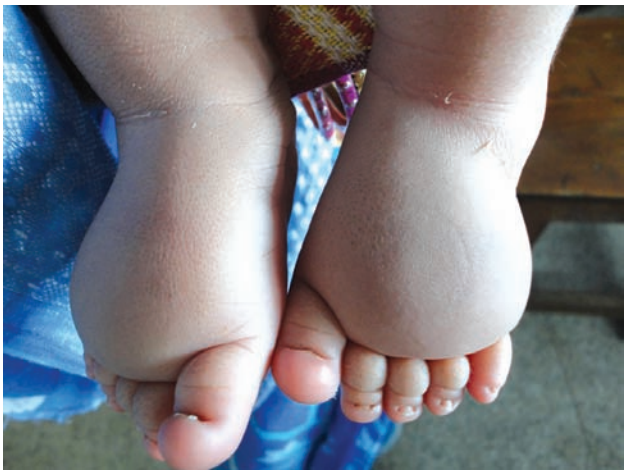

Fig. 2.14B Congenital lymphedema

If surgery is required, a deep resection down to the facial plane with extensive, excision repair has to be done. Since lymphatic channels are innumerable and highly ramifying, recurrences are not uncommon.

LYMPHEDEMA (Fig. 2.14B)

Lymphedema is characterized by soft tissue swelling due to accumulation of excess amount of protein rich lymph due to output failure. In chronic cases edema becomes nonpitting. Lymphedema can be classified as below:

Primary Lymphedema (Intrinsic Defects in Lymphatic Channels)

- Congenital lymphedema (Milroy's disease)
- Lymphedema praecox
- Lymphedema tarda.

Syndromes associated with primary lymphedema: Turner syndrome, Noonan syndrome, Yellow nail syndrome, Proteus syndrome, Emberger syndrome, Distichiasis-lymphedema syndrome.

Cutaneous disorders associated with primary lymphedema: Hemangiomas, congenital absence of nail, Xanthomatosis with chylous lymphedema.

Secondary Lymphedema

- *Iatrogenic:* Radiotherapy, radical lymph node dissection, postmastectomy.
- *Infection:* Recurrent bacterial cellulitis/lymphangitis, filariasis, lymphogranuloma venereum.
- *Inflammatory:* Rosaceous, sarcoidosis, rheumatoid arthritis, lymphedema of upper limb due to recurrent eczema.
- *Malignancy:* Hodgkin lymphoma, Kaposi sarcoma.
- *Vascular:* Post phlebitis syndrome, venous ulcer.
- *Factitial:* Repeated application of tourniquet to the wrist (Secretan's syndrome).
- *Others:* Bullous lymphedema due to congestive cardiac failure, podoconiosis, persistent hand edema of drivers.

Milroy's disease is characterized by unilateral/bilateral lymphedema of lower leg, predominantly affecting females and present since birth. Mode of inheritance is autosomal dominant with underlying inactivation of VEGFR-3, responsible for lymphangiogenesis. Genitalia, face and arm can be involved.

Lymphedema praecox: It is the most common form of primary lymphedema predominantly affecting females and presents before 35 years of age. Underlying defect may be hypoplasia, aplasia or hyperplasia with varicose dilatation of lymphatic systems. Swelling starts from ankle and gradually moves upward to involve entire leg with a dull pain.

Lymphedema tarda: It accounts for less than 10% of cases and presents after 35 years of age.

The usual chief complaint of the patient suffering from lymphedema is heaviness and fatigue of the affected limb with gradual worsening of edema particularly towards evening which reduces on limb elevation. In chronic cases edema becomes indurated and nonpitting. Squaring of the toe and difficulty in pinching the skin over second toe (Stemmer's sign) may be the presenting feature.

Alarming complications are recurrent cellulitis or lymphangitis. Ulceration, postmastectomy lymphangiosarcoma (Stewart-Treves syndrome), elephantiasis verrucosa nostra cutis (thickening, hyperkeratosis and pseudo papillary growth of overlying skin).

The investigation for confirmation of lymphedema is isotope lymphoscintigraphy. Many other investigations can be performed with their individual merits; duplex ultrasound rule out venous pathology where CT scan exclude any obstructing mass.

Permanent cure is impossible. Different modalities of treatment are used to offer the patient an acceptable quality of life starting from skin surface massage to improve lymphatic flow, limb elevation, graded compression stockings, pneumatic compression therapy, use to diuretics, antibiotic therapy to deal with episodes of cellulitis/lymphangitis and long-term prophylaxis with ivermectin or diethylcarbamazine. Surgical therapy may aggravate the condition by obliterating lymphatic channels.

NEVUS OF OTA AND ITO (Figs 2.15 and 2.16B)

Nevus of Ota presents as an extensive, blue, patch like area of dermal melanocytic pigmentation of the sclera and the skin adjacent to the eye. It is more common in Asian people. The pigmentation is often speckled and is composed of deeper bluish and more superficial brownish elements which do not always coincide. This is best appreciated in the eye where the affected sclera is blue and the conjunctiva brown. The areas involved are the eyelids, the bulbar and palpebral conjunctiva, the sclera, cheeks, forehead, scalp, alae nasi and ears. The pigmented spots usually appear in childhood and increase in number and extent to become confluent in some areas. The nevus of Ito involves the acromioclavicular region and the upper chest and like Ota's, is largely confined to the Asian population.

Management

The disorder is generally benign although it does not disappear spontaneously. Cosmetic camouflage can disguise the blemish. Recently Q-switched ruby laser or Argan laser has shown good results.

MELANOCYTIC NEVUS (Figs 2.17 to 2.20F)

Melanocytic nevi are only rarely present at birth. Most nevi appear in adolescence or early childhood. However, congenital nevi are found in about 1–2% of newborn infants. Congenital nevi are usually larger than acquired nevi, measuring more than 1.5 cm in diameter. Giant congenital melanocytic nevus or bathing trunk nevus is present at birth. The common site is the lower back and thigh area and a very large proportion of the infants surface area may be involved.

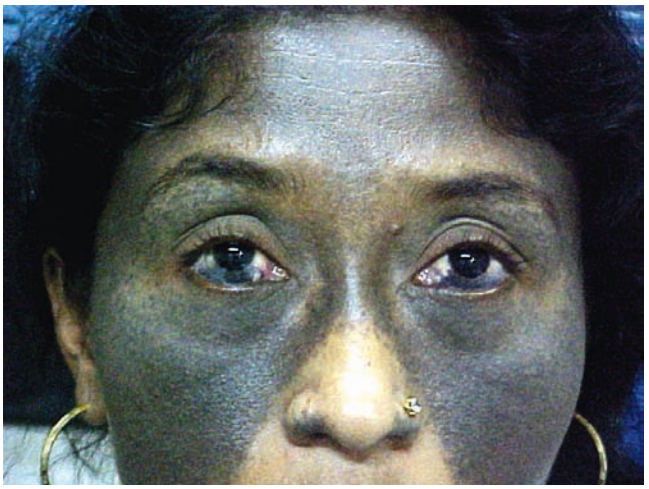

Fig. 2.15 Bilateral nevus of Ota in an adolescent girl

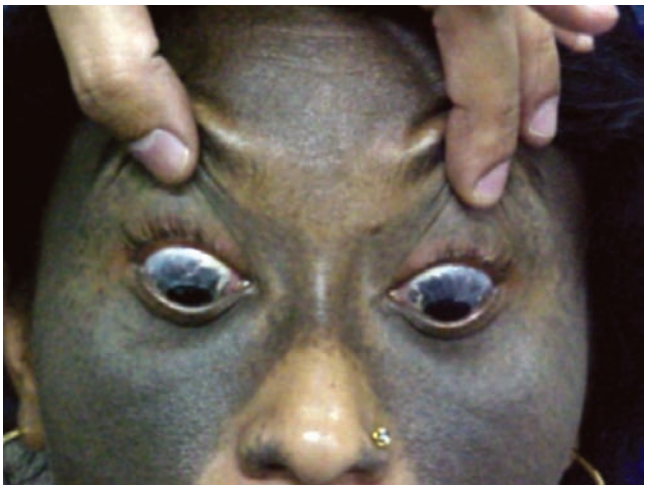

Fig. 2.16 Close-up showing scleral pigmentation

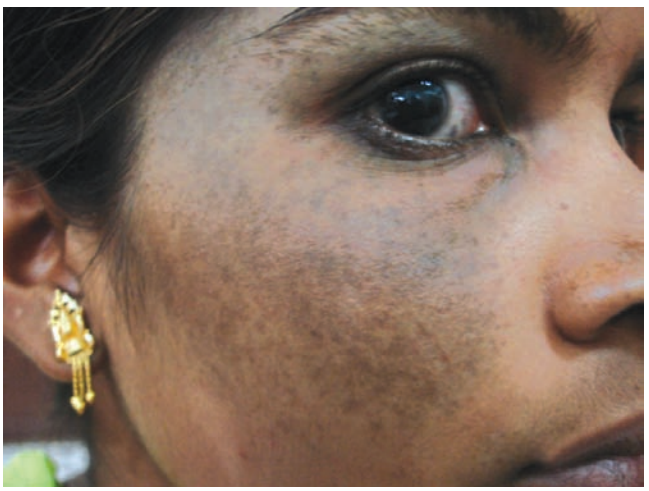

Fig. 2.16A Nevus of Ota

"Opinions have vested interests just as men have."—Samuel Butler

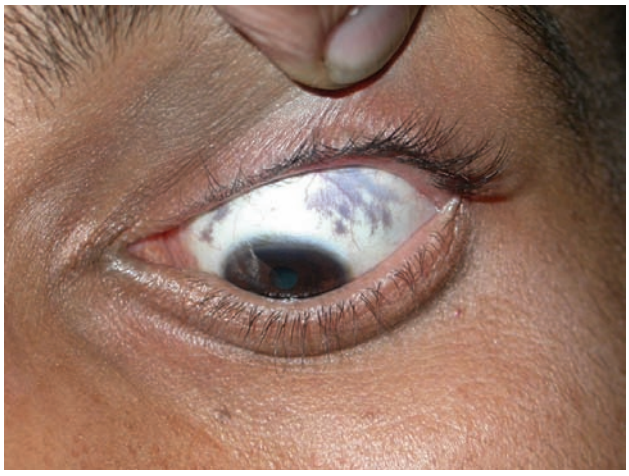

Fig. 2.16B Nevus of Ota, note scleral pigmentation

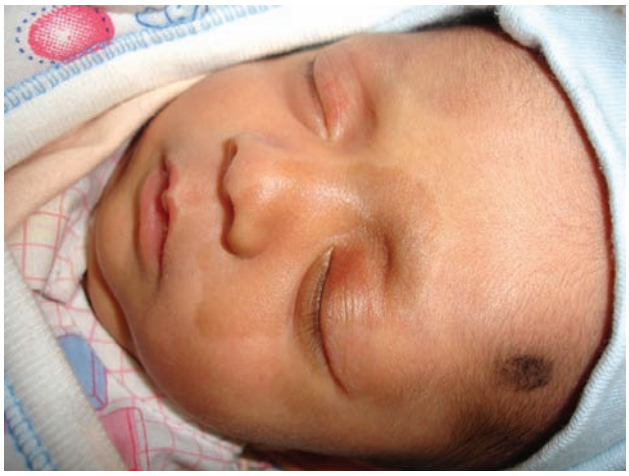

Fig. 2.17 Congenital melanocytic nevus at birth

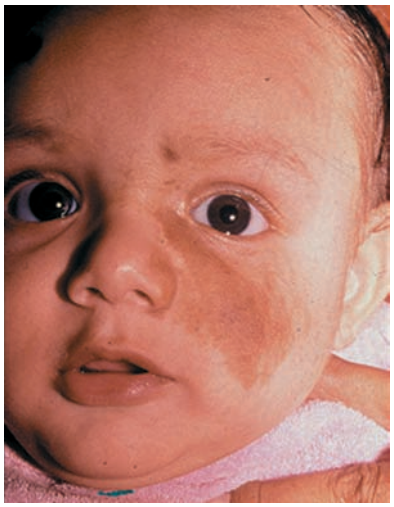

Fig. 2.17A Same baby at 1-year of age

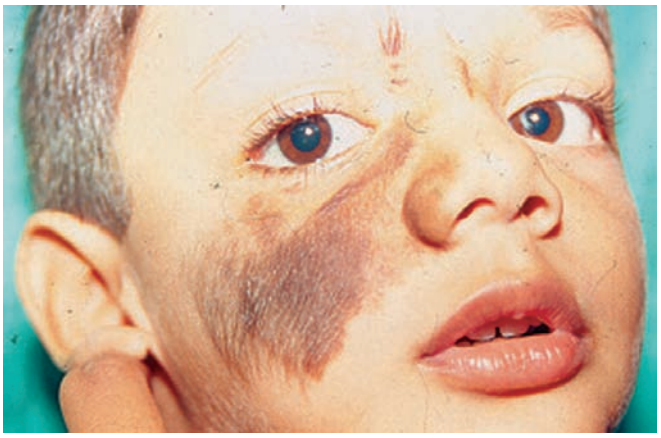

Fig. 2.18 Gradual growth of hairs in a melanocytic nevus

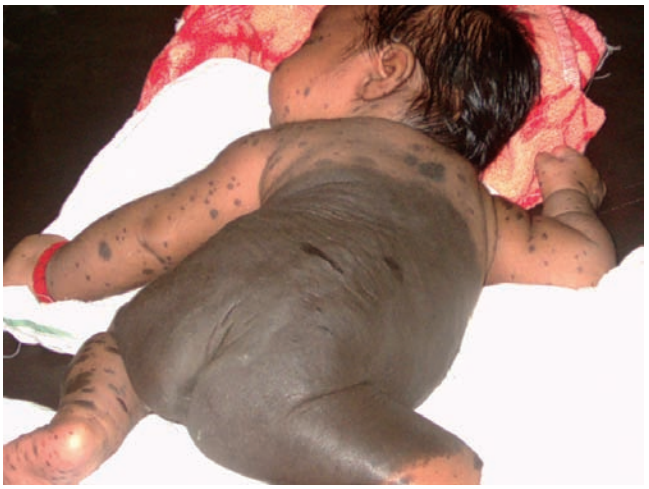

Fig. 2.19 Melanocytic nevus in a bathing trunk distribution in a newborn

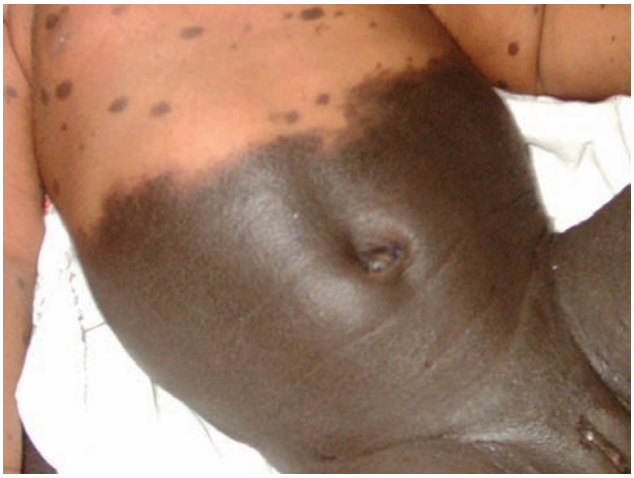

Fig. 2.20 Close-up showing satellite lesions

"If you wished to be loved, love."—Lucius Annaeus Seneca

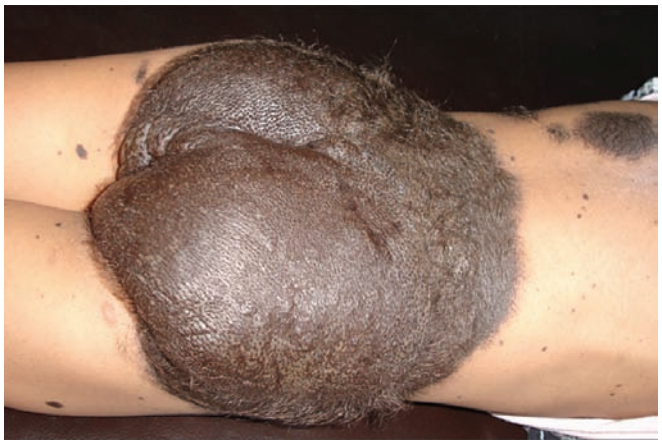

Fig. 2.20A Giant hairy melanocytic nevus in a 5-year-old boy

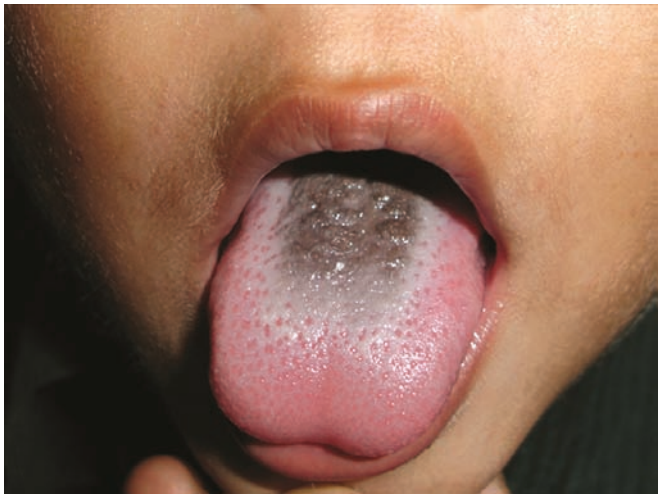

Fig. 2.20B Melanocytic nevus over tongue in a 3-year-old boy

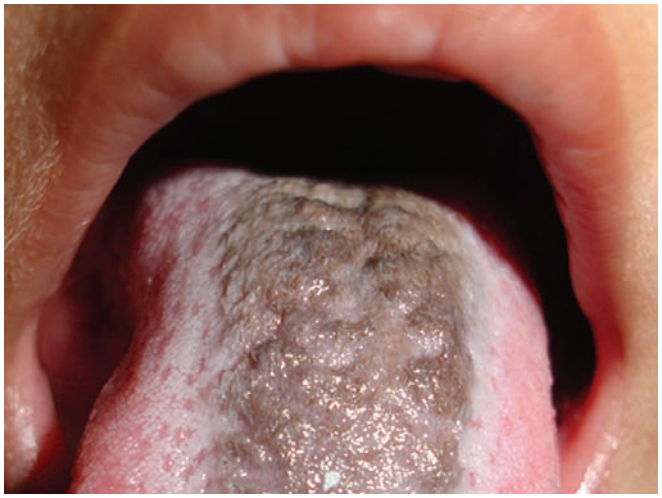

Fig. 2.20C Higher magnification

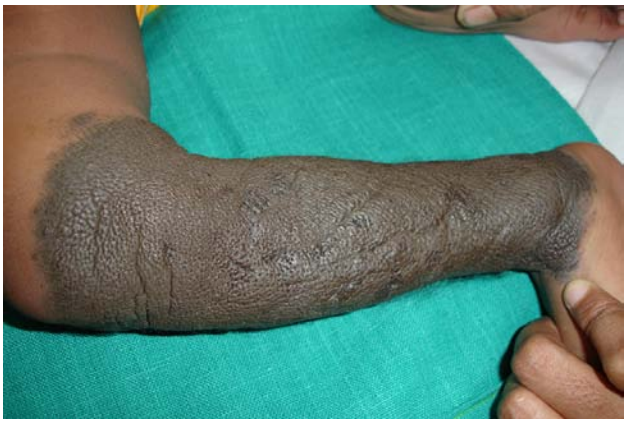

Fig. 2.20D Congenital hairy melanocytic nevus encircling whole leg

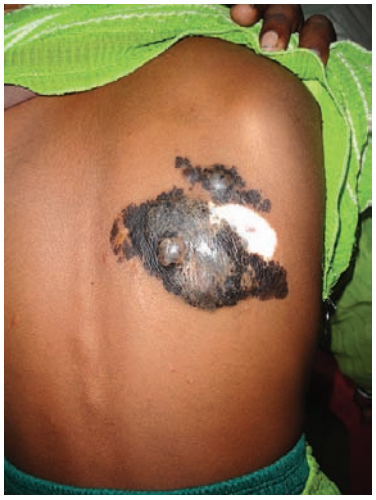

Fig. 2.20E Melanocytic nevus, presence of depigmented patch is rare

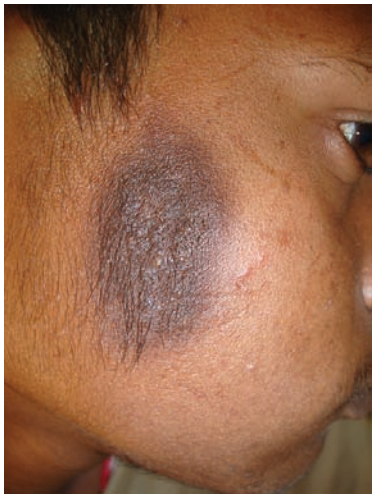

Fig. 2.20F Melanocytic nevus over face in a school going boy

"Whether it's the best of times or the worst of times, it's the only time we've got."—Art Buchwald

Natural History

As the infant grows, the surface may become rugose or warty and nodules may develop on it. The hairy component present in 95% cases tends to become more prominent in late childhood but at this stage the nevus ceases to thicken and becomes paler.

Systemic Associations

For removal of small lesions, dermabrasion and Q-switched ruby laser therapy are recommended. In large congenital melanocytic nevi, advances in soft tissue expansion technique may add to cosmetic gain in surgical approaches.

Management

There may be associated abnormalities such as meningeal involvement, spina bifida or meningocele when the nervus is over the vertebral column or club foot and hypertrophy or atrophy of the deeper structures of a limb.

Excision and reconstructive surgery may be tried by a team of pediatric surgeon, plastic surgeon and vascular surgeon working in tandem.

BECKER'S NEVUS (Figs 2.20G and 2.20H)

Also known as Becker's melanosis, it presents as an irregular macular hyperpigmentation with hypertrichosis characteristically seen on the shoulders, anterior chest, scapular region of adolescent males.

Becker's nevus may begin in childhood, usually following exposure to sunlight in otherwise normal males (occasionally females), at or shortly after puberty. The first change generally appears as a grayish brown pigmentation on the chest, back or upper arm that spreads in an irregular fashion until it reaches an area 10–15 cm in diameter (about the size of a hand or larger). The outline is sharply demarcated, irregular and often surrounded by island of blotchy pigmentation. Although characteristically seen unilaterally on the upper half of the trunk, especially around the shoulder, it has also been reported in other areas on the trunk, forehead, cheeks, supraclavicular region, abdomen, forearm, wrist, buttocks, and shins. Approximately after 1–2 years, coarse hairs appear over the patch. The intensity of pigmentation may fade somewhat as the patient becomes older, but the hyperpigmentation and hypertrichosis tend to persist throughout life.

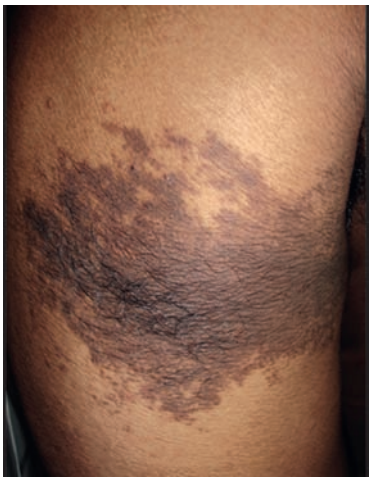

Fig. 2.20G Becker's nevus over side of back in a young adult

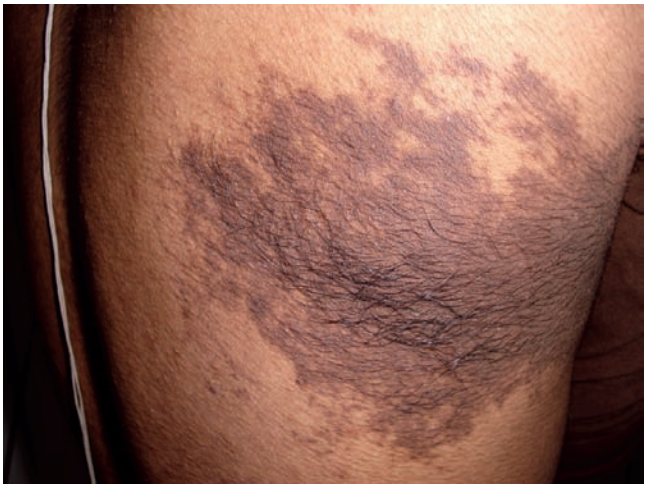

Fig. 2.20H Close-up of Becker's nevus

Etiology

The etiology of Becker's nevus is unknown, but androgen receptor assays suggest that a localized increase in the receptors seen in individuals with this disorder. In addition, reports of family cases raise the question of a genetic influence in some patients and the occasional association of smooth muscle hamartoma and Becker's nevi occur without other pathologic findings. Some workers feel that Becker's melanosis may represent an organoid nevus and part of the spectrum of epidermal nevi and the epidermal nevus syndrome.

Treatment

Treatment of this disorder therefore is purely cosmetic and consists of therapy with the Q-switched ruby laser or excision with split thickness skin grafts. Unfortunately, these procedures usually yield results far from satisfaction.

LENTIGINES (Fig. 2.21)

These are small, tan, dark brown or black, flat oval or circular lesions that appear in childhood and increase in number with age. Their size varies from 1–2 mm, may occur on any cutaneous surface, show uniform pigmentation and appear darker than freckles.

Natural History

Lesions that appear in early childhood may fade or disappear.

Treatment

For permanent lesions, treatment is for cosmetic purpose. Excision by a small punch biopsy, shaving, cryosurgery, laser, etc. may be beneficial.

LEOPARD SYNDROME (Fig. 2.22)

This is an autosomal dominant (AD) disorder with high penetrance and variable expressivity characterized by striking cutaneous pigmentation. The term LEOPARD syndrome is actually a mnemonic used to describe the many protean manifestations of this disorder. Lentigines, electrocardiographic conduction defects, ocular hypertelorism, pulmonary stenosis, abnormalities of genitalia, retardation of growth and deafness. The cutaneous pigmentation is in the form of small, dark, 1–5 mm lentigines which are usually congenital or appear soon after birth. With age, they increase in size, number and depth of color. They tend to be concentrated around the neck and upper trunk but may also appear on the skin of the face and scalp, arms palms, soles and genitalia.

FRECKLES (EPHELIDES) (Figs 2.22A and 2.22B)

Freckles are red or light brown well-defined circumscribed macules, usually less than 5 mm in diameter, which appear in childhood especially over exposed areas of skin. They often arise in early childhood, generally between 2 and 4 years of age but not in infancy. These appear to be inherited as autosomal dominant trait and more common in individuals with fair skin and red hairs. They have only cosmetic but no systemic connotations.

Lentigines are differentiated from freckles by their darker color, scattered distribution, comparative sparseness and the fact they do not darken and increase in number or exposure to the sunlight.

Treatment

Regular application of sunscreens blocking both UVB and UUA are helpful. In extensive lesions, when seen in a young girl, various surgical treatment options can be undertaken. These are chemical peeling (using 50% trichloroacetic acid, 10% glycolic acid, etc.) cryotherapy, light electrofulguration, laser, etc. Avoidance of direct exposure to sun is of paramount importance.

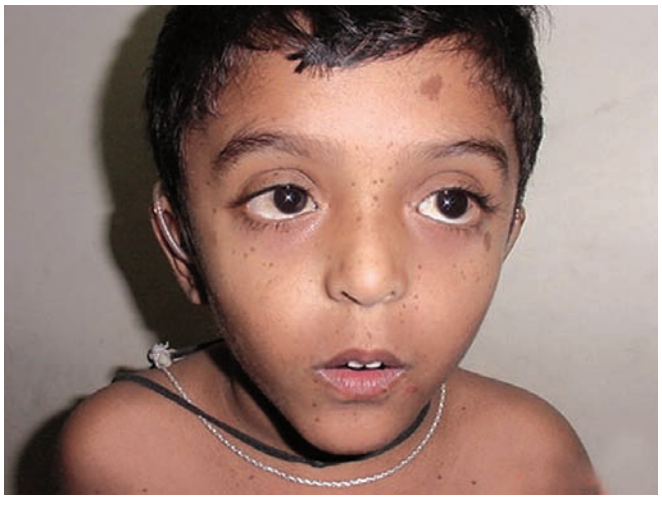

Fig. 2.21 Lentigines over face in a 6-year-old boy

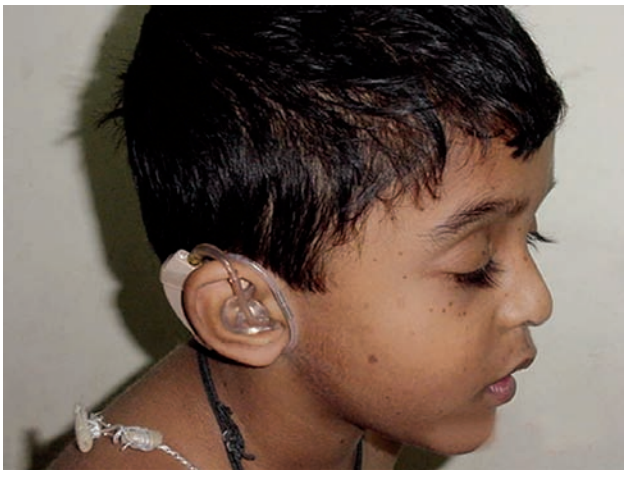

Fig. 2.22 Lentigines with hearing aid in the same boy having LEOPARD syndrome

"I never said all actors are cattle; what I said was all actors should be treated like cattle."—Alfred Hitchcock

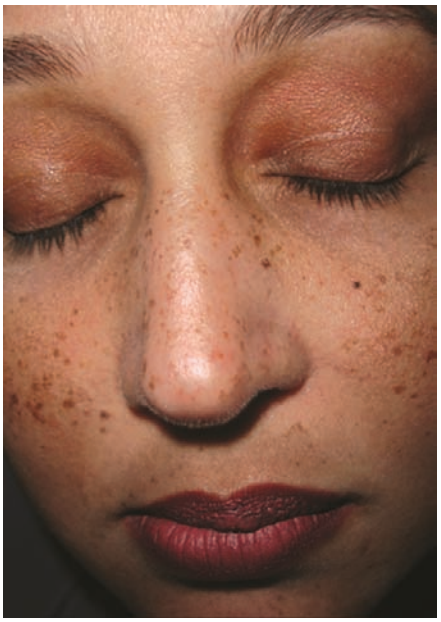

Fig. 2.22A Freckles over face

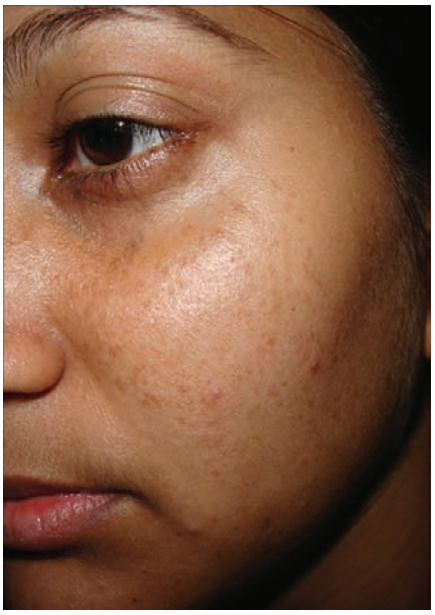

Fig. 2.22C Nevus spilus over face in 14-year-old girl

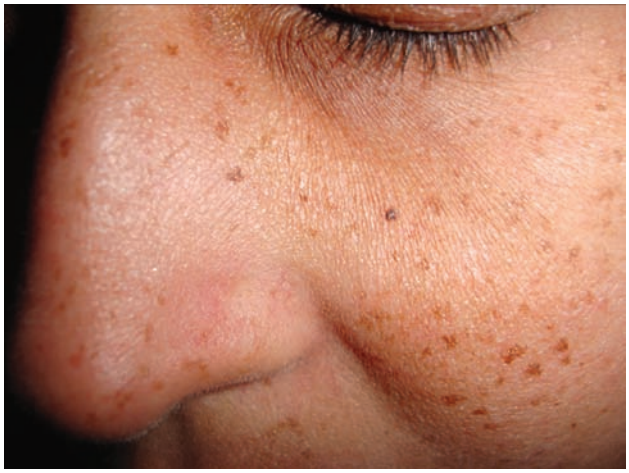

Fig. 2.22B Close-up of freckles

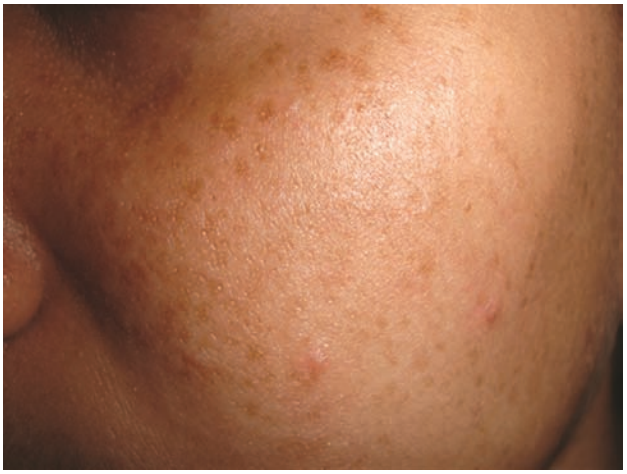

Fig. 2.22D Close-up of nevus spilus

NEVUS SPILUS (Figs 2.22C and 2.22D)

It presents as a solitary, nonhairy, flat brown patch dotted by smaller dark brown to blackish brown freckle-like areas of pigmentation. This is a common disorder usually appearing at birth, infancy or childhood. It is estimated to occur in 2–3% of the adult population. Its size may vary from 1–20 cm in diameter and can appear on any area of the face such as trunk, or extremities without relation to sun exposure.

Although in this disorder, there are reports of malignant melanoma developing within lesions of nevus spilus, it does not necessitate routine removal of uncomplicated lesions. It only needs a cosmetic camouflage.

PEUTZ–JEGHERS SYNDROME (Figs 2.23 to 2.26)

This is an autosomal dominant disorder characterized by mucocutaneous pigmentation and generalized intestinal polyposis. The cutaneous lesions appear as flat, bluish brown to black irregularly oval spots less than 5 mm in diameter. They are seen most commonly on the lips, buccal mucosa, nasal and periorbital regions, elbows, dorsal aspects of the fingers and toes, palms, soles and periumbilical, perianal or labial regions. Occasionally the gums and hard palate and rarely the tongue may be affected. The spots

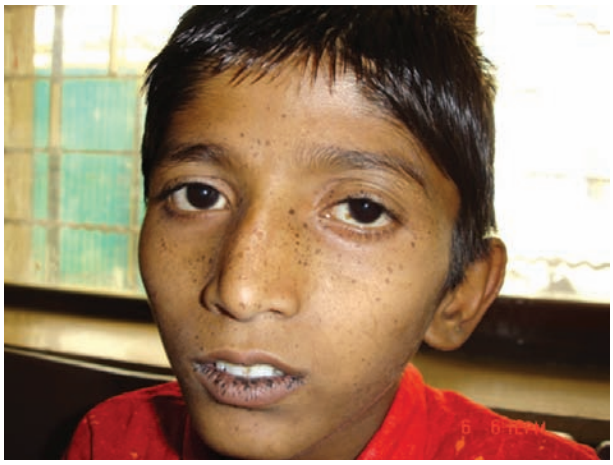

Fig. 2.23 Hyperpigmented macules over the face in P-J syndrome

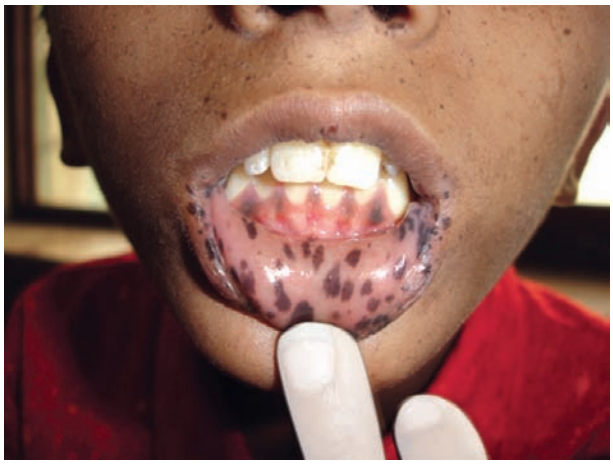

Fig. 2.24 Close-up of hyperpigmented macules over the lips

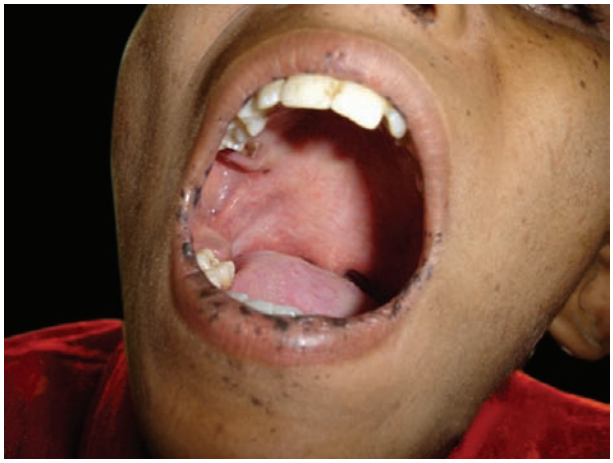

Fig. 2.25 Close-up of hyperpigmented macules over the oral mucosa

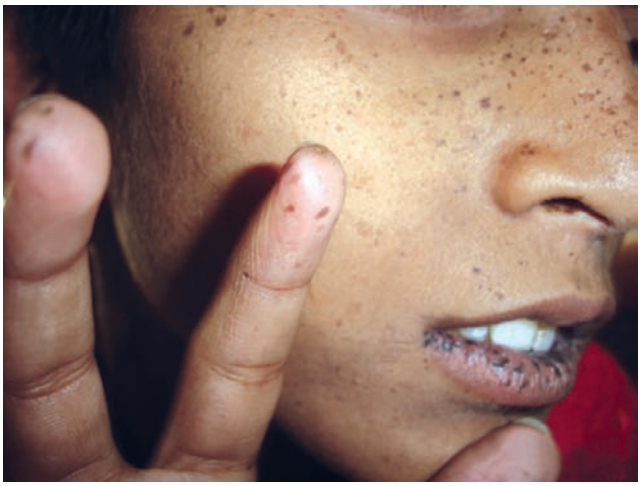

Fig. 2.26 Pigmented macules over the fingertips

on the skin and lip often fade after puberty whereas those on the buccal mucosa, palate and tongue tend to persist. The gastrointestinal polyps may be present anywhere between the gastroesophageal junction to the anal canal. The polyps represent benign hamartomas and have a low malignant potential. Children frequently present with abdominal pain, melena or intussusception.

Management

Management of cutaneous pigmentation chiefly consists of reassurance of patients and parents. Treatment of polyposis is limited to relief of symptoms as multiple resections may lead to malabsorption.

EPIDERMAL NEVI (Figs 2.26A to 2.26I)

Epidermal nevi represent a benign congenital disorder that is characterized by circumscribed hyperkeratosis and hypertrophy of the epidermis. This disorder, usually apparent at birth in early childhood, affects both sexes equally and is known by several descriptive names, nevus verrucosus, nevus units lateris, and ichthyosis hystrix. The lesions may be deeply or slightly pigmented, have either a unilateral or a bilateral distribution and often favor the extremities in what appears to be a dermatomal distribution, but may occur anywhere on the cutaneous surface. Although single lesion may occur, the disorder generally consists of multiple lesions arranged in a linear distribution.

Usually present at birth, it may also appear in infancy, early childhood, and occasionally in adults life. Lesions may be grayish yellow-brown and velvety, granular, warty or papillomatous.

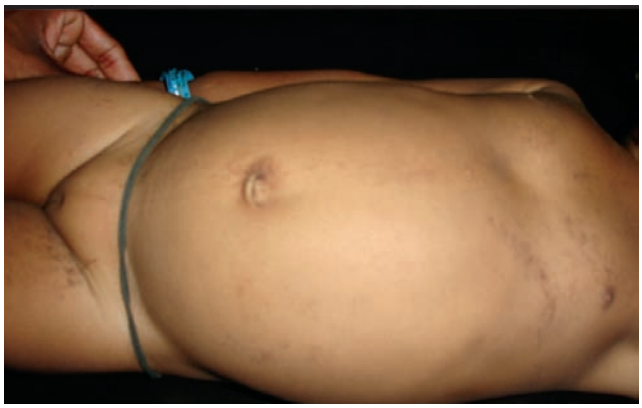

Fig. 2.26A Verrucous epidermal nevus, note lesions along Blaschko's lines

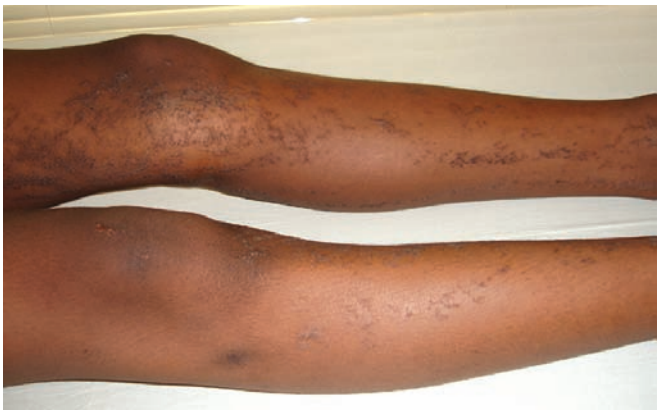

Fig. 2.26D Same boy, lesions over legs

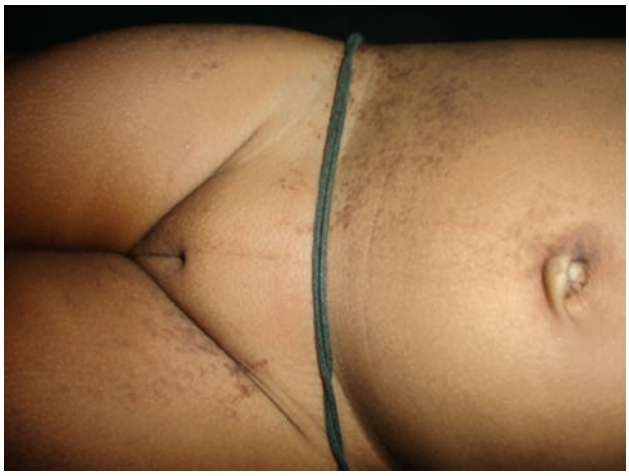

Fig. 2.26B Verrucous epidermal nevus in a 3-year-old girl

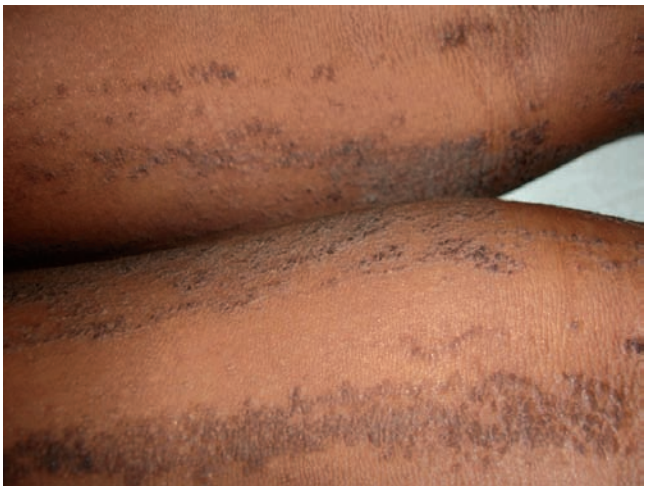

Fig. 2.26E Close-up of verrucous epidermal nevus

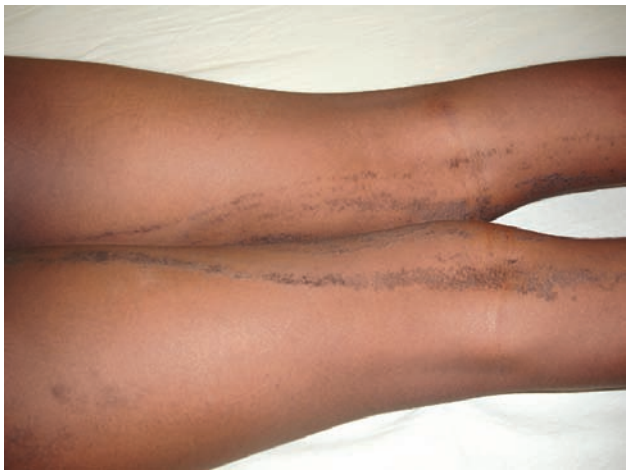

Fig. 2.26C Lesions of verrucous epidermal nevus along Blaschko's lines

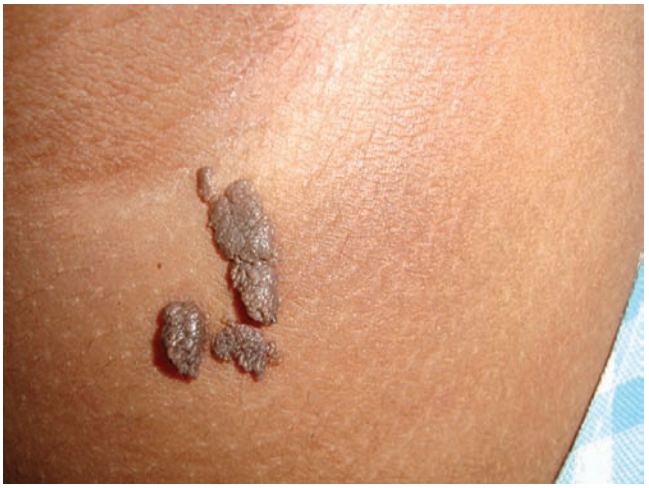

Fig. 2.26F Verrucous epidermal nevus over axilla in a 4-year-old girl

"The worst solitude is to have no real friendships."—Francis Bacon

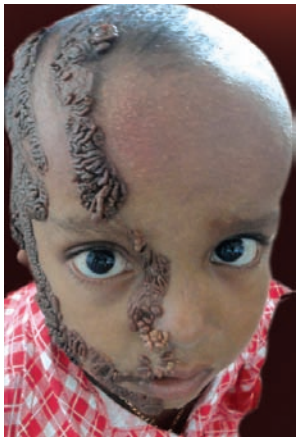

Fig. 2.26G Verrucous epidermal nevus over face and scalp

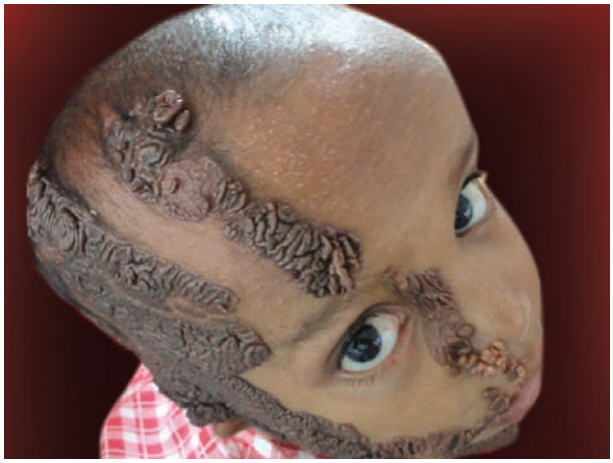

Fig. 2.26H Same boy, another view

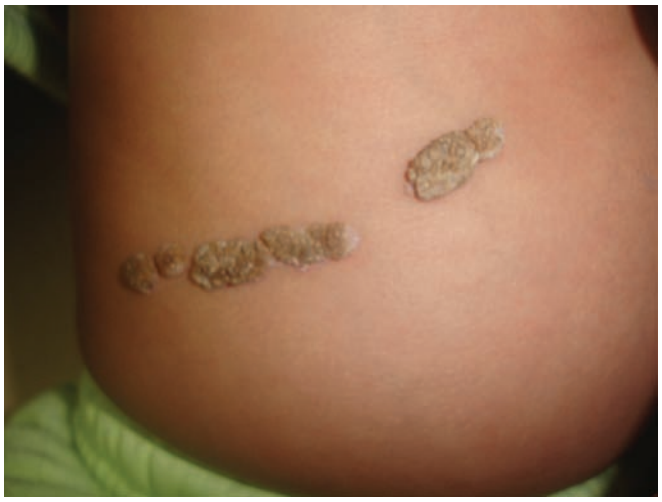

Fig. 2.26I Verrucous epidermal nevus, close-up

More often noted on the trunk or limb then on the head or neck, they may be single or multiple and round or oval. They vary from 2–3 cm or more in diameter and, when seen on the limbs, frequently appear in a linear distribution.

Nevus unius lateralis may present as a single linear or spiral warty lesions or at time as an elaborate continuous or interrupted pattern affecting multiple sites, usually on one-half of the body. On the extremities lesions usually follow the long axis, and on the trunk or extremities they may be arranged in groups or as spiral streaks. On the trunk, the lesions frequently tend to have a transverse orientation. If a large area of the body is affected, the term systematized epidermal nevus may be used.

Treatment

It depends on the site, extent of the lesions, and the age of the patient. It is frequently wise, however, to delay surgery until the final extent of the process can be determined since early excision may result in the appearance of new lesions in or adjacent to the region of previously treated areas. Excision by a plastic surgeon is the treatment of choice for lesions that are unsightly or uncomfortable, or when malignant change is suspected. Although cryosurgery (with liquid nitrogen), dermabrasion or electrodesiccation and curettage may produce gratifying results initially, recurrences are common.

INFLAMMATORY LINEAR VERRUCOUS EPIDERMAL NEVUS (ILVEN) (Figs 2.27 and 2.27A)

Verrucous epidermal nevus usually presents as a single linear lesion at birth. It consists of closely set, papillomatous, hyperkeratotic papules, located anywhere on the head, trunk on extremities. Clinically it may resemble the inflammatory linear verrucous epidermal nevus, but the latter differs by the presence of erythema and pruritus. The linear epidermal nevus in its systematized form may be associated with skeletal deformities and central nervous system defects.

Management

Moderate to potent topical corticosteroids for 2–4 weeks may help subsidence of inflammation. Intralesional triamcinolone acetonide injection every 3 weekly for 2–3 injections may give similar results. However, the remission is temporary and lesions tend for recur with wearing off of the action of topical steroid. Surgical excision, deep-shave excision or dermabrasion may be curative.

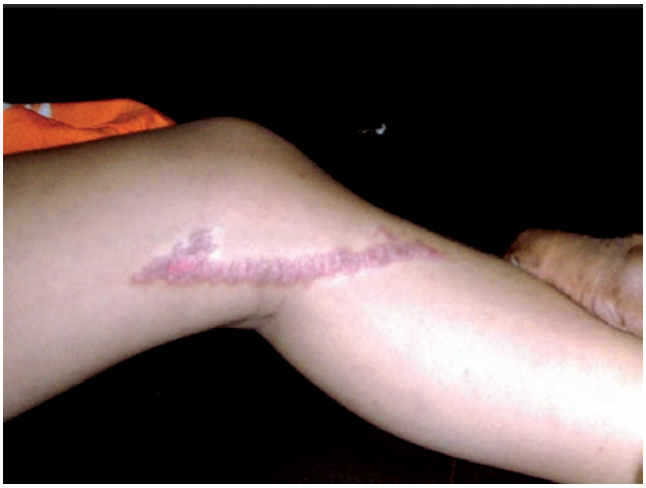

Fig. 2.27 Linear verrucous band like lesion with erythema

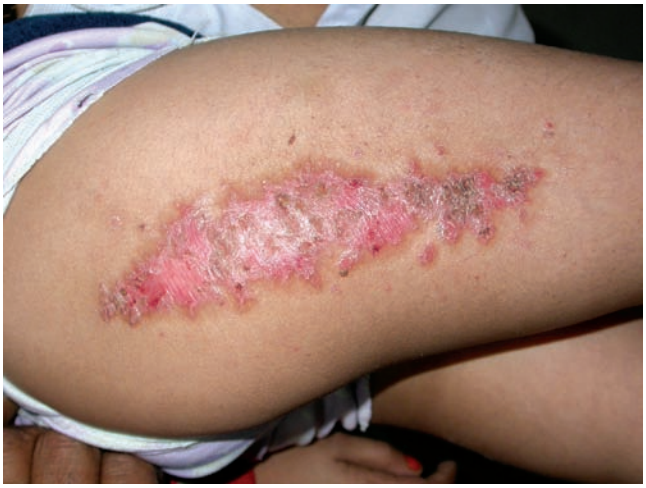

Fig. 2.27A ILVEN over thigh

NEVUS SEBACEOUS (Figs 2.28 to 2.28C)

Nevus sebaceous of Jadassohn presents as well circumscribed hairless plaque at birth or early childhood. In the young, they are yellow or yellowish brown with a flat and velvety appearance. With puberty the lesions become raised, thickened and nodular with closely set papillomatous projections. The lesion is round, oval or linear and varies from few millimeters to several centimeters in diameter. During adolescence and adult life, 10–15% of the lesions undergo secondary neoplastic changes, most commonly a basal cell carcinoma. Malignant change is usually heralded by ulceration or rapid enlargement in size. Other neoplasms that can arise from nevus sebaceous are leiomyoma, piloleiomyoma, hidradenoma, apocrine cystadenoma and squamous cell carcinoma.

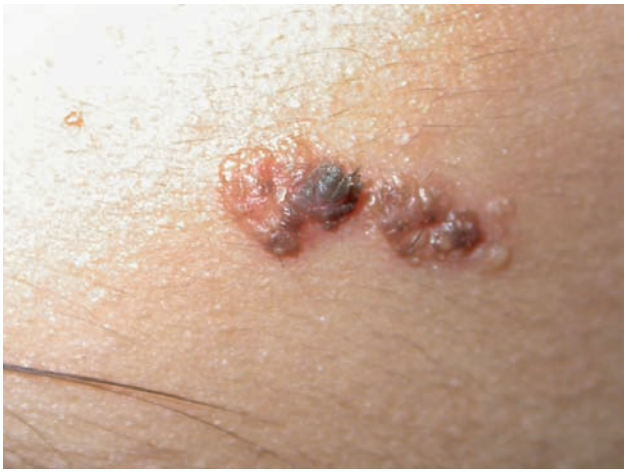

Fig. 2.28 Greasy papulonodular lesions of nevus sebaceous in clusters

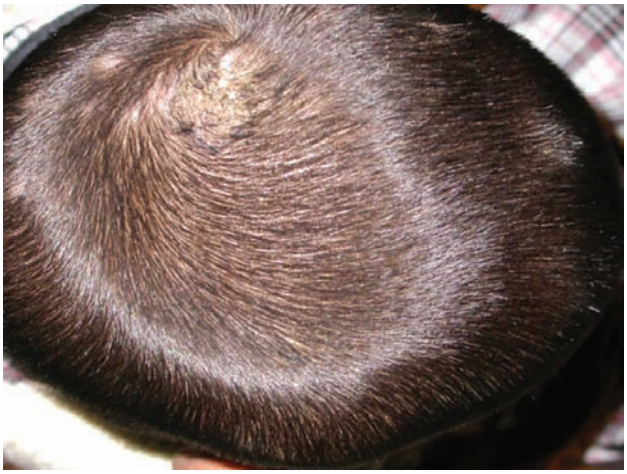

Fig. 2.28A Nevus sebaceous in 6-year-old boy

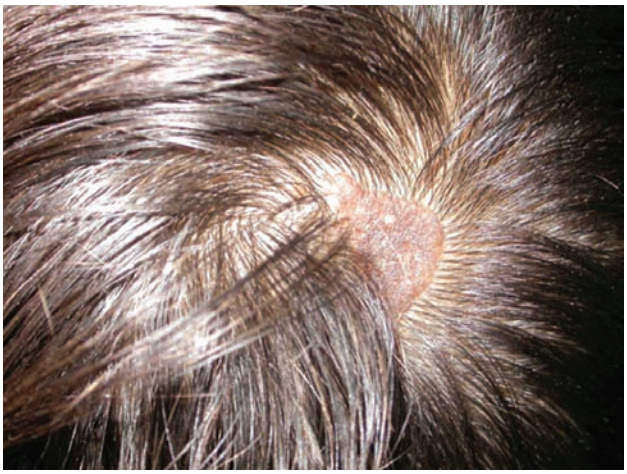

Fig. 2.28B Same boy, close-up of the lesion

"It is impossible to love and to be wise."—Francis Bacon

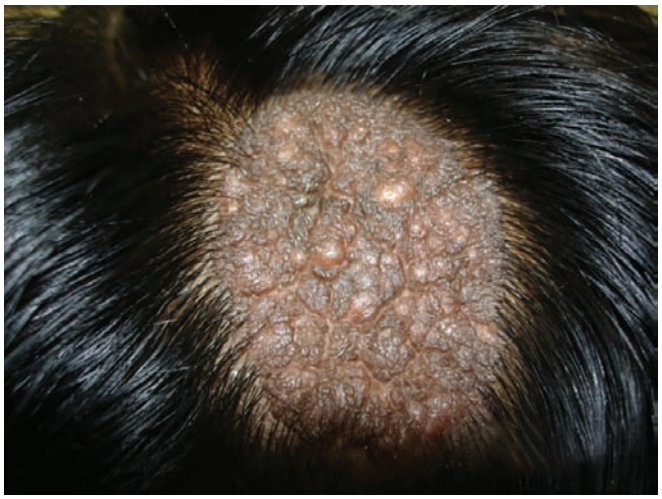

Fig. 2.28C Nevus sebaceous, note huge size and nodularity of the lesion

Systemic Associations

Large lesions may be associated with ophthalmic, skeletal, neurologic and pigmentary abnormalities.

Treatment

Early diagnosis and treatment is important because of its malignant transformation. Local deep full thickness surgical excision by a pediatric/plastic surgeon is ideally recommended.

NEVUS COMEDONICUS (Figs 2.29 and 2.29A)

This developmental disorder is believed to result from a failure in development of the mesodermal component of the pilosebaceous complex. It occurs with equal frequency in males and females and half the cases present at birth. The lesions manifest as groups of closely set, slightly elevated papules that have in their center a dark firm hyperkeratotic plug resembling a comedo in a linear or band-like distribution on the body particularly on the face, neck, upper arm, chest and abdomen.

Natural History

The lesions increase in size with age and extend above the cutaneous surface giving a nutmeg greater-like feeling to the skin. The lesions may get complicated by secondary infection and abscess formation.

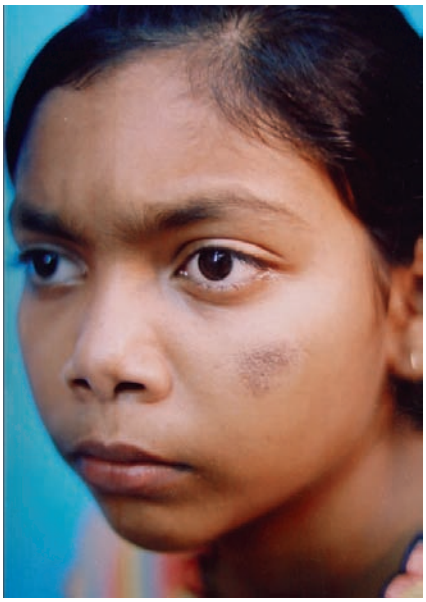

Fig. 2.29 Clustered black comedo like lesions of nevus comedonicus over cheek

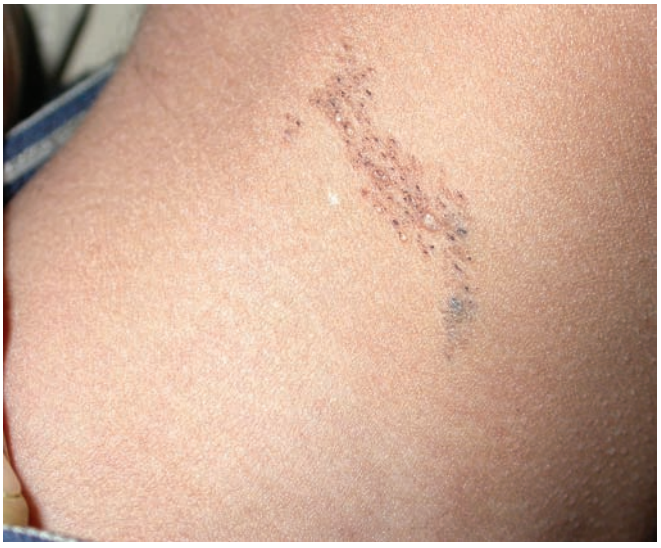

Fig. 2.29A Nevus comedonicus

Management

Management includes treatment of secondary infection and surgical excision of the entire lesion.

3

Genodermatoses

ECTODERMAL DYSPLASIA (Figs 3.1 to 3.4)

Ectodermal dysplasias are of two types—hypohidrotic and hidrotic.

Hypohidrotic ectodermal dysplasia: Is essentially X-linked recessive disorder. Characterized by partial and complete absence of sweat glands, hypotrichosis and hypodontia. The essential features of this disease are absence, reduction of sweating, hypotrichosis and total or partial anodontia. Face has a characteristic feature with prominent frontal ridge and chin, saddle nose, sunken cheeks, thick everted lips, large ears and sparse hair. The skin is smooth, soft, dry and appear prematurely aged. Heat intolerance is a regular feature.

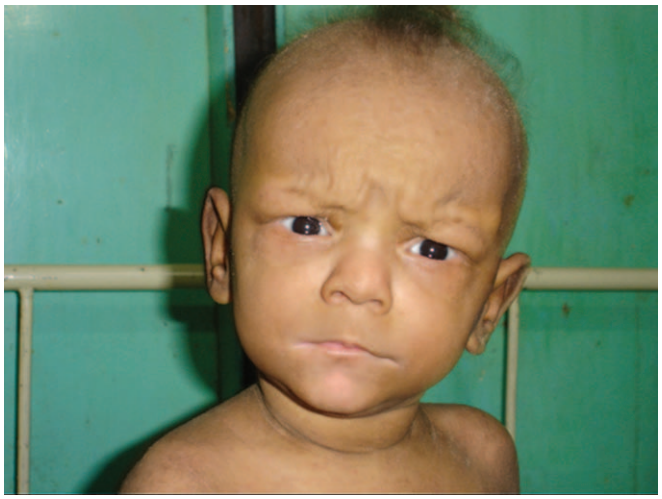

Fig. 3.1 Hypohidrotic ectodermal dysplasia in a 4-year-old boy

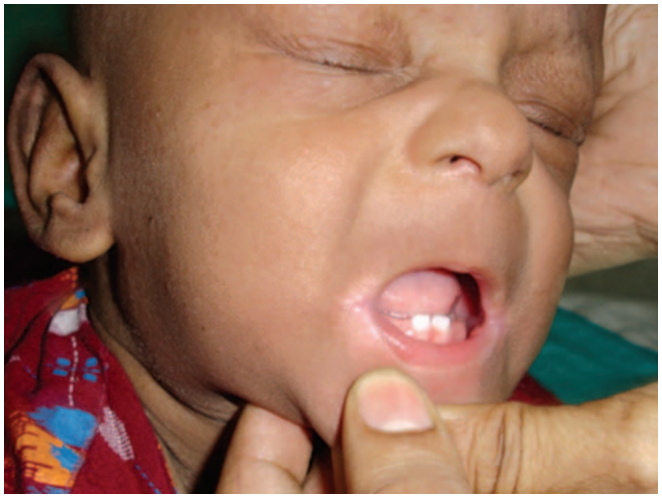

Fig. 3.2 Same boy, lack of dentition

ANHIDROSIS

The term anhidrosis refers to absence of sweating due to dysfunction in any step of physiological process of sweat production even in presence of appropriate stimuli. Hypohidrosis means diminished sweating and represents part of the spectrum of the disease. Anhidrosis can be divided into generalized and localized.

Generalized anhidrosis may be due to insult at different level of central nervous system, such as organic lesion in cortex, hypothalamus, pons and brainstem and transcetion of the spinal cord. Different sensory and autonomic neuropathies such as leprosy, diabetes, alcoholic neuropathy, Guillain-Barre syndrome, familial amyloidosis should be kept in mind. Important dermatological causes of generalized anhidrosis are anhidrotic ectodermal dysplasia, atopic dermatitis, ichthyosis and xerosis, systemic sclerosis. Drugs such as tricyclic antidepressant, antipsychotic, anticholinergic, anticonvulsant, muscle relaxant, neuromuscular paralytics and opioids are one of the major culprits and proper history should be taken. Physicians should be highly cautious while dealing with a case of generalized anhidrosis where the main matter of concern is poor heat tolerance. Patients should not be put

"He who knows how to flatter also knows how to slander."—Napoleon Bonaparte

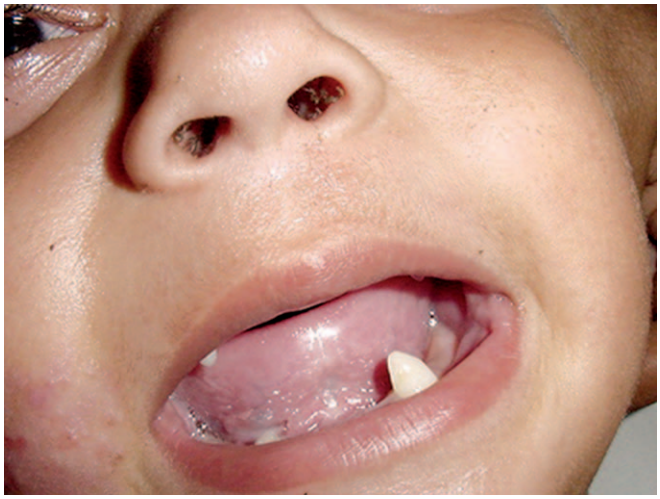

Fig. 3.3 Note the absence of teeth

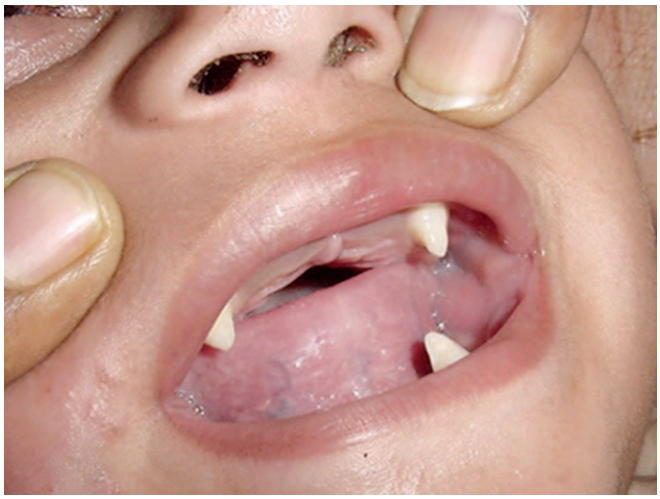

Fig. 3.3A Only teeth are peg-shaped canines

into any form of heat stress. Alarming signs of heat stress are dizziness, drowsiness, palpitations, nausea, tachycardia and substernal tightness. Important local causes are tuberculoid leprosy, miliaria, pompholyx, eczema, vitiligo, incontinentia pigmenti and Bezex syndrome. Localized anhidrosis is of little clinical significance except in few cases such as leprosy and disabling xerotic eczema. Patients are often more concern about compensatory hyperhidrosis which may be misleading.

Treatment options are limited. Avoidance of heat stress, water cooled vest, keeping the patient in cool environment, avoidance of the offending drugs and liberal use of moisturizers in atopic dermatitis are some of the therapeutic modalities. Any form of hyperthermia should be managed aggressively to restore sweating.

Treatment

Treatment consists restriction of physical exertion, avoidance of warm climate, counseling and reassurance of the parents is important part of management.

Hidrotic ectodermal dysplasia: Is essentially autosomal dominant disorder. Dystrophy of the nails is the key feature of the syndrome. Persistent paronychial infections, diffuse hyperkeratosis of palms and soles are other features.

Management

It is asymptomatic. Explaining the condition to the parents and counseling are essential aspects of management.

PALMOPLANTAR KERATODERMAS

Palmoplantar keratoderma (PPK) refers to thickening of palms and soles either localized or diffuse because of genetic predisposition or inflammatory condition secondary to psoriasis, pityriasis rubra pilaris or Reiter's disease.

DIFFUSE KERATODERMAS

Epidermolytic and Nonepidermolytic Palmoplantar Keratoderma (Figs 3.4 to 3.4C)

It is an autosomal dominant disorder characterized by diffuse palmoplantar thickening. This is often associated with hyperhidrosis and maceration. The waxy hyperkeratosis is surrounded by an erythematous border. In the former on histopathology of skin, epidermolytic hyperkeratosis is seen.

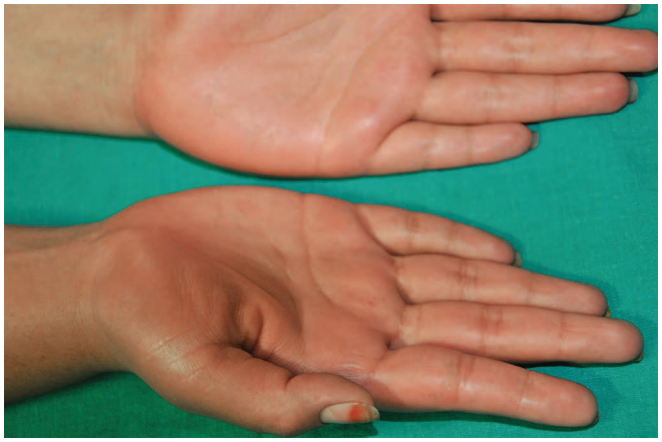

Fig. 3.4 Palmoplantar keratoderma, note associated erythema

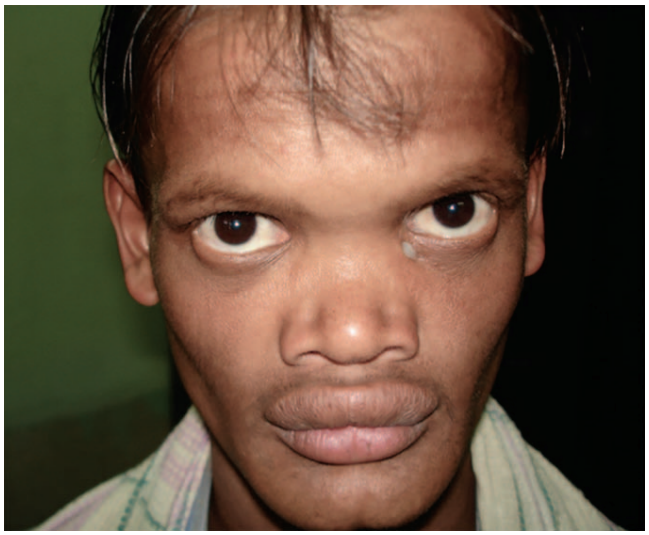

Fig. 3.4A Hypohidrotic ectodermal dysplasia in an adolescent boy

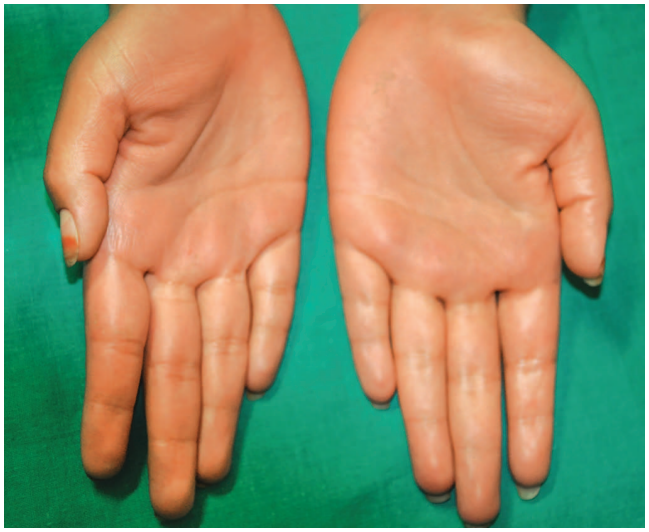

Fig. 3.4B Same patient with PPK

Vohwinkle Syndrome (Fig. 3.4D)

It is a type of mutilating keratoderma characterized by PPK with 'honey comb' pattern and constrictions (pseudoainhum) that may lead to amputation of distal digits. Other features are presence of knuckle pads, leuconychia and sensorineural deafness.

Clouston Syndrome

Is an autosomal dominant condition. The growth of nails is slowed down and they are thickened or thinned, striated, discolored, brittle or hypoplastic. The tips of the digits show pseudoclubbing and chronic infection lead to complete destruction of nail plates.

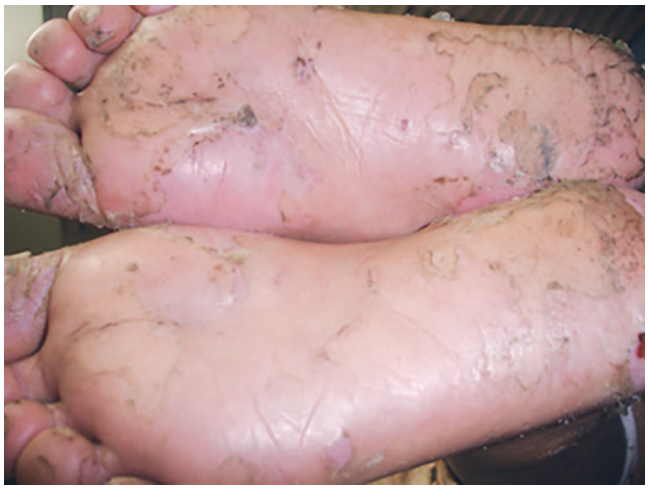

Fig. 3.4C Diffuse PPK

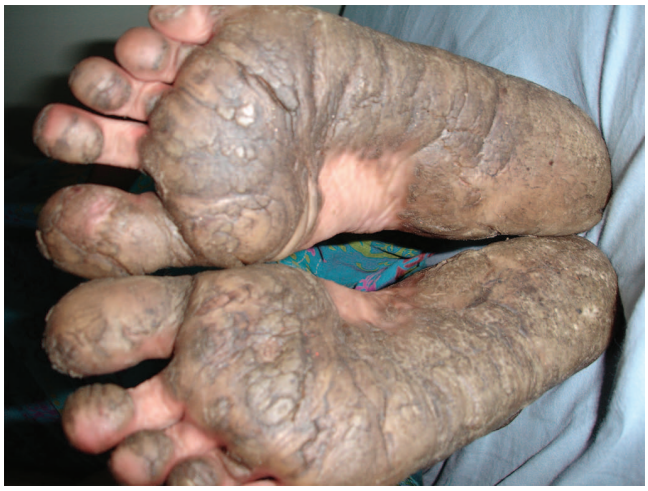

Fig. 3.4D Honeycomb pattern of PPK

Mal De Meleda (Figs 3.4E and F)

It is an autosomal recessive form of diffuse PPK where the PPK overflows and affects dorsum of hands and feet (transgradiens). Hyperhidrosis and candidal/fungal infection may be associated. There is occasional perioral erythema.

Olmsted Syndrome (Fig. 3.4G and H)

It is a rare autosomal dominant disorder presenting with progressive development of painful plaques of keratoderma over palms and soles that begins during infancy to early

"I do not mind lying, but I hate inaccuracy."—Samuel Butler

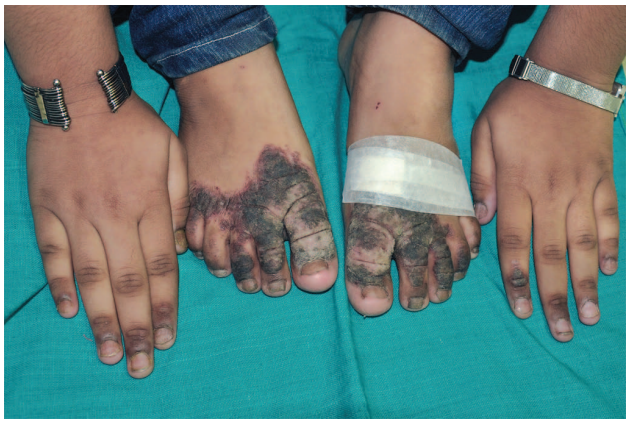

Fig. 3.4E Palmoplantar keratoderma, note lesions are spreading over dorsal aspect of hand and feet

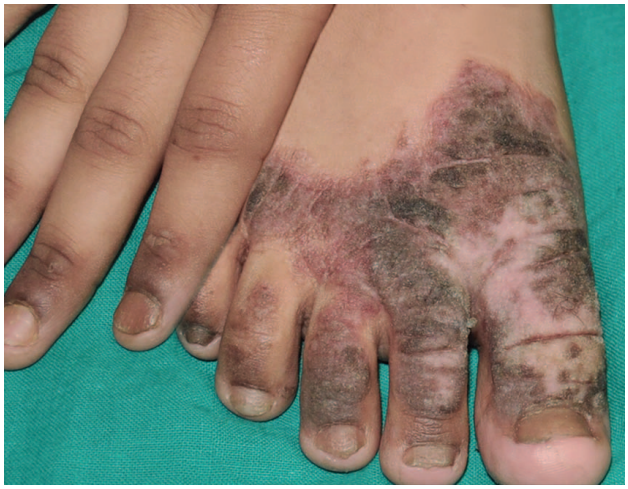

Fig. 3.4F PPK encroaching over dorsum

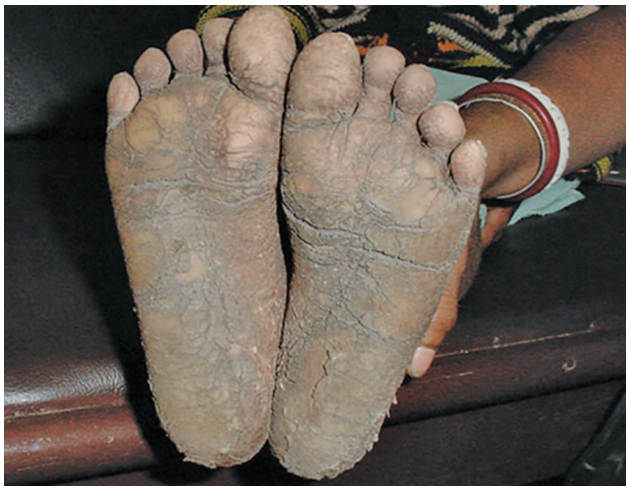

Fig. 3.4G PPK with mutilating toes

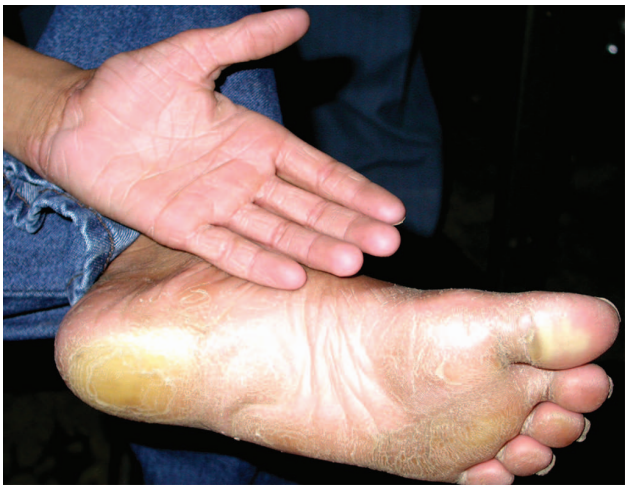

Fig. 3.4H Diffuse PPK

childhood. The borders of keratoderma tend to be erythematous. Autoamputation from progressive constriction of digits is common. Other features are periorificial thickening, fissuring, alopecia and nail dystrophy.

Focal Keratodermas

It refers to localized keratodermas over palms and soles. Various conditions which present as focal keratodermas are:

1. Pachyonychia congenita
2. Richner-Hanhart syndrome
3. Howel Evans syndrome
4. Papillon–Lefevre syndrome.

Pachyonychia Congenita (Figs 3.4I to M)

It encompasses a group of autosomal dominant conditions which manifest as focal keratoderma. They are generally divided as pachyonychia congenital one (PC 1 or Jadassohn–Lewandowsky syndrome) and pachyonychia congenital two (PC 2 or Jackson-Lawlor syndrome). In PC 1 there is focal PPK with oral leukokeratosis. In PC 2 focal PPK is associated with follicular keratosis and multiple steatocysts.

Richner-Hanhart Syndrome

It is an autosomal recessive condition in which there is focal PPK with tyrosinemia because of deficiency of hepatic aminotransferase enzyme.

The early skin lesions are seen in first year of life as yellowish keratotic papules over palms and soles. But often they appear at teen age. The lesions become erythematous, erosive and painful with time. Associated features are photophobia and corneal erosions which usually develop by 6 months of life.

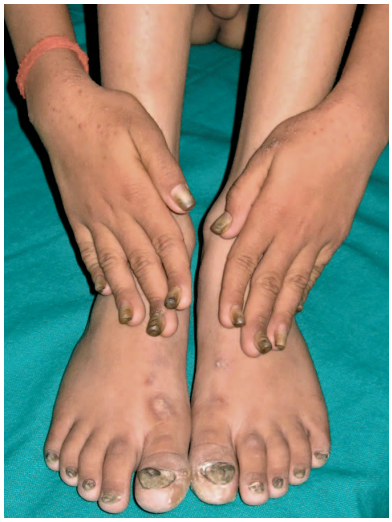

Fig. 3.4I Thickened nails in pachyonychia congenita type 1

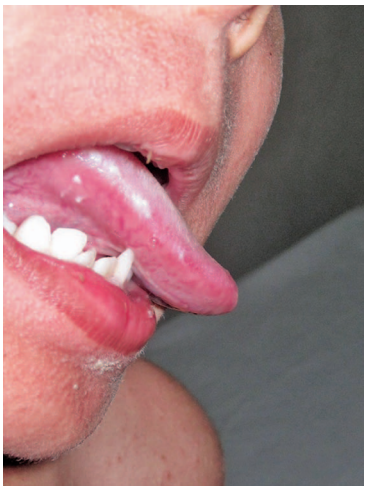

Fig. 3.4J Oral leucokeratosis in PC 1

Treatment
Restrictions of tyrosine with low phenylalanine and low tyrosine containing diet.

Howel Evans Syndrome

In this condition, there is late-onset dominant focal PPK with development of esophageal carcinoma at around 6th decade of life in most of the individuals.

Papillon-Lefevre Syndrome (Fig. 3.4N)

Is an autosomal recessive condition manifesting as PPK which often extends on the dorsal surface of hands and feet.

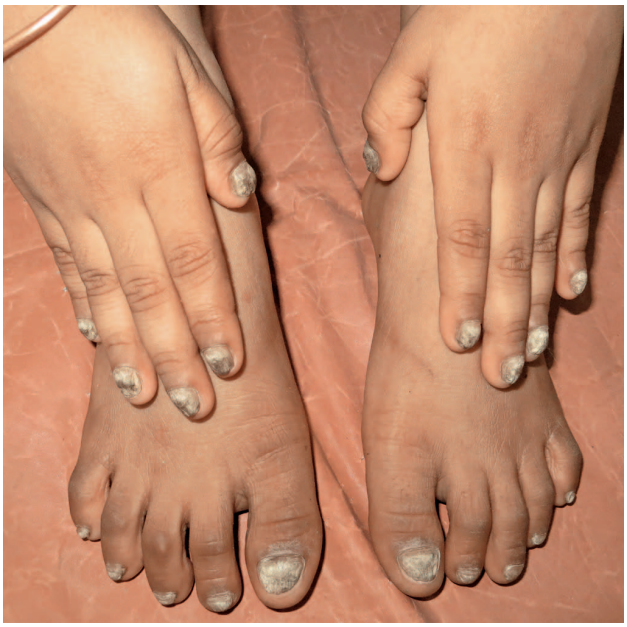

Fig. 3.4K Thickened nails in PC 2

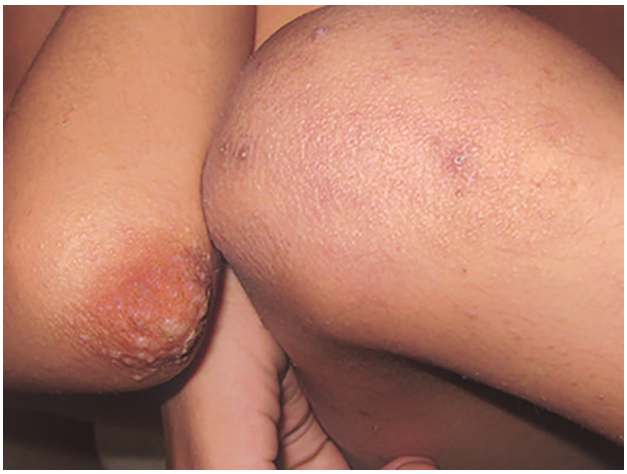

Fig. 3.4L Hyperkeratotic plaque over elbow in PC 2

Psoriasis-like lesions are seen over knees and elbows. As early as at 3 years of age there may be development of periodontitis with loss of both permanent and deciduous teeth. Most of the patients may become edentulous by 15 years of age.

PUNCTATE PALMOPLANTAR KERATODERMA

This condition is characterized by development of discrete keratoses over palms and soles. The punctate keratodermas vary from 1 to 3 mm in size and are mostly distributed over

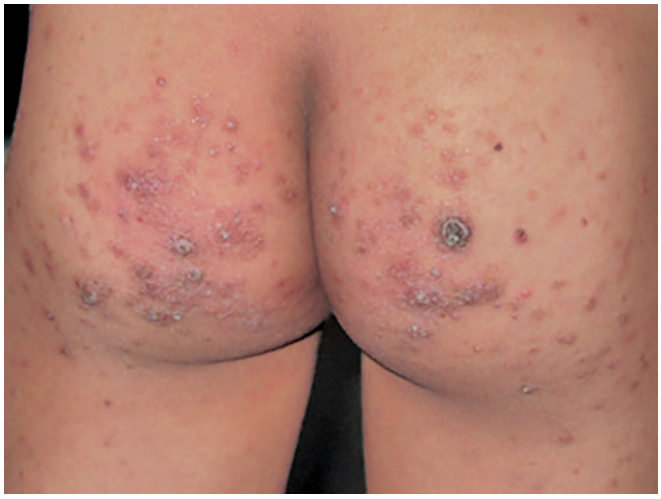

Fig. 3.4M Follicular keratosis over buttocks in PC 2

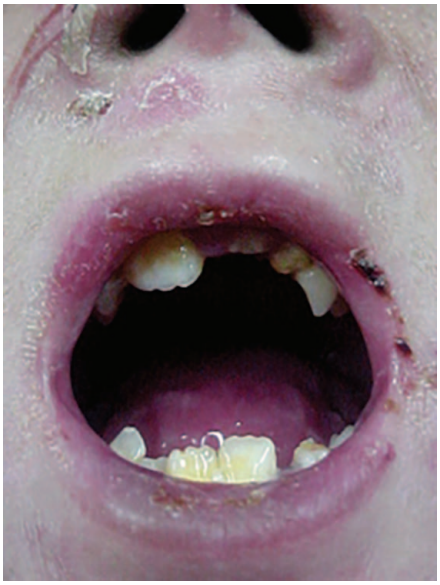

Fig. 3.4N Papillon-Lefevre syndrome

palmar creases and volar aspect of fingers. The central keratinous plugs if picked out, leaves a shallow depressed pit with a keratotic base. The lesions are usually asymptomatic but may be painful on walking.

Treatment

Treatment of all forms of hyperkeratosis of palms and soles is done with keratolytics like 10–20% salicylic acid and 20–40% urea either alone or in combination. For severe discomfort or symptomatic PPK, oral retinoids may be used for short duration.

ERYTHROKERATODERMAS

Erythrokeratodermas present as hyperkeratotic plaques over different parts of the body. Two types have been recognized.

1. Erythrokeratoderma variabilis (EKV)
2. Progressive symmetric erythrokeratoderma.

Erythrokeratoderma Variabilis (Figs 3.4O to Q)

It is a dominantly inherited condition and characterized by two distinct type of lesions.

1. Sharply marginated pruritic patches of erythema which are often figurate in configuration and undergo changes in size, shape and configuration over a period of days to weeks.
2. Hyperkeratotic plaques with the thik yellow brown scales that usually overlie erythema.

Lesions are most often distributed over limbs, trunk and buttocks. They are often distributed symmetrically. Face is relatively spared.

The lesions are mostly noted first at birth or during the first year of life. The condition exacerbates in winter and regress in summer spontaneously. In most, the lesions tend to improve at puberty.

Treatment

Oral retinoids show good improvement and can be given on a longterm basis for 10–15 years only during phases of aggravation. A proper history and repeated check-up of laboratory parameters are a must.

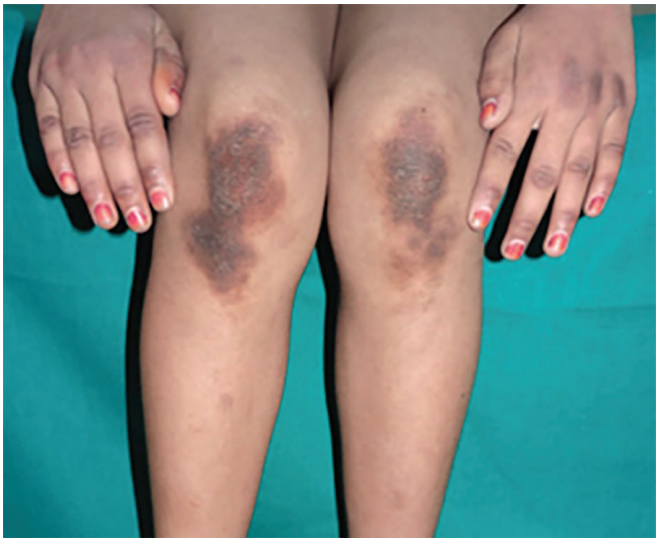

Fig. 3.4O Erythrokeratoderma variabilis

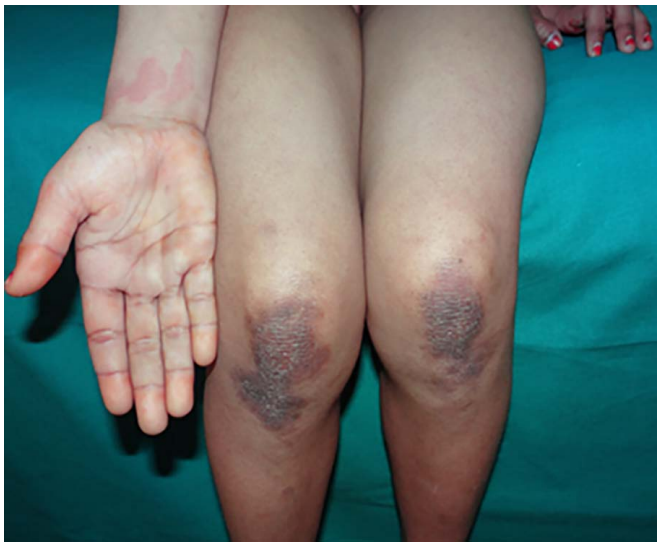

Fig. 3.4P Erythrokeratoderma variabilis in the same child

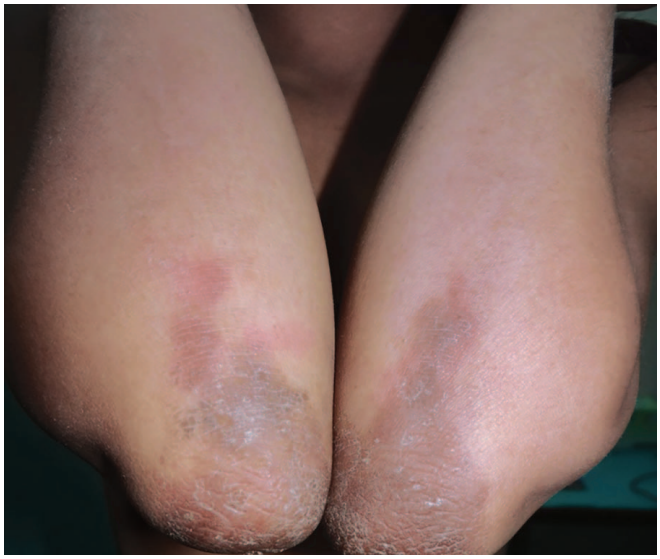

Fig. 3.4Q EKV, close-up

Progressive Symmetric Erythrokeratoderma (Figs 3.4R and S)

The condition has features almost identical to that of EKV. However, the absence of migrating red patches and higher incidence of palmoplantar keratoderma distinguishes it. The disorder tends to have its onset during infancy, is usually limited to extremities, buttocks and face. The condition tends to regress at puberty. The genetic mode of inheritance is not exactly known.

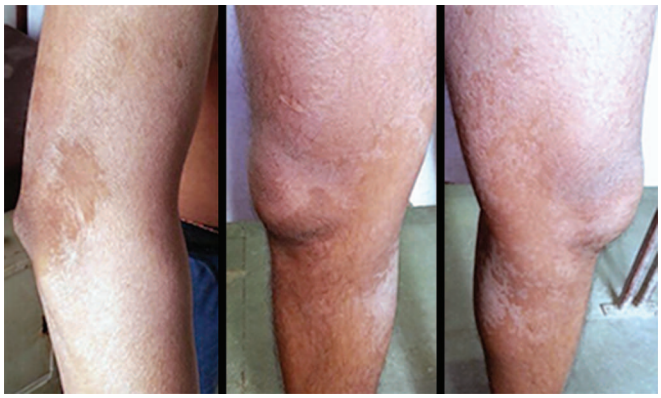

Fig. 3.4R Progressive symmetric erythrokeratoderma

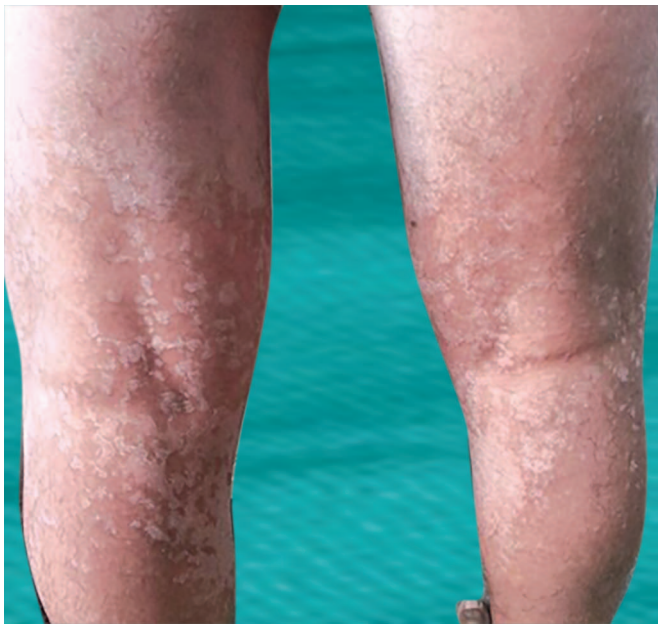

Fig. 3.4S Same child, close-up

XERODERMA PIGMENTOSUM (Figs 3.5 to 3.8A)

Xeroderma pigmentosum (XP) is a severe rare autosomal recessive disorder characterized by cutaneous photosensitivity, a decreased ability to repair DNA damage by UV radiation and a tendency to early development of cutaneous malignancies. Symptoms appear between 6 months and 3 years of age, the tumor stage is reached by 20 years of age. The characteristic clinical features include erythema, freckling, both hyperpigmentation and depigmentation, premature ageing, telangiectasia, hyperkeratosis, ulceration, keratoacanthomas, and after a relatively short period of time,

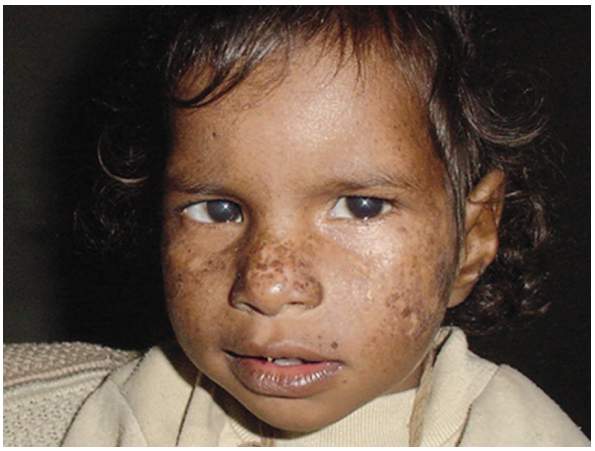

Fig. 3.5 Pigmented and depigmented macules over photosensitive distribution

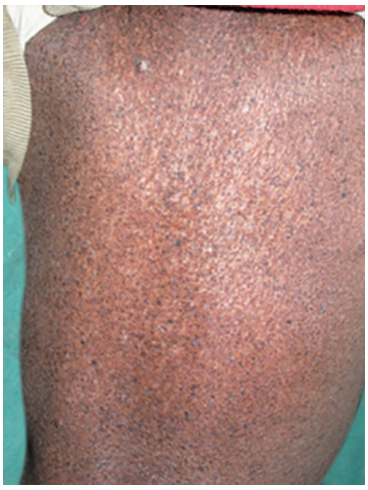

Fig. 3.6B Same child, back

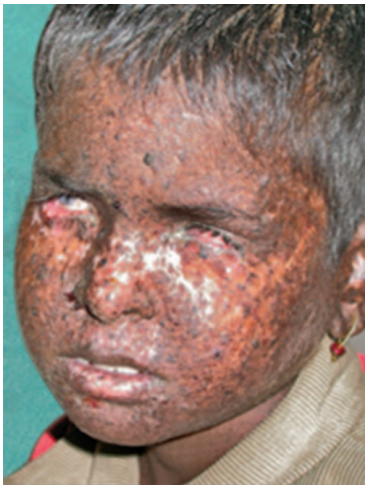

Fig. 3.6 Xeroderma pigmentosum

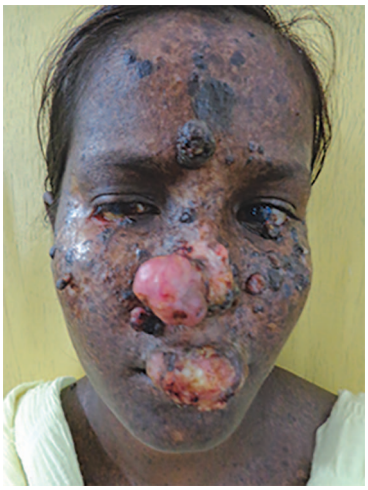

Fig. 3.7 XP in a 9-year old girl with all 3 types of skin malignancy

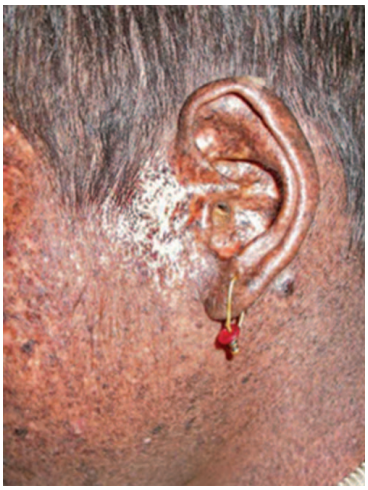

Fig. 3.6A Same child, close-up

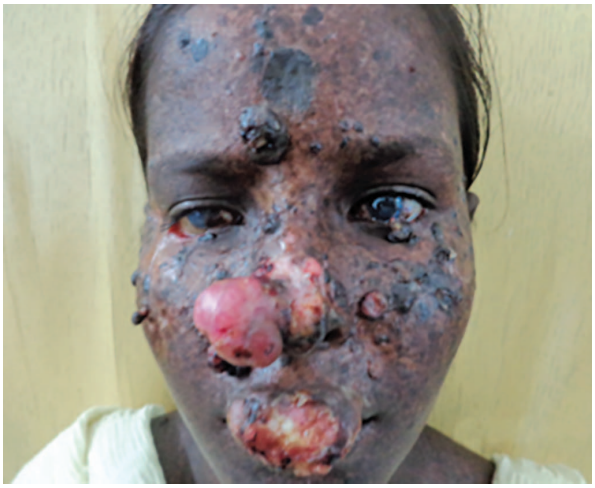

Fig. 3.8 Various types of skin tumors and corneal ulceration

"Those who make peaceful revolution impossible will make violent revolution inevitable."—John F Kennedy

Fig. 3.8A Side view of face of the same girl

Fig. 3.8B Pigmented xerodermoid in a 10-year-old boy

skin cancer. In the acute form, the first manifestation appears early, sometimes shortly after birth after the first exposure to the sun. Initial clinical findings being photophobia, erythemas, freckled hyperpigmentation of exposed parts and subsequently papillomatous or verrucous lesions followed by degenerative and eventual malignant changes.

Natural History

The severity of the disease varies in the severe form, the disease is fatal by 10 years of age.

Treatment

Treatment consists of genetic counseling, vigorous avoidance of UV light exposure, methyl cellulose eye drops to keep the corneas moist and soft contact lenses to protect against mechanical trauma. The premalignant and malignant tumors are treated by topical application of antimetabolites and surgical removal. Oral retinoids have been useful in delaying the development of malignancies of the skin. Dermabrasion and skin grafting are tried for actinically damaged skin.

Pigmented Xerodermoid (Figs 3.8B to D)

Pigmented xerodermoid is a variant of xeroderma pigmentosum (XP). It has a later age at onset in the third or fourth decade of life in comparison to XP which has an onset within one to two years after birth. XP has an autosomal recessive mode of inheritance with a frequency of 1 in 1 million persons in Europe and the United States.[1] It is more common in regions where consanguinity and marriages between close relatives is practiced. XP has seven complementation groups namely A-G and a variant XP-V. Recently the XP-V variant is considered to be the same as pigmented xerodermoid.

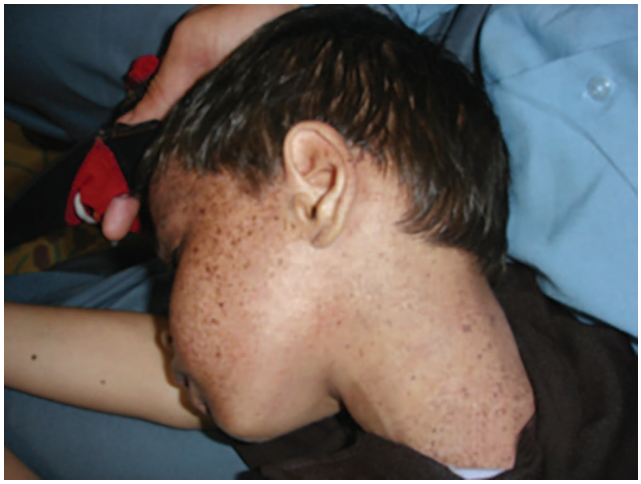

Fig. 3.8C Same child, close-up of neck and side of face

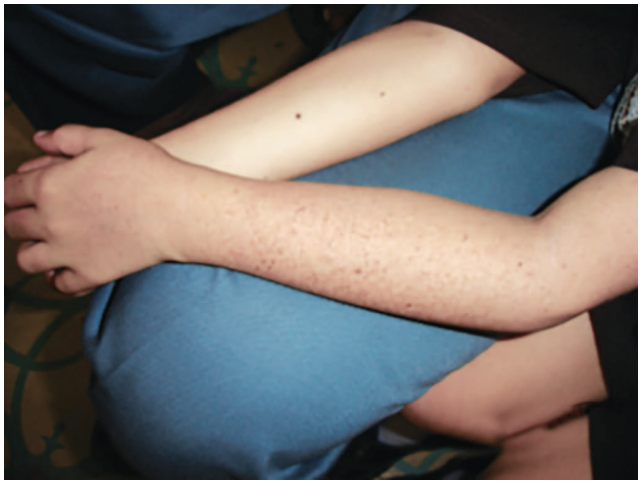

Fig. 3.8D Same child with close-up, extensor of forearms

The complementation groups have been found to be associated with biallelic mutations in nucleotide excision repair genes: XPA, ERCC1, ERCC3 (XP-B), XPC, ERCC2 (XP-D), DDB2 (XP-E), ERCC4 (XP-F), and ERCC5 (XP-G) and also with mutations in the DNA bypass polymerase POLH. The XP-V variant has normal nucleotide excision repair of UV-damaged DNA but they have a defect in the error-prone polymerase, DNA polymerase eta (encoded by POLH). Here there is total depression of DNA synthesis following UV exposure.[2]

XP is clinically characterized by photosensitivity, freckle like pigmentation, ocular changes like photophobia, keratitis, etc. and early onset of malignant cutaneous neoplasms. A proportion of patients also has neurologic abnormalities.

Pigmented xerodermoid or XP-variant patients have cutaneous and ocular manifestations similar to XP but neurologic involvement is rare. Clinical features may be mild in some and severe in others.

Clinically it needs to be differentiated from other variants of XP, XP with neurologic abnormalities, Cockayne syndrome (CS), the XP/CS complex, trichothiodystrophy (TTD), the XP/TTD complex, cerebro-oculofacioskeletal (COFS) syndrome, COFS/TTD, CS/TTD complex, and the UV-sensitive syndrome and other diseases with cutaneous photosensitivity like Rothmund-Thompson syndrome, hartnup disease among a few.[3]

Treatment consists of stringent photo protection of the skin and eyes. Cigarette smoke should be avoided (since it contains carcinogens like benzopyrene) and lubricating eye drops must be used. Total body examinations must be carried out at regular intervals for early identification of malignancies. Premalignant lesions like actinic keratoses may be treated with cryotherapy and malignancies treated along same protocols as in patients without XP. Isotretinoin and acitretin may be tried to prevent cutaneous malignancies. Since exposure to sunlight is minimized, vitamin D may be given prophylactically to prevent bone fractures.[3]

Affected parents can undergo genetic testing to find out the risk of having an offspring with the disease. Prenatal testing and genetic counseling have an important role to play in the diagnosis and management of the disease.

PSEUDOXANTHOMA ELASTICUM (Figs 3.9 and 3.10)

This genetic disorder of the elastic tissue involves the skin, eye and the cardiovascular system. Both autosomal dominant and autosomal recessive transmission may cause the disease. Skin lesions are the hallmark of this disorder characterized by yellowish xanthoma-like papules and linear plaques resembling plucked chicken skin, morocco leather or orange skin (peau d' orange). As they are small in children, diagnosis may be delayed till the 2nd or 3rd decade.

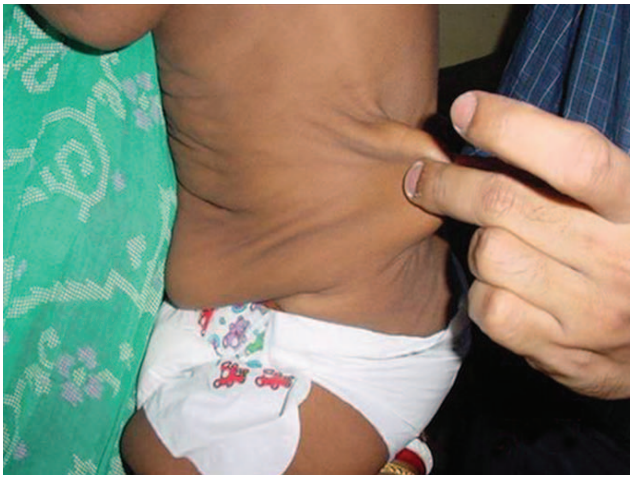

Fig. 3.9 Elasticity of lax skin

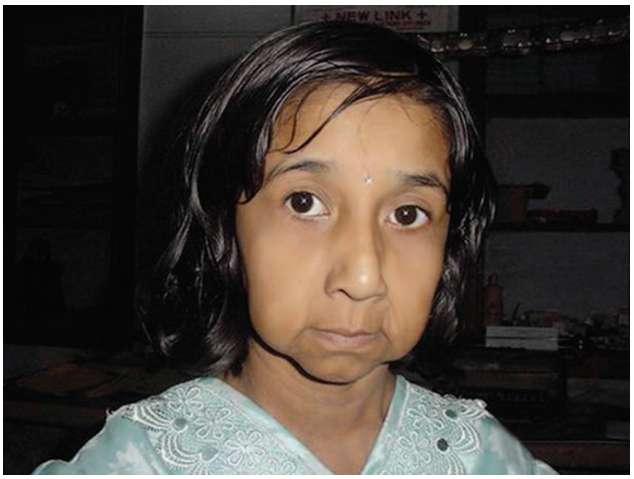

Fig. 3.10 Redundant skin over the face

Systemic Associations

Eye changes are seen as slate gray to reddish brown linear bands which are uncommon in childhood. Loss of central vision is the most frequent disability. Significant cardiovascular changes include peripheral disease with easy fatiguability, intermittent claudication, hypertension, mitral valve prolapse, coronary artery involvement, cerebral, gastrointestinal or uterine hemorrhage.

Management

There is no specific treatment for this disorder. Genetic counseling should be provided and the patients should be advised to avoid strenuous activities and go for regular vascular survey and ophthalmologic examinations.

CUTIS LAXA (Figs 3.10A to C)

It is a heterogeneous group of disorder clinically characterized by loose, redundant, inelastic skin and histologically by loss of elastic tissue in the dermis. This entity may be inherited or acquired.

The condition, also known as dermatomegaly, dermatolysis, generalized elastolysis or chalazoderma has three well-recognised genetic form; autosomal dominant, autosomal recessive and X linked of which the second one is most frequent and most severe. Frame shift or splicing mutation of elastin gene is responsible for autosomal dominant form; mutation in fibulin-5 gene may cause either autosomal dominant or recessive cutis laxa where as fibulin-4 mutation is solely associated with autosomal recessive variety with different system involvement. X-linked cutis laxa or occipital horn syndrome (previously type ix Ehlers Danlos syndrome) is due to defect in copper transporter ATP7A.

The bening, dominant form primarily restricted to the skin with good prognosis. Loose inelastic skin with reduced resilience produces aged appearance of the patients. Pendulous skin around eye, face and neck gives the appearance of blood-hound like facies. Involvement of shoulder girdle simulates St Bernard dog.

Autosomal recessive form is associated with severe systemic involvements like diverticula, pulmonary emphysema, hernia, cor pulmonale, osteoporosis, aortic aneurysm, large fontanelles with delayed closure, congenital dislocation of hip and lax joints. Congestive cardiac failure may be the presenting feature in infancy. Death usually occurs in 1st year of life.

X-linked cutis laxa (CL) is associated with parasagittal exostoses arising from occipital bone along with different system involvement including gastrointestinal tract.

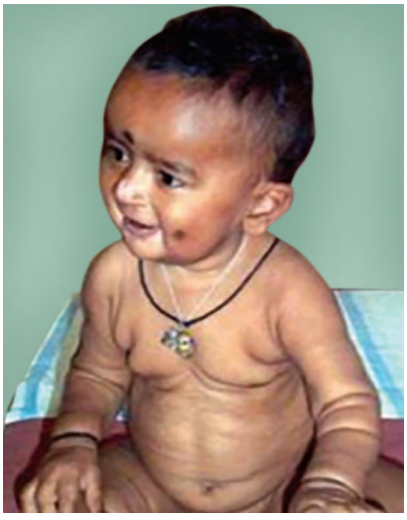

Fig. 3.10A Cutis laxa, note laxity of skin

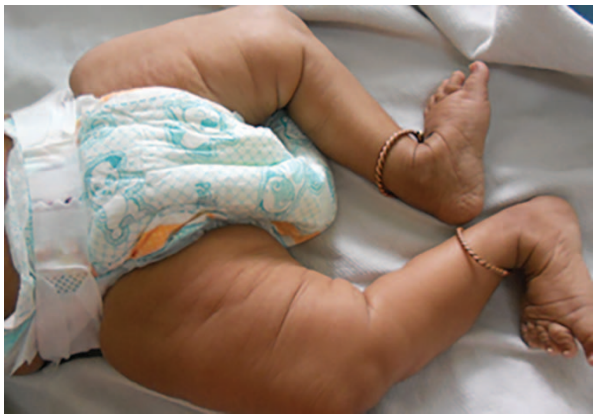

Fig. 3.10B Cutis laxa, thigh and legs

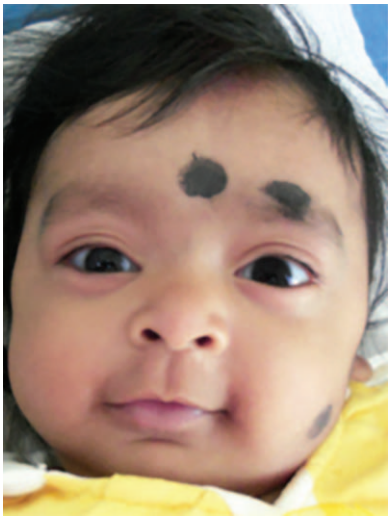

Fig. 3.10C Same child, face

Acquired form of CL resembles phenotypically with milder variety of inherited CL with no positive family history and has a late onset. Acquired variety may be idiopathic, paraneoplastic, post inflammatory (urticaria, erythema multiforme, systemic lupus erythematosus, angioedema, rheumatoid arthritis), drug induced (penicillin, penicillamine) and hematological (multiple myeloma). Acquired CL can be further classified into generalized and localized. Localized variety is usually restricted around eye, palm and sole.

Among the differentials most important and confusing ones are Ehlers-Danlos syndrome (EDS) and pseudo xanthoma elasticum (PXE). In EDS, skin is hyperextensible but still elastic and recoil normally. Histopathology further supports the diagnosis of EDS where pathology is in collagen fibers in contrast to CL where pathology lies within elastic fibers. Though PXE skin is also loose and fails to recoil like that of CL but papules at the affected site (pebbly appearance) favors the diagnosis.

Though reconstructive surgery dramatically improves cosmetic appearance but its role is only temporary as recurrence is common. Involvement of internal organs requires multidisciplinary approach.

DARIER'S DISEASE (Figs 3.11 to 3.13A)

Also known as keratosis follicularis. Darier's disease is an autosomal dominant (AD) disease characterized by greasy crusted papules on the scalp, face, neck, seborrheic areas of the trunk and flexures of the extremities. The age at onset varies from early childhood through adulthood, though, it typically appears between 8 and 15 years of age. The lesions start as pinhead to pea sized flesh colored papules. Most papules are perifollicular and as the disease progresses, they coalesce to form plaques covered with flesh colored yellowish brown greasy crusts that tend to become purulent and malodorous. The lesions exacerbate in summer. Nail involvement beginning as a red streak with subungual hyperkeratosis accompanied by adjacent white streaks on the nail plate is often the first sign of the disorder and may be the only manifestation in early childhood. Subsequently, fragility, splitting, fissuring of the nails and subungual splinter hemorrhage occur. Lesions of the mucous membrane consist of small white papules resembling leukoplakia. Palmoplantar hyperkeratosis is present in 10 percent of the affected individuals. Indolent papules resembling flat warts on the dorsal aspect of the hands and feet (a disorder termed 'acrokeratosis verruciformis of Hopf) have been described in association with Darier's disease.

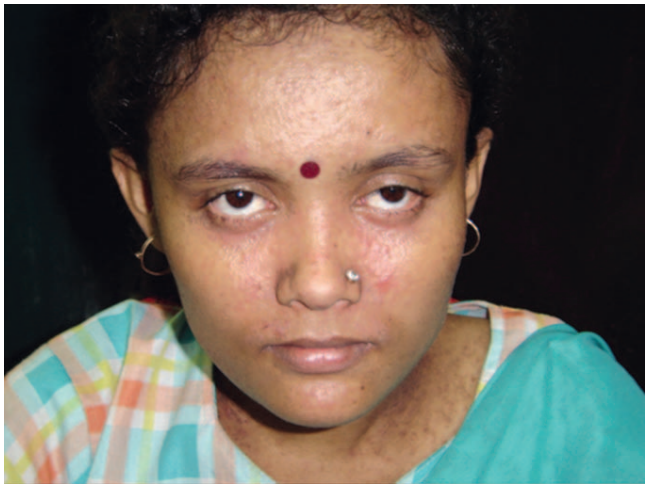

Fig. 3.11 Darty warty papules of Darier's disease over face and neck of an adolescent girl

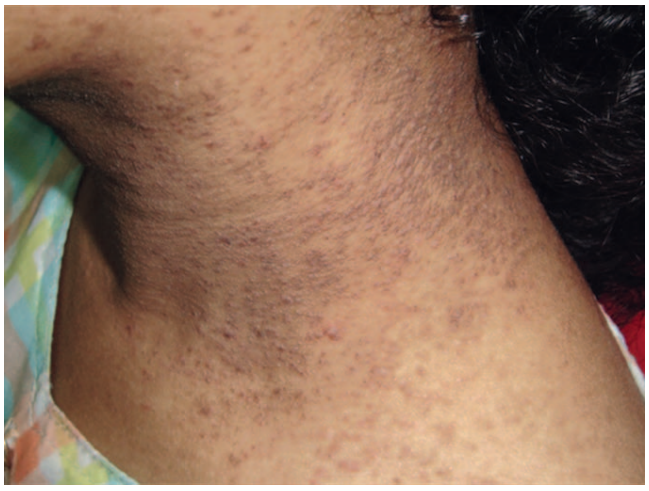

Fig. 3.12 Same girl, close-up of neck lesions

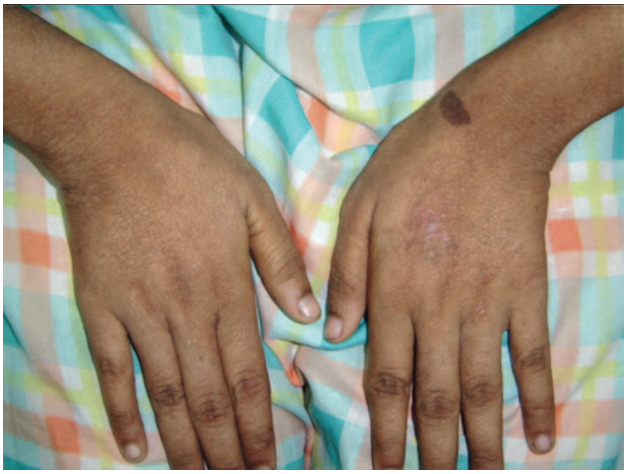

Fig. 3.13 Plane wart like lesions over dorsa of hands in the same girl

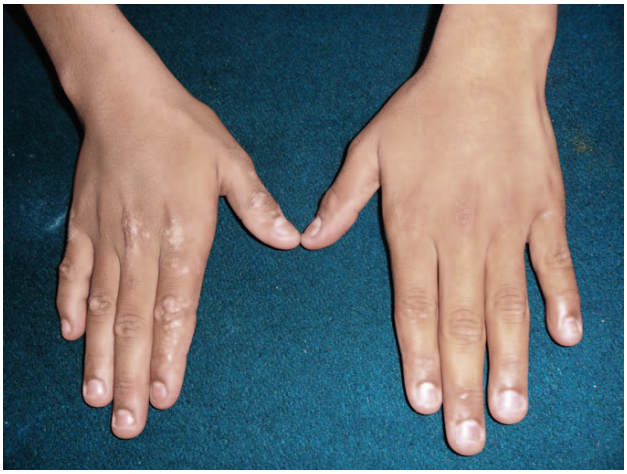

Fig. 3.13A Acrokeratosis lesions over classical site, often present in children with Darier's disease

Management

There is no specific therapy for Darier's disease. Patients are instructed to avoid sun exposure, heat and humidity as the lesions are exacerbated in summer and aggravated by sunlight, ultraviolet exposure and perspiration. Topical vitamin A acids are helpful in controlling the lesions, however, prolonged remissions are not seen.

PROGERIA (Figs 3.14 to 3.18)

Progeria is a rare disease characterized by a combination of dwarfism, generalized atrophy of the subcutaneous tissue and muscle, a high incidence of generalized atherosclerosis, and early onset of progressive senile degenerative changes. Usually a history of consanguineous marriage in the parents is available and the disease affects other siblings as well. This suggests an autosomal mode of inheritance. However, recently cases with automal recessive inheritance are also on record. However, there are only a handful families with progeria have been documented across the globe. There is no sex predilection. The classical clinical features consist of dwarfism, alopecia of the scalp, eyebrows and eyelashes, prominent scalp veins and generalized atrophy of muscle and subcutaneous tissue. The face is small with recession of the chin, a thin beaked nose gives a bird-like appearance. The head gives a hydrocephalic appearance. The skin is generally thin, dry, wrinkled with mottled brownish hyperpigmentation. The fingers and toes show sclerodermatous changes, there is terminal tuft resorption, contractures may also be seen. The nails are thin, brittle and resorption of bones lead to osteoporosis and tendencies to frequent fracture. The teeth

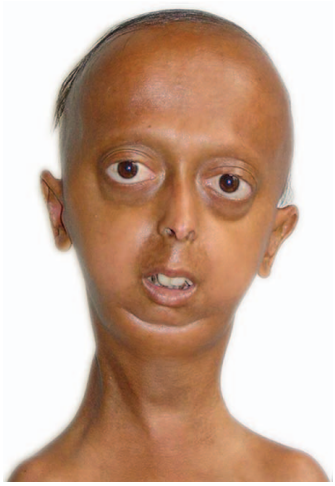

Fig. 3.14 Progeria boy of 18 years

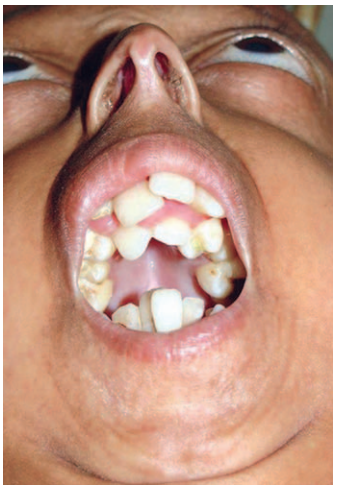

Fig. 3.15 Overcrowding of teeth causing dental malocclusion

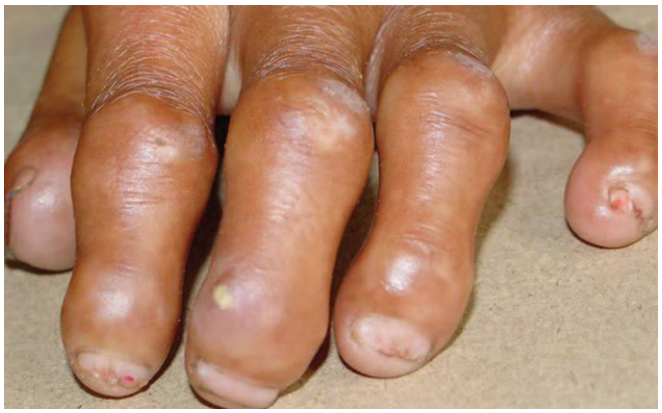

Fig. 3.16 Fingers showing acroosteolysis and sclerodermoid changes

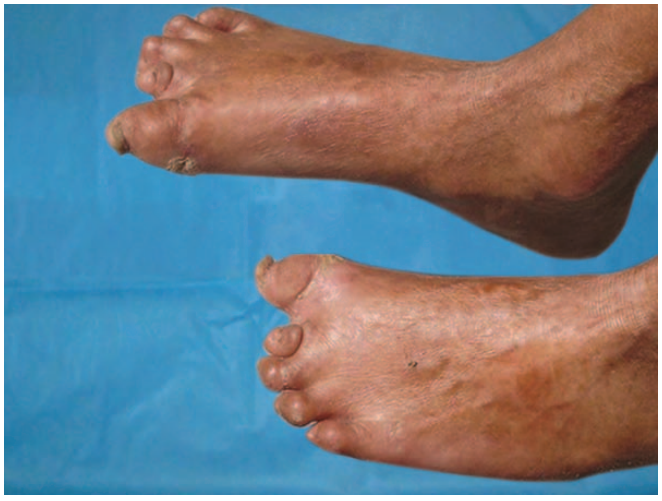

Fig. 3.17 Resorption of toes and repeated ulcerations

"With a gentleman I am always a gentleman and a half, and with a fraud I try to be a fraud and a half."—Francis Bacon

Fig. 3.18 Progeria family, consanguinity between parent

becomes crowded as the decidous teeth are often retained leading to a double chin appearance. The chest becomes narrow with a protuberant abdomen.

Prognosis

The overall prognosis is poor with development of early and extensive atherosclerosis after the age of 5 years only. This may lead to hypertension, cardiomegaly, angina, myocardial infarction and congestive cardiac failure. Death usually occurs during the second decade of life.

KINDLER SYNDROME (Figs 3.19 to 3.22)

It is a rare autosomal recessive (AR) condition characterized by skin fragility, acral blisters, photosensitivity, poikiloderma, cutaneous atrophy and mucosal inflammation. The new classification of epidermolysis bullosa (EB) divides it into four types: intraepidermal (EB simplex), junctional, dermolytic, (dystrophic) and mixed (Kindler syndrome). The gene involved in Kindler syndrome is FERMT1 (previously known as KIND1) which encodes a protein linking actin with the extracellular matrix, thus affecting skin integrity.

The major features of Kindeler syndrome in infancy are skin fragility and photosensitivity. Blisters appear either immediately or shortly after birth. The blister formation may improve during childhood variably. In early childhood the atrophy and 'cigarette-paper like' wrinkling of dorsum of hands and feet become more apparent. Photosensitivity is absent at birth but develops gradually. Webbing of fingers and toes have been reported. Other features are mild to moderate gingivitis, gingival fragility and periodontitis. Various other

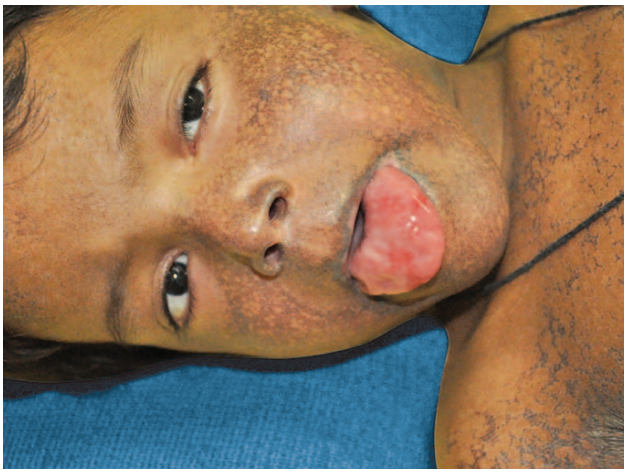

Fig. 3.19 Kindler syndrome

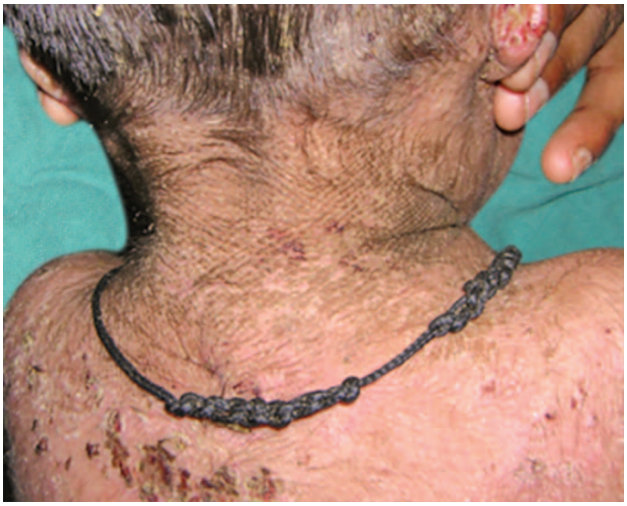

Fig. 3.20 Same child, scarring and pigmentation on neck

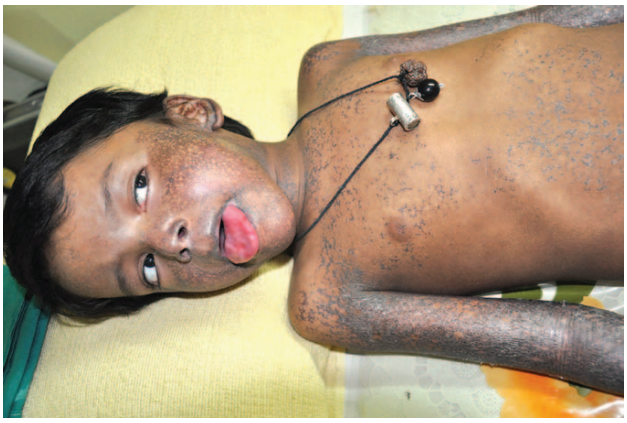

Fig. 3.21 Same child, scarring and pigmentation over upper arm and forearm

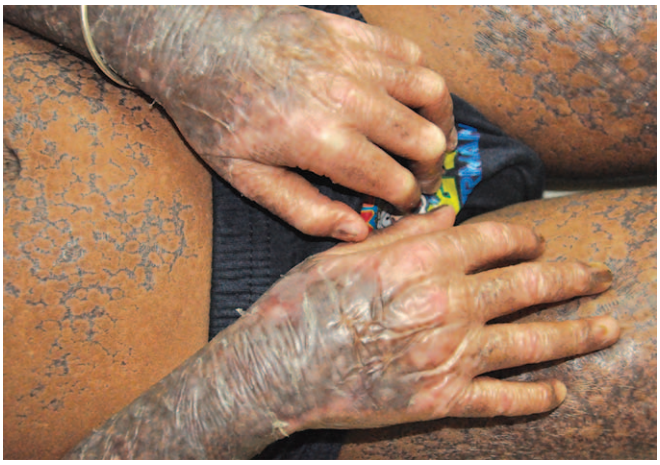

Fig. 3.22 Cigarette paper like scarring over dorsum of hands in Kindler syndrome

complications are esophageal stricture and stenosis, anal stenosis, urethral stricture, keratoconjunctivitis, ectropion and conjunctival scarring.

Prognosis

Normal life expectancy.

Treatment

The cases are best managed by multidisciplinary team comprising of dermatologists, pediatricians, specialist nurses, dieticians, dentists and ophthalmologists. The most important thing is to emphasize regular use of sunscreen and sunprotecting clothes.

"Money is like manure, of very little use except it be spread."—Francis Bacon

4

Disorders of Keratinization

ICHTHYOSIS VULGARIS (Figs 4.1 to 4.2A)

This is an autosomal dominant condition, more common in temperate climates with an equal sex distribution. It shares a close relationship with atopic diseases. The skin may appear dry and scaly in the neonatal period, however, scaling becomes more prominent from 2 months onwards. The scale is white or gray, small, flaky and semiadherent with turned up edges. It is most pronounced on the extensor surfaces of the arms and lower legs and characteristically spares the flexural creases. The trunk is mildly affected and the napkin area is spared. Facial scaling, generally forehead and perioral, mild dandruff and involvement of the pinnae is seen in some patients. The palms and soles are usually free of scale but palmoplantar hyperlinearity is a helpful feature in these patients whether they have co-existent eczema or not. Symptoms of ichthyosis are few and limited to complaints of dryness and roughness. In patients with co-existent eczema, flexural lichenification and pruritus with excoriation are additional features.

Natural History

There is improvement of the condition in warm to sunny weather. Many sufferers have a gradual improvement in adolescence.

Management

Increasing the humidity in the environment is a beneficial measure in all patients with ichthyosis. Regular emollient application is necessary. The emollient may be in the form of aqueous cream for mild to moderate ichthyosis vulgaris or in the form of paraffin based or cetyl and stearyl alcohol containing emollients for severely affected ones. Bath oils and emollient soap substitutes are useful. Keratolytic agents, such as 1–5% salicyclic acid may be added to emollient

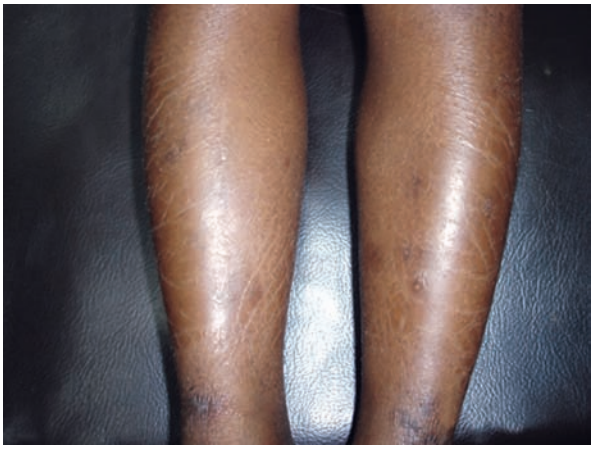

Fig. 4.1 Brown small scales of ichthyosis vulgaris distributed bilateral symmetrical fashion

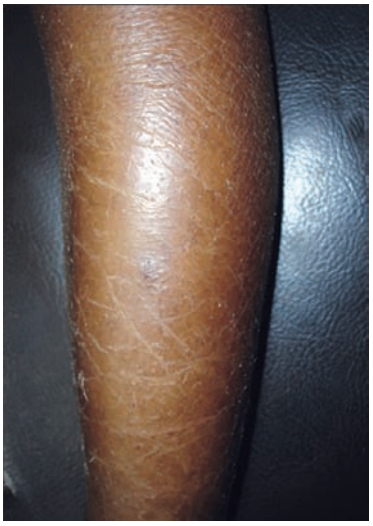

Fig. 4.2 Close-up of scales and keratosis follicularis

"The busy have no time for tears."—Lord Byron

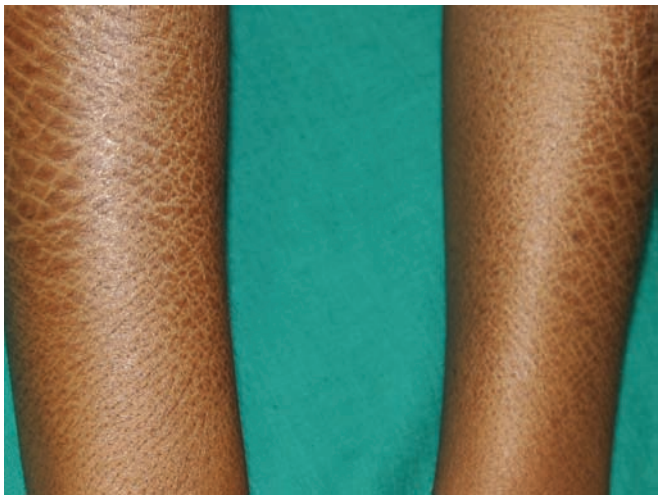

Fig. 4.2A Ichthyosis vulgaris, note fine scales

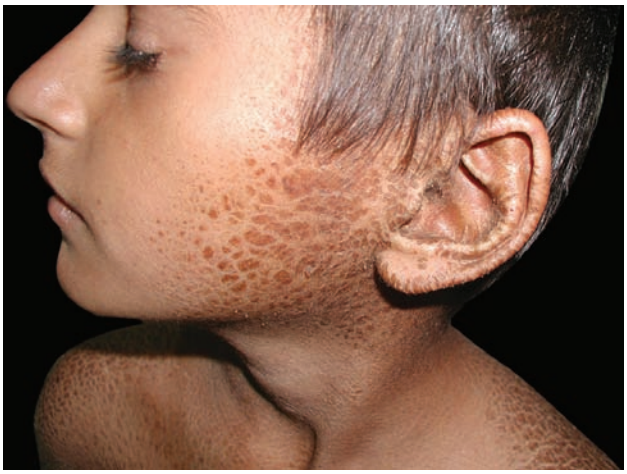

Fig. 4.3 Involvement of face and neck in XLRI

cream bases to encourage shedding of the scales but their widespread usage should be avoided in children because of their systemic toxicity. Urea containing emollient bases improve epidermal hydration, causes lysis of keratin and are bacteriostatic. Patients with atopic dermatitis having ichthosis will need treatment of AD along with treatment of ichthyosis.

X-LINKED RECESSIVE ICHTHYOSIS (Figs 4.3 to 4.3C)

X-linked recessive ichthyosis (XLRI) affects male offsprings of female carriers who are asymptomatic. In 75% of cases, scaling is evident within the first week of life although parents may not become aware of persistent scaling until some months later. A prominent peeling episode takes place by 6 months. The scaling of XLRI tends to increase throughout childhood, often spreading up from the lower legs to the trunk. Scaling is most prominent on the extensor surfaces of the upper arms, the outer thighs and around the lower legs. Typically, the scale is medium to large polygonal, adherent, dull and light brown or muddy in color. In contrast to ichthyosis vulgaris the flexures may be involved. Palms and soles are spared.

Systemic Associations

X-linked recessive ichthyosis (XLRI) is often associatd with maldescended testes, abnormalities of sperm count or motility leading to infertility and testicular cancer. Corneal dots, thread-like or comma shaped opacities, detected with slit lamp microscope, occur in 50–100% of adult patients and in 25% of female carriers.

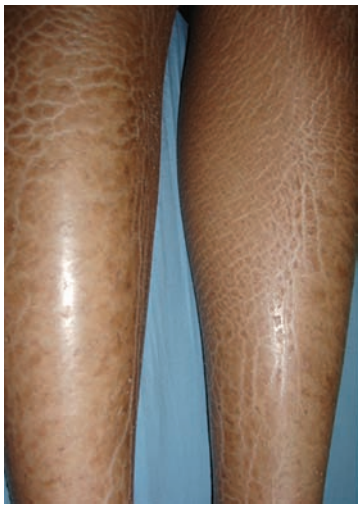

Fig. 4.3A Large thick brown scales of XLRI

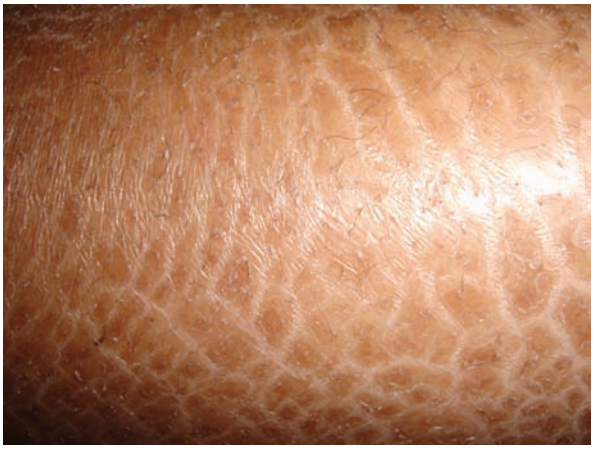

Fig. 4.3B Close-up of scales of XLRI

"Conscience is thoroughly well-bred and soon leaves off talking to those who do not wish to hear it."—Samuel Butler

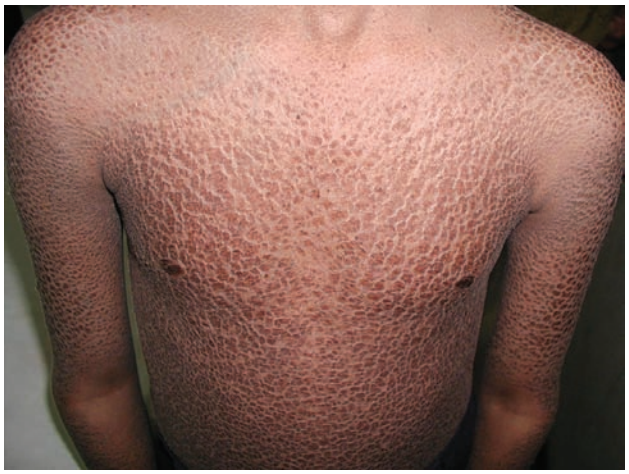

Fig. 4.3C Ichthyosis XLRI, involvement of trunk and upper limbs

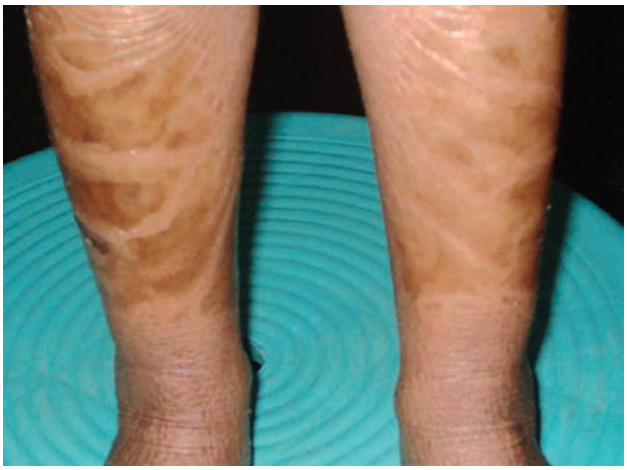

Fig. 4.4 Large, big, dark scales of lamellar ichthyosis

Natural History

Spontaneous improvement to some extent occurs during summer and daily application of emollient is helpful.

Treatment

Keratolytics and urea containing preparations are less irritant than, in cases of ichthyosis vulgaris. In severe cases or XLRI, intermittent short courses of oral retinoids is beneficial. However, the treatment is costly.

LAMELLAR ICHTHYOSIS (LI) (Figs 4.4 to 4.5A)

This autosomal recessive ichthyosis is less common than nonbullous ichthyosiform erythroderma. It is characterized by the presence of large, pigmented scales in the absence of erythroderma. At birth, most present as a collodion baby and after shedding show a less intense erythroderma than nonbullous ichthyosiform erythroderma (NBIE), an important distinguishing feature. Scaling occurs within the first month of life and may affect the whole skin surface or localize to the scalp, abdomen and lower legs.

Management

Treatment is more or less same as ichthyosis vulgaris and urea, lactic acid and vaseline containing ointments are useful.

Hydroxy acid or propylene glycol are also effective. Regular use of antiseptic washes and appropriate systemic antibotics may be required in severe cases with repeated cutaneous bacterial and fungal infection and associated

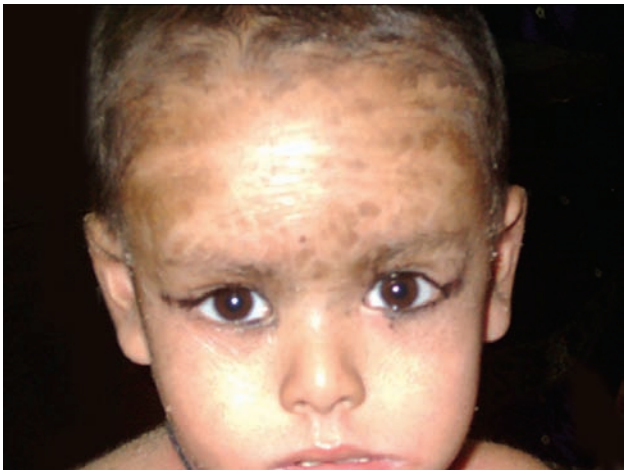

Fig. 4.5 Lamellar ichthyosis affecting forehead

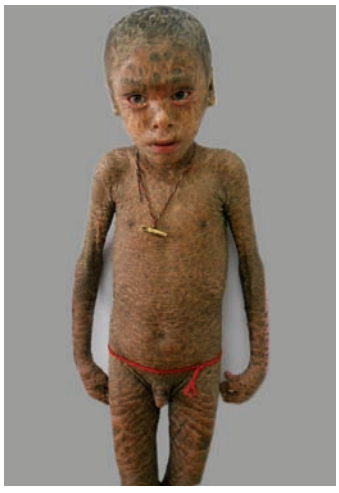

Fig. 4.5A Lamellar ichthyosis, note thick pigmented large scales

"The dead have been awakened-shall I sleep? The worlds at war with tyrants-shall I crouch? the harvests ripe-and shall I pause to reap? I slumber not; the thorn is in my couch; Each day a trumpet soundeth in mine ear, its echo in my heart."—Lord Byron

body odor. Topical calcipotriol produces slight reduction in scaling. Oral retinoid therapy is beneficial in some patients.

NONBULLOUS ICHTHYOSIFORM ERYTHRODERMA (Figs 4.6 to 4.9C)

Nonbullous ichthyosiform erythroderma (NBIE) is a rare and usually severe autosomal recessive inflammatory ichthyosis. In over 90% of cases it presents at birth with a collodion baby appearance. After shedding of the collodion membrane, generalized scaly erythroderma is apparent and in severe cases persistent. Erythroderma generally lessens in childhood. Scaling can affect all areas including the scalp, ears, face, flexures, palms and soles. The scale of NBIE is white or gray, light superficial and semiadherent. Palmoplantar hyperkeratosis occurs in 70% of patients. Ectropion with loss of eyebrows and lashes compound the ocular problem. Scalp involvement often causes tinea amiantacea and may lead to patchy cicatricial alopecia, hypoplasia of the nasal and aural cartilages may occur as a result of compression and scarring. A mild nail dystrophy occurs in up to 50% of cases but hair, teeth and mucosal surfaces are normal. In most patients, sweating is absent or markedly reduced from infancy onwards. Pruritus is common but skin infections are rare. NBIE differs from lamellar ichthyosis in having finer scaling and more pronounced erythema.

Management

Emollients and keratolytics form the mainstay of treatment. Topical retinoids are avoided as it can cause irritation over an inflamed skin. Prevention of sunburn and sun-induced damage is mandatory. Systemic retinoids may be helpful. Acitretin is given at a starting dose of 0.5–0.75 mg/kg/day and continued till 2–3 weeks when the good response is usually seen. The dose of acitretin is then brought down to a minimum effective dose of 0.1–0.25 mg/kg/day and may be continued for 2–3 months as per response and safety.

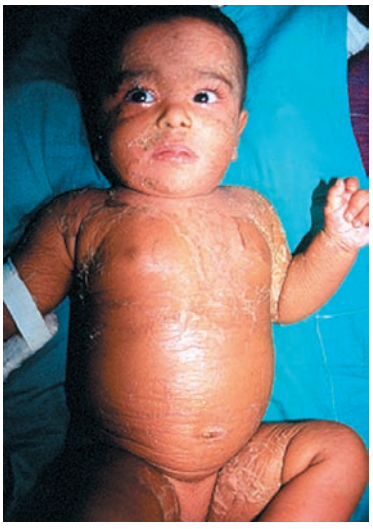

Fig. 4.6 Large thick pigmented scales of NBIE

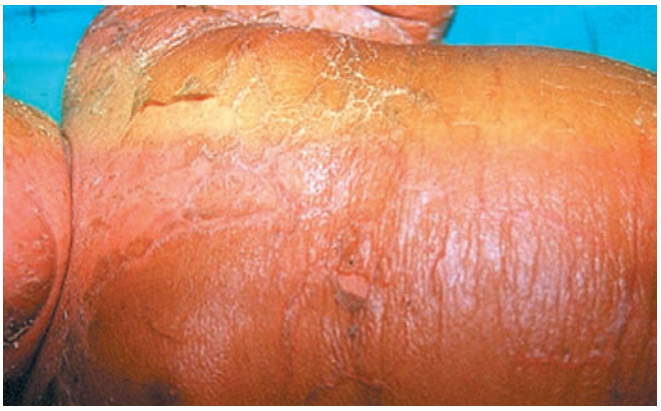

Fig. 4.7 Severe involvement of trunk in NBIE

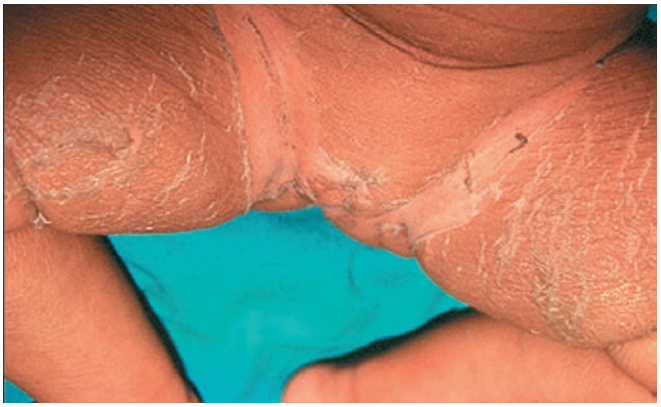

Fig. 4.8 Involvement of thighs in NBIE

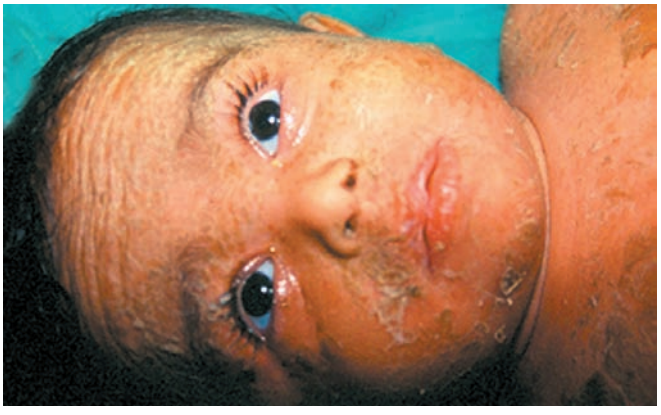

Fig. 4.9 Same child showing involvement of face

"Absence-that common cure of love."—Lord Byron

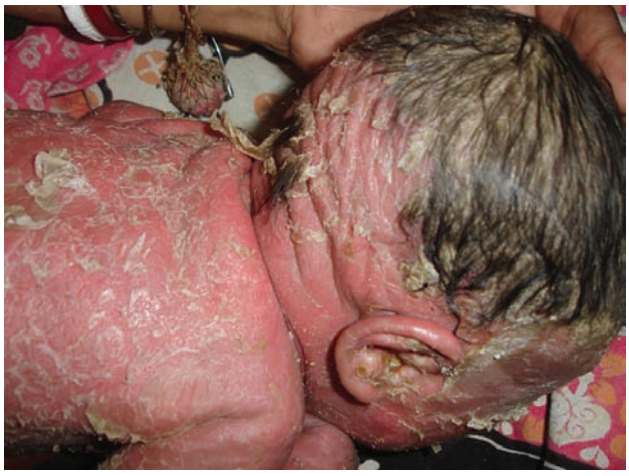

Fig. 4.9A NBIE baby

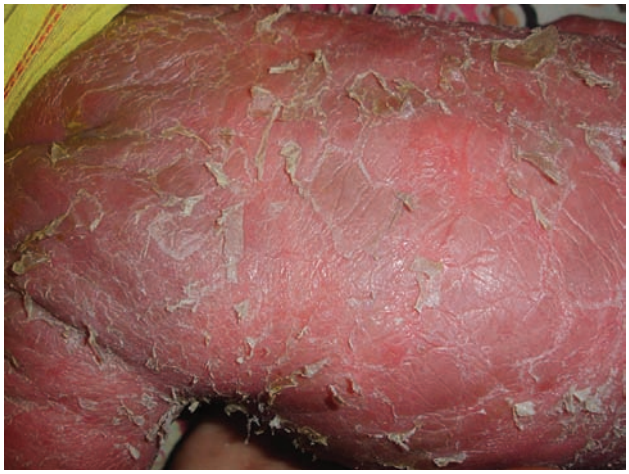

Fig. 4.9B NBIE, note skin over back

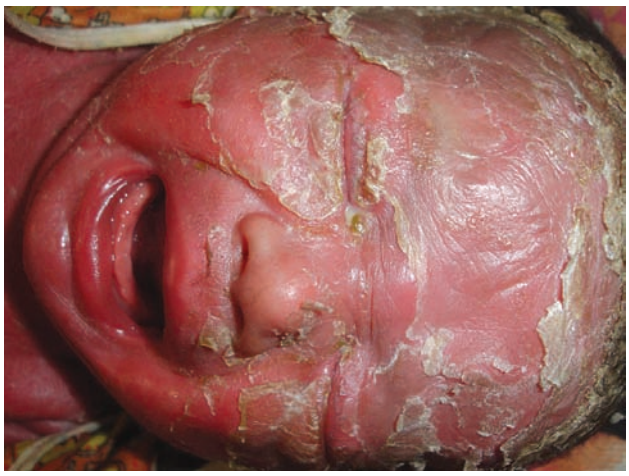

Fig. 4.9C NBIE, close-up of face

EPIDERMOLYTIC HYPERKERATOSIS (BULLOUS ICHTHYOSIFORM ERYTHRODERMA) (Figs 4.10 to 4.13A)

This is a rare autosomal dominant disorder of keratinization which in its early phase, is associated with blistering. Patients present with a mild generalized erythroderma at birth. The skin is very fragile leading to flaccid blisters and peeling at site of minor trauma within the first few hours of life. Frequent misdiagnosis at this stage includes staphylococcal scalded skin syndrome and epidermolysis bullosa. However, the baby is generally apyrexic and well. Many of these babies succumb to severe infection, severe dehydration and malnutrition subsequently leading to very high mortality. With improved neonatal intensive care the prognosis has somewhat improved. Erythroderma fades in infancy but

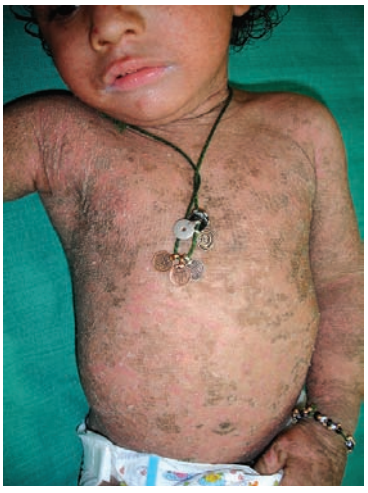

Fig. 4.10 Epidermolytic hyperkeratosis

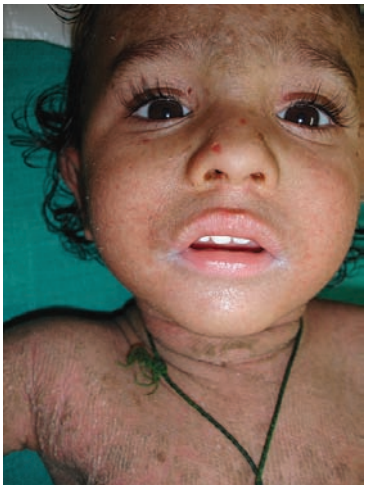

Fig. 4.11 Same boy, note face and neck

"Retirement at sixty-five is ridiculous. When I was sixty-five I still had pimples."—George Burns

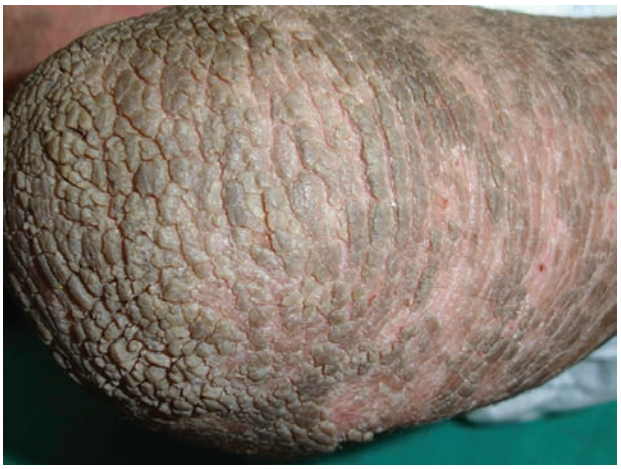

Fig. 4.12 Thick scales giving a fissured appearance

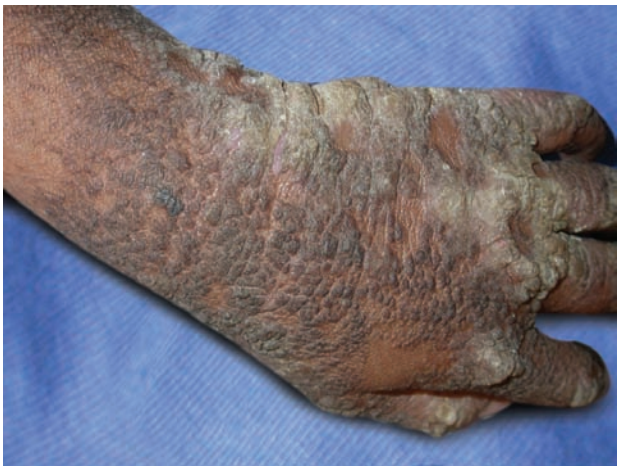

Fig. 4.12A Epidermolytic hyperkeratosis, note porcupine like appearance of skin

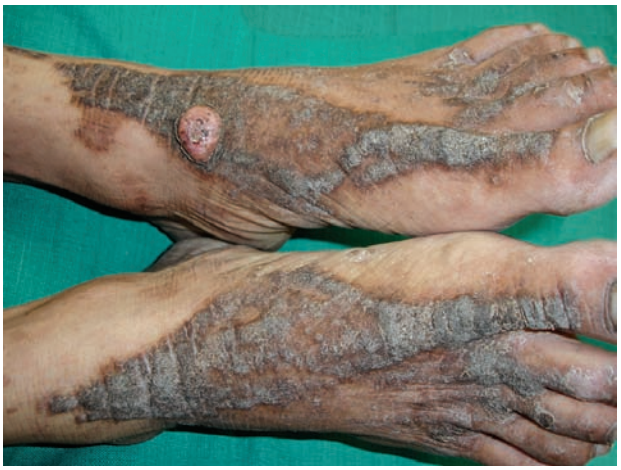

Fig. 4.13 EH over dorsum of feet, bilateral in a 17-year-old boy

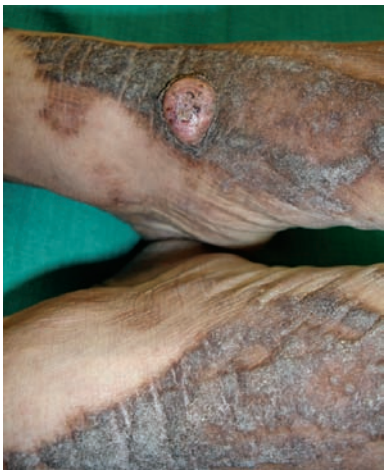

Fig. 4.13A Same boy, close-up of lesions

the characteristic gray, waxy scale progresses. Increasing hyperkeratosis is obvious from early childhood and is most prominent around joint flexures, scalp, anterior neck, abdominal wall and infragluteal folds. At these sites, yellow-brown waxy and ridged scales build up in skin creases. Cobble stone keratoses and verrucous plaques may develop at other sites. Repeated skin infections and cellulitis are troublesome complications in these children. Palmoplantar hyperkeratosis develops in approximately 60% of these patients. Severely affected patients suffer significant physical and psychological morbidity.

Differential Diagnosis

In the neonatal period, other blistering disorders such as epidermolysis bullosae, staphylococcal scalded skin syndrome, herpetic infection and incontinentia pigmenti must be excluded by clinical, histopathological and microbiological assessment.

Management

Emollients are of limited value in BIE as the scales are often greasy and the skin remains sodden and macerated. Keratolytic preparations like salicylic acid, alpha-hydroxy acids, or propylene glycol are effective. Regular use of antiseptic baths/washes, rotational systemic antibiotics, anticandidal preparations many be required in severe cases with repeated bacterial or fungal (candidal) infections and associated body odor. For localized lesions at puberty or late childhood, topical calcipotriol is found to be effective. For extensive lesions, oral retinoid is beneficial in such patients.

COLLODION BABY (Figs 4.14 to 4.19A)

The term 'collodion baby' is used to describe infant who are born with a membrane like covering resembling collodion or

Fig. 4.14 Collodion baby, note thick fissured scales over face

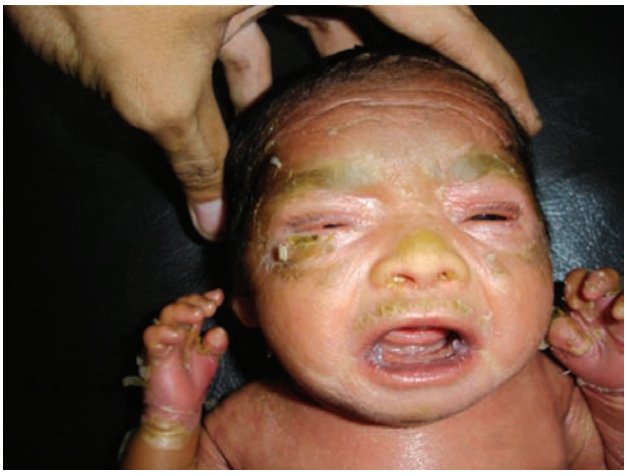

Fig. 4.15 Same baby showing mild ectropion and eclabium

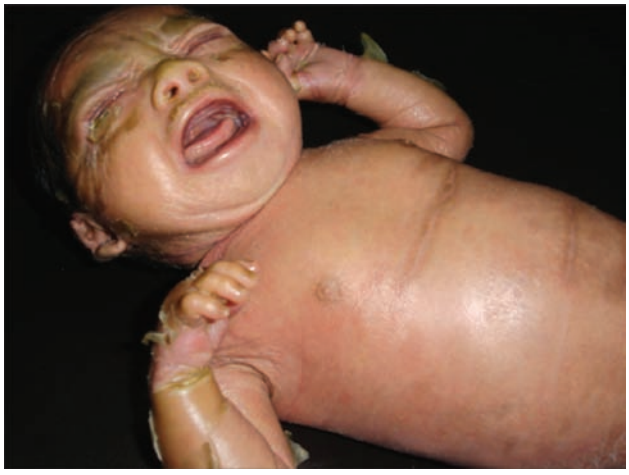

Fig. 4.16

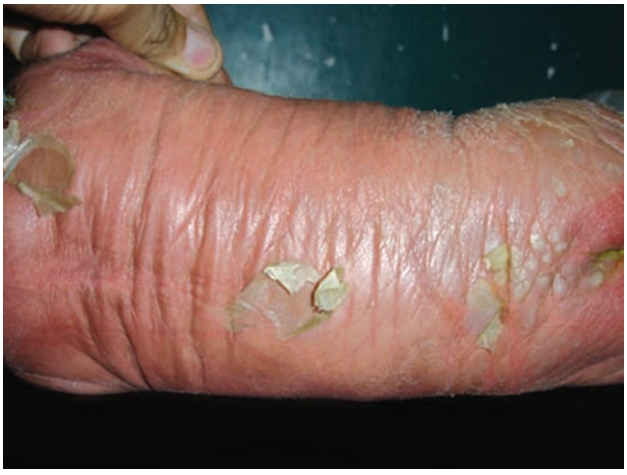

Fig. 4.17

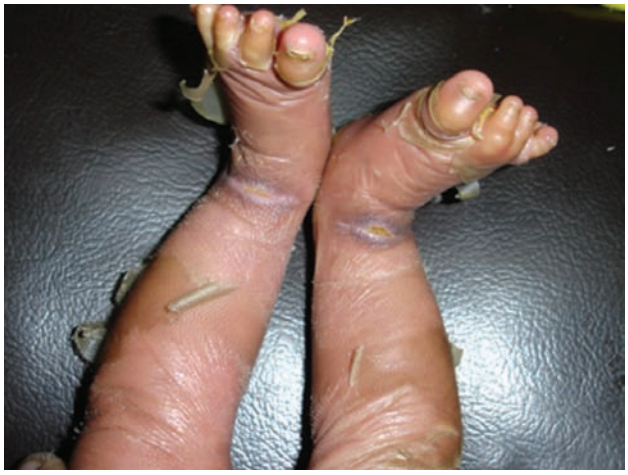

Fig. 4.18

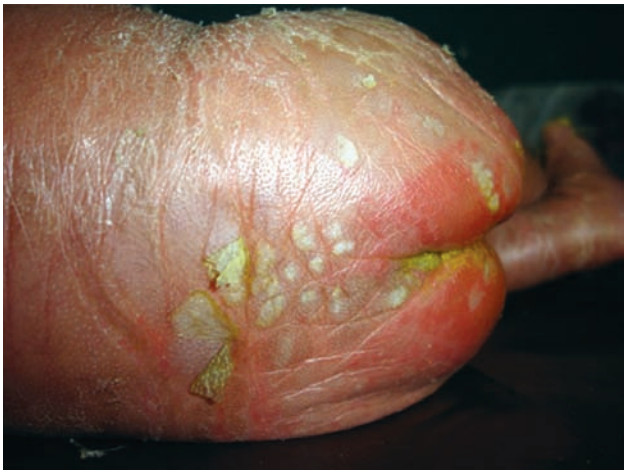

Fig. 4.19

Figs 4.16 to 4.19 Showing membrane like thick sheets of scales coming out over different parts of the body

"Don't hit at all if it is honorably possible to avoid hitting; but never hit soft."—Theodore Roosevelt

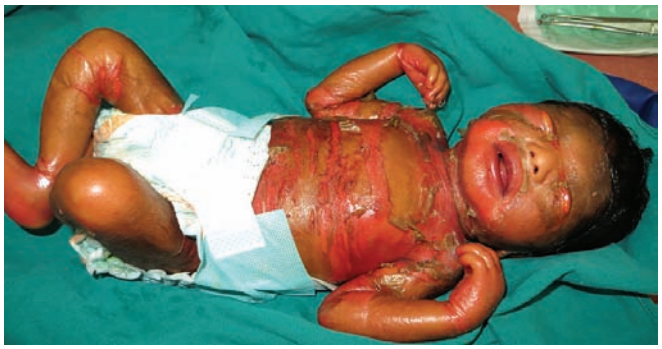

Fig. 4.19A Collodion baby, very severe form

oiled parchment. The collodion baby is not a disease entity but is a phenotype common to several disorders. Majority of the cases are due to congenital ichthyosiform erythroderma. Other causes are lamellar ichthyosis, Netherton's syndrome, Conradi's disease, trichothiodystrophy, Sjögren-Lasson syndrome, recessive X-linked ichthyosis and ichthyosis vulgaris.

Complications

The membrane, by its tautness, causes distortion of facial features and extremities. Infants are unable to suck and breathe properly, suffer from cutaneous and systemic infection, temperature instability and electrolyte imbalance.

Treatment

Treatment is mainly in the form of supportive care. Infants are kept in humidified incubator with special attention to the prevention of temperature instability, sepsis, fluid and electrolyte imbalance. Topical therapy may be done by using light emollient preparations.

HARLEQUIN FETUS (Figs 4.20 to 4.20C)

The term harlequin fetus refers to a severe and dramatic form of congenital ichthyosis probably inherited as an autosomal recessive (AR) trait. The disease is fatal with a life span of 6 weeks or less. The thickened gray or yellow colored skin is devided into polygonal, triangular or diamond shaped plaque by deep reddish brown fissures resulting from severe keratosis, resembling the traditional costume of a 'harlequin.' Regidity of the skin results in ectropion, fish mouth deformity of lips, distorted nose and ears. Nails are hypoplastic or absent. There is difficulty in sucking, breathing and swallowing with flexion deformity of all joints of the limbs.

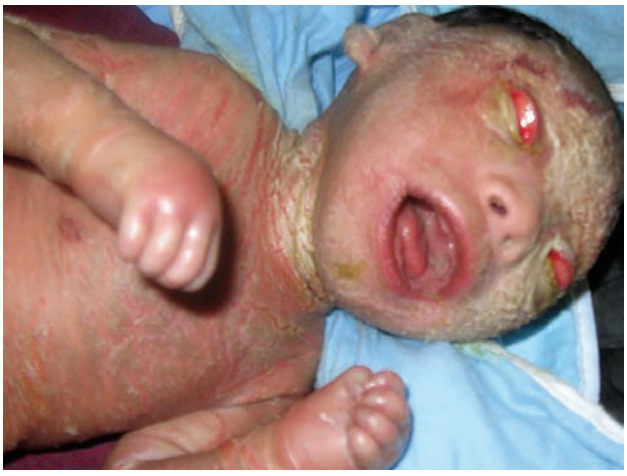

Fig. 4.20 Harlequin baby, note encasement of the baby in a thick keratinous membrane with ectropion, eclabium and fissuring over the point of stretching of the limbs

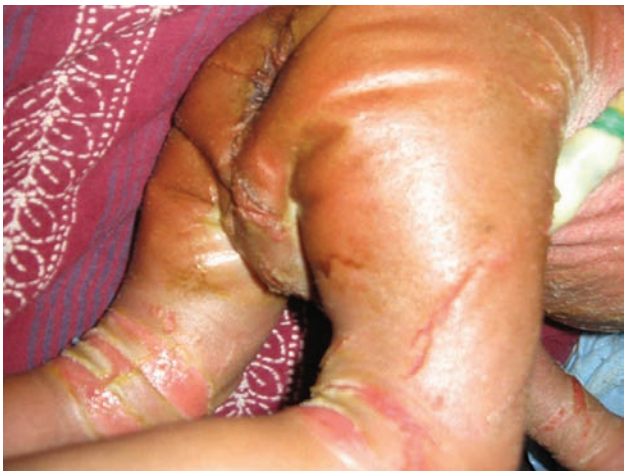

Fig. 4.20A Note chequered appearance of fissured skin (from which the name 'Harlequin' originates)

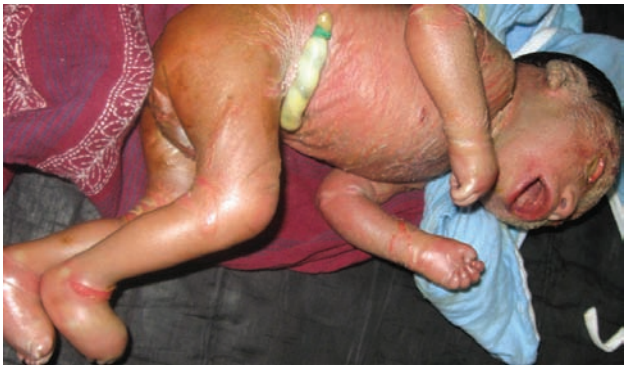

Fig. 4.20B Harlequin ichthyosis, note gross ectropion and eclabium

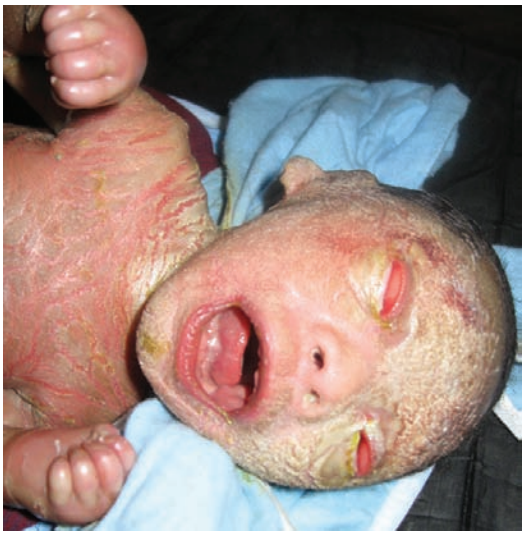

Fig. 4.20C Close-up of Harlequin fetus

Natural History

Therapy is generally ineffective, most cases are either stillborn or die during the neonatal period usually during the first few hours or days of life of prematurity.

Complications

Pulmonary infection, poor feeding, excessive fluid loss, poor temperature regulation or sepsis may develop as a result of cutaneous infection.

Treatment

Treatment with oral retinoid etretinate and intensive skin care can prolong survival but at the cost of quality of life.

PITYRIASIS RUBRA PILARIS (Figs 4.21 to 4.24C)

This disorder is characterized by circumscribed follicular keratoses, palmoplantar keratoderma and erythroderma, affecting both sexes equally. In the classical adult onset PRP, the eruption starts most often on the head, neck or upper trunk as an erythematous slightly scaly macule. Erythematous perifollicular papules with a central follicular plug appear few weeks later. These coalesce to form orange, red scaly plaques that frequently contain islands of normal appearing skin. The classical juvenile PRP is early in onset, between 5–10 years of age. In the circumscribed juvenile PRP which affects children, sharply demarcated areas of follicular hyperkeratosis and erythema are seen in the knees and elbows.

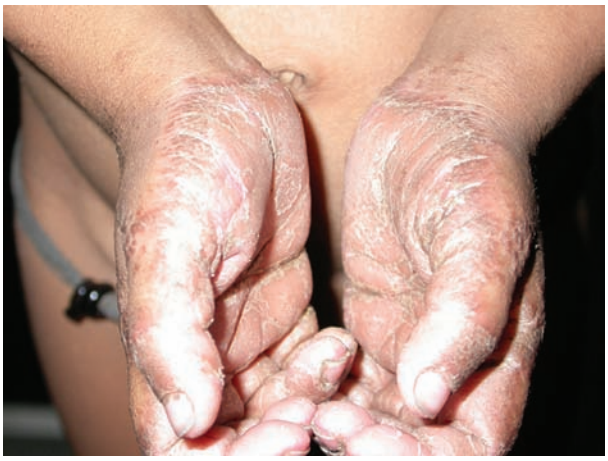

Fig. 4.21 Diffuse hyperkeratosis over the palms in a 10-year-old boy with PRP

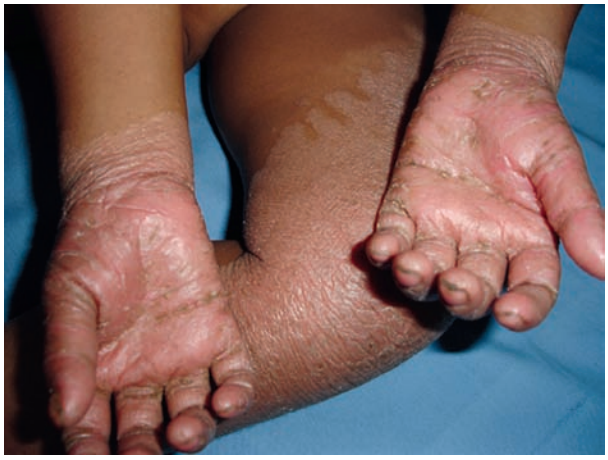

Fig. 4.21A PRP palms, note thickening and fissuring

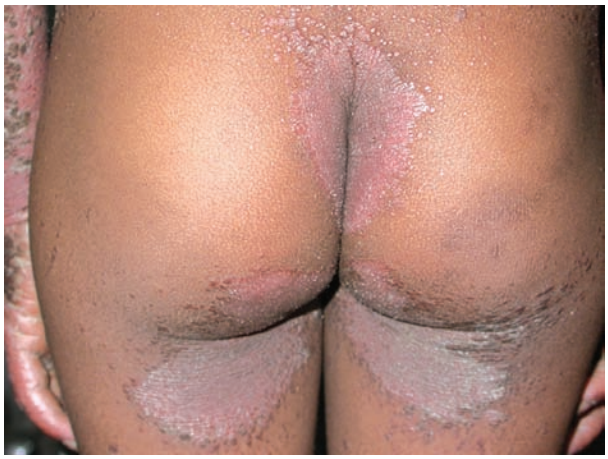

Fig. 4.22 Hyperkeratotic lesions over gluteal fold, buttocks and upper thighs

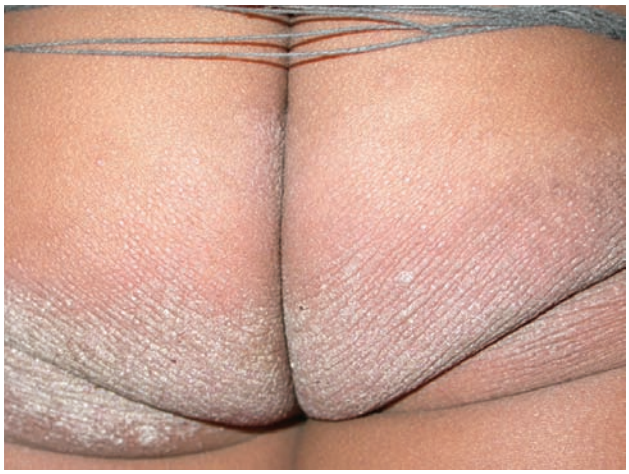

Fig. 4.23 Hyperkeratotic lesions over the buttocks and thighs

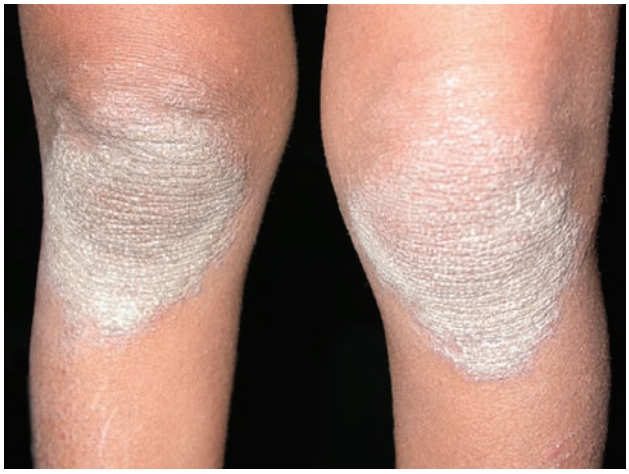

Fig. 4.24 Hyperkeratotic spiny lesions over the knees

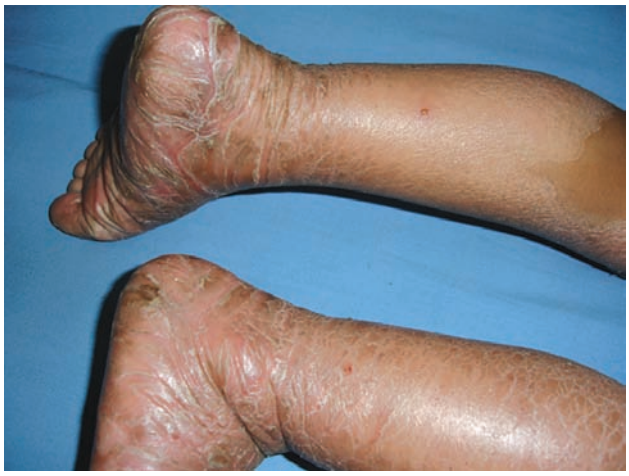

Fig. 4.24A Lower legs and soles in PRP

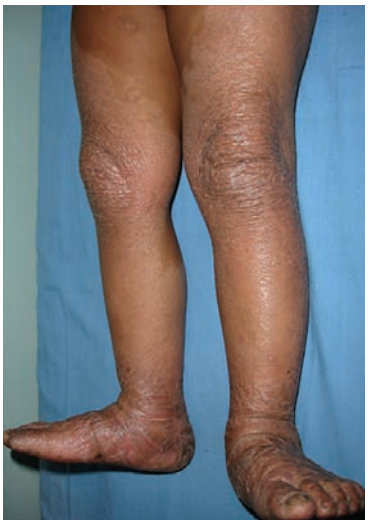

Fig. 4.24B Legs and soles in PRP

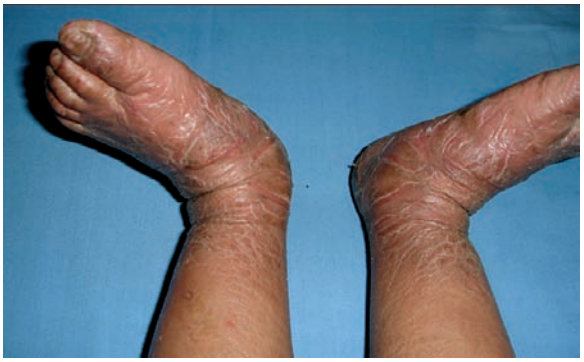

Fig. 4.24C Bilateral thickening, scaling and fissuring of feet in PRP

Treatment

Rest and bland applications are of immense help. Equal parts of liquid paraffin and soft white paraffin applied frequently, reduces the exfoliation. In the active erythrodermic phase, acitretion can be used at a dosage of 0.75 mg/kg/day or isotretinoin at a dosage of 1.0–1.5 mg/kg/day.

KID SYNDROME (Figs 4.25 to 4.25B)

It is an autosomal dominant disorder characterized by keratitis (with progressive corneal opacification), ichthyosis and sensorineural deafness. It results from mutation of *GJB2* encoding for connexion 26. It presents with erythematous symmetric plaques on face with verrucous appearance and furrowing around mouth. Leather like palmar and plantar keratoderma is almost always present. Nail changes manifest in the form of rough cuticles, subungual hyperkeratosis with

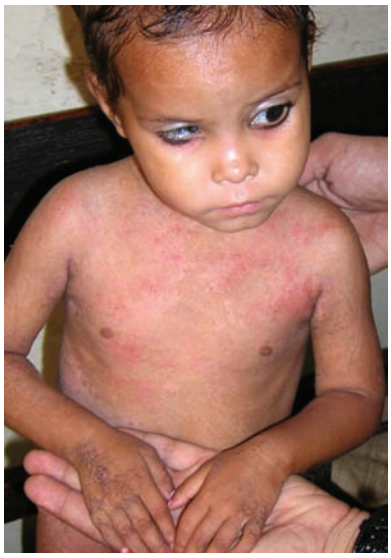

Fig. 4.25 KID syndrome, note keratitis and ichthyosis

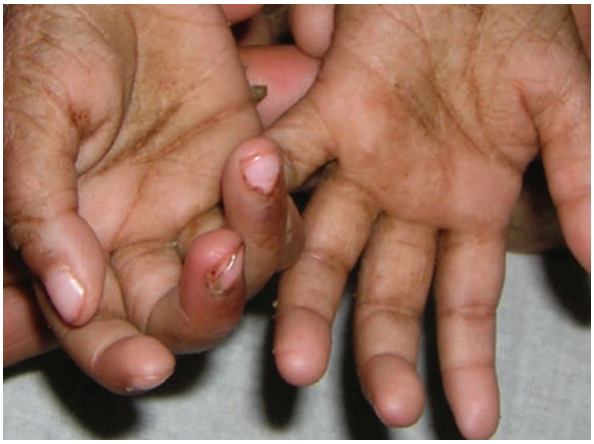

Fig. 4.25A Involvement of palms in KID syndrome

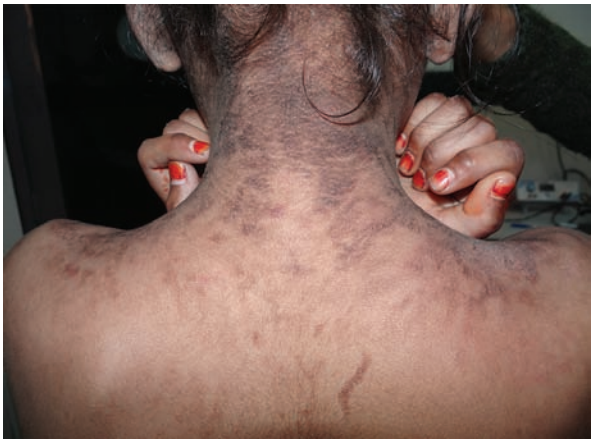

Fig. 4.25B Close-up of neck in KID syndrome

leukonychia. Follicular hyperkeratosis leading to scarring alopecia may be present. Affected individuals have increased susceptibility to infections. Squamous cell carcinoma of the tongue and skin have been reported.

Treatment

In contrast to other ichthyotic conditions, treatment of these patients with oral retinoids has been reported to be of little benefit and to exacerbate the corneal neovascularisation.

NETHERTON SYNDROME (Figs 4.26 to 4.26C)

It is an autosomal recessive disorder characterised by ichthyosis, atopy and a structural hair shaft defect. It occurs due to mutation in *SPINK5* gene encoding for serine protease in the epithelial cell. It presents with ichthyosis linearis circumflexa (polycyclic serpiginous and erythematous plaques with migratory double edged scales at the margins) and atopic dermatitis manifesting as food allergy, asthma or dry itchy skin leading to lichenification over flexures at later stages. Hair shaft abnormality in the form of trichorrhexis invaginata, in which the distal hair segment is telescoped into the proximal one leading to a ball and socket deformity is found on microscopy. Prenatal diagnosis using molecular assay is possible. As Netherton syndrome is complicated by an impaired skin barrier. Hence, a caution should be exercized while using topical steroids and calcineurin inhibitors.

SJÖGREN-LARSSON SYNDROME

This condition is an autosomal recessive condition characterized by congenital ichthyosis, spastic paralysis and mental

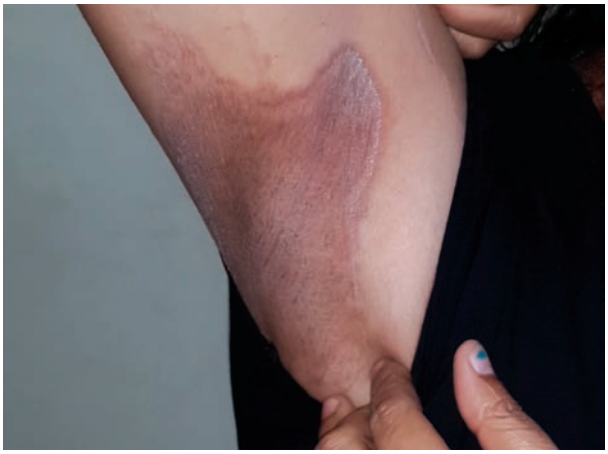

Fig. 4.26 Classical skin lesions of Netherton syndrome, ichthyosis linearis circumflexa. Note double-edged scales

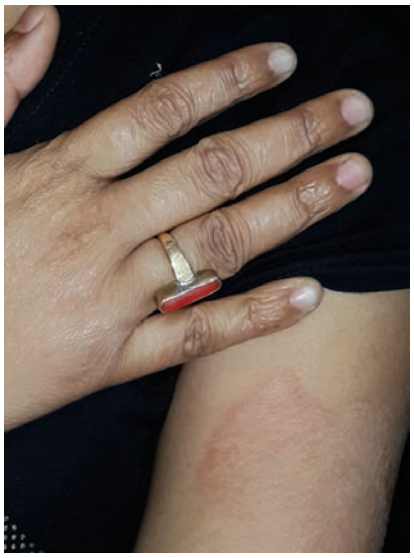

Fig. 4.26A Netherton syndrome, note atopic xerosis of hand and ILC over upper arm

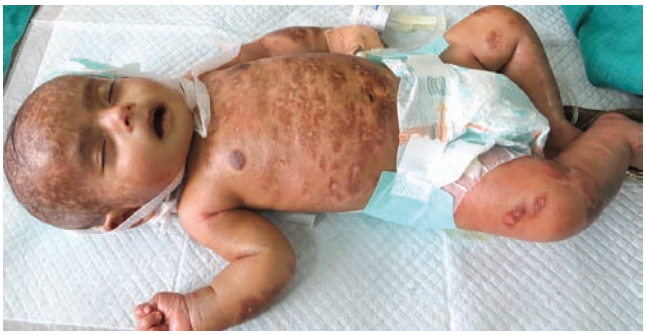

Fig. 4.26B Netherton syndrome presenting with atypical ichthyosis

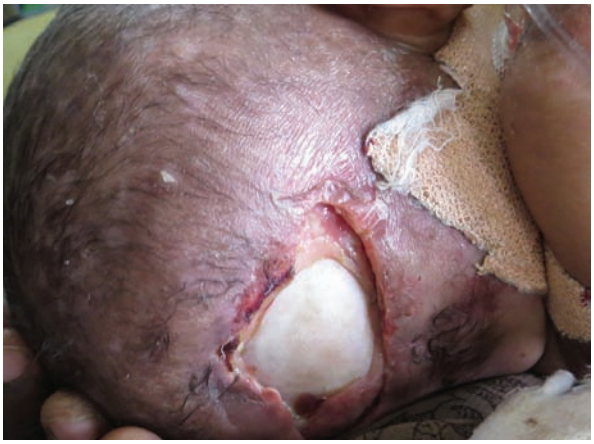

Fig. 4.26C Netherton syndrome with atypical presentation, scalp abscess

retardation. It occurs due to mutation in the fatty aldehyde dehydrogenase gene (FALDH). The ichthyosis may manifest at birth with fine to thick scales giving a yellowish hue to the thickened hyperkeratotic areas and accentuated skin markings. The commonly affected sites include neck, lower abdomen and flexures. During the first 2–3 years spastic diplegia or tetraplegia develops with mental retardation, seizures and speech delay. A characteristic finding that manifests after 1 year of age is the glistening white dots in the macula of the retina.

REFSUM DISEASE

It is an autosomal recessive condition occurring due to the impaired break down of dietary phytanic acid caused by a deficiency of phytanoyl coenzyme A hydroxylase (PhyH), leading to its accumulation in the tissues. Clinical manifestations include retinitis pigmentosa, peripheral neuropathy, cerebellar ataxia, cranial nerve dysfunction, miosis, electrocardiographic changes, cardiomyopathy, renal tubular dysfunction and skeletal abnormalities. Ichthyosis manifesting as small white scales generally manifests in adulthood.

Diagnosis

The diagnosis is made by elevated levels of plasma phytanic acid.

Treatment

It includes dietary restriction of foods containing phytanic acid and its precursors, plasmapheresis and lipapheresis. This disease should be considered in a clinical setting of delayed onset ichthyosis with neurologic impairment as therapy can arrest the progression.

CONRADI-HÜNERMANN-HAPPLE SYNDROME

It is a X-linked dominant chondrodysplasia punctata characterized by mosaic pattern of skin involvement and occurence only in females. It occurs due to a mutation in the emopamil binding protein (EBP) gene. It is lethal to males. Affected females have normal life expectancy. It presents at birth with congenital ichthyosiform erythroderma which clears over months and is replaced by linear hyperkeratosis, follicular atrophoderma and pigmentary anomalies. Hair shaft anomalies with scarring alopecia can occur. Stippled calcifications in radiographs may be noted in childhood but is no longer visible after puberty. Other features that may be present are cataracts, short stature with asymmetry of limbs.

Treatment

In the form of correction surgeries for limb length may be offered.

CHILD SYNDROME

Child syndrome is a rare, X-linked dominant disorder present since birth. The acronym is self explanatory e.g; congenital hemidysplasia, ichthyosiform erythroderma and limb defect. Ichthyosiform erythroderma usually has a unilateral involvement with ipsilateral hypoplasia of different systems including musculoskeletal, central nervous system and cardiovascular system. Extent of limb defect varies from digital hypoplasia to complete absence of extremity. Biopsy may demonstrate abnormal lamellar granules in stratum spinosum. Defects in intermediate steps of cholesterol biosynthesis are responsible for this condition. Various hypotheses are proposed; few of them are peroxisomal deficiency and mutation of *NSDHL* gene encoding a 3 beta hydroxysteroid dehydrogenase.

PEELING SKIN SYNDROME (Figs 4.26D and E)

Peeling skin syndrome is a rare, autosomal recessive disorder clinically characterized by continuous shedding of stratum corneum throughout life and histopathologically by separation of epidermis in between stratum corneum and stratum granulosum. It may be associated with pruritus, easily pluckable hair, growth retardation, shedding of nail, hypogonadism and anosmia. This entity is also known as 'idiopathic deciduous skin' and keratolysis exfoliativa congenital. Two subtype of peeling skin syndrome non-inflammatory type A and inflammatory type B have been proposed. Type A or acral type characterized by peeling restricted to the dorsum of hand and feet and due to mutation of TGM5 gene. Whereas main features of type B is congenital ichthyosiform erythroderma characterised by patchy migratory peeling of skin along with pruritus, atopy, elevated IgE level and aminoaciduria. Type B is caused by homozygous mutation of *CSDN* gene encoding corneodesmosin. Usually, there is no seasonal variation but summer aggravation may be seen in some of the patients. Therapies such as emollients, salicylic acid and oral retinoid may be effective.

HAILEY-HAILEY DISEASE (Figs 4.27 to 4.27C)

Etiology

Hailey-Hailey (HH) disease is a rare, autosomal dominant disease characterized by recurrent bullous and vesicular dermatitis of intertriginous area, though intact blisters are rarely

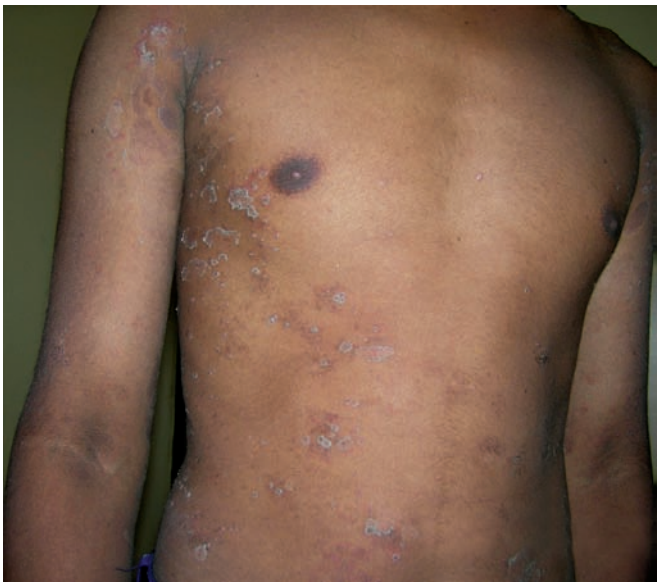

Fig. 4.26D Peeling skin over trunk

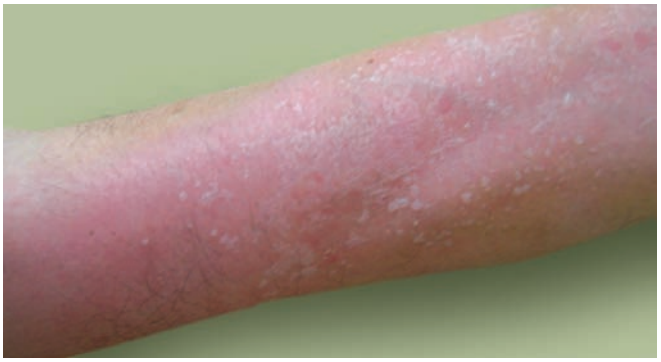

Fig. 4.26E Peeling skin over forearm

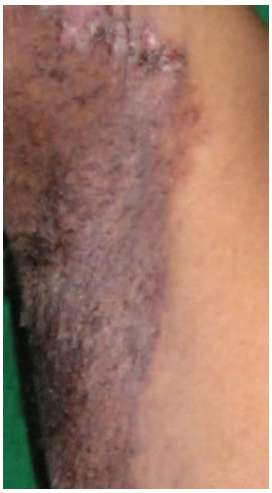

Fig. 4.27 Axilla—a common site for Hailey-Hailey pemphigus

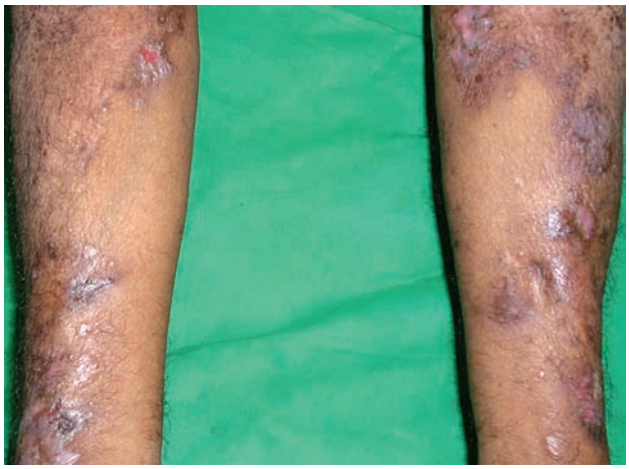

Fig. 4.27A HH pemphigus aggravated during summer

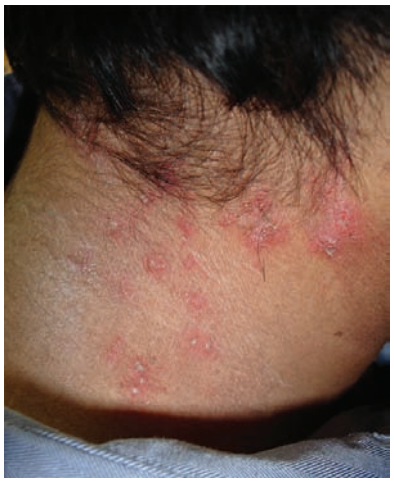

Fig. 4.27B Lesions of Hailey-Hailey disease over neck in an adolescent boy

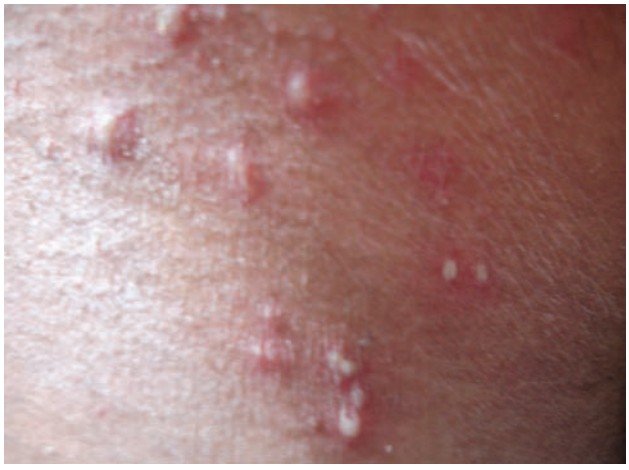

Fig. 4.27C Close-up of lesions

seen. The disease is prevalent in second and third decade with equal sex involvement. Occasionally, adolescent boys or girls can also get affected. The disease gets aggravated typically during summer, may be due to excessive sun exposure, sweating and masceration. Other precipitating factors are trauma, heat, friction, bacterial and fungal infection. The basic defect is due to loss of function mutation of *ATP2C1* gene encoding the human secretory pathway calcium/magnesium adenosine triphosphatase (*hsp CA1*) which transport calcium within golgi apperatus, thus maintaining Ca homeostasis within keratinocytes.

Clinical Features

Patient may present with painfull erosion covered with impetiginous crust. Sometimes the lesions assume circinate pattern with spreading active inflammatory border and dry crusted center. Mucosal involvement is rare. Some patient present with longitudinal white lines in nail and plamar pits. Classical histopathological finding is full thickness incomplete acantholysis give rise to a "dilapidated brick wall appearance". Disease is characterized by frequent exacerbations and remission.

Differential Diagnoses

Close differentials are darier disease, candidal intertrigo, eczema and pemphigus vegetans.

Treatment

Different modalities of treatment has been tried including oral antibiotics, dapsone, oral retinoid and systemic and topical steroids. Treatment with topical tacrolimus and topical calcipotriol is also effective.

POROKERATOSIS (Figs 4.28 to 4.30)

Porokeratosis is a clonal disorder of keratinization characterized by hyperkeratotic papules and plaque with thread like elevated border and histopathologically by cornoid lamella with absent granular layer beneath it. Keratotic ridge can be accentuated by application of gentian violet followed by removal with alcohol.

Etiopathogenesis

It is a genetically heterogeneous disorder where the mode of inheritance is autosomal dominant. Various patho-mechanisms has been described including over-expression of *p53* and *pRb* gene, abnormal expression of involucrine, loricine,

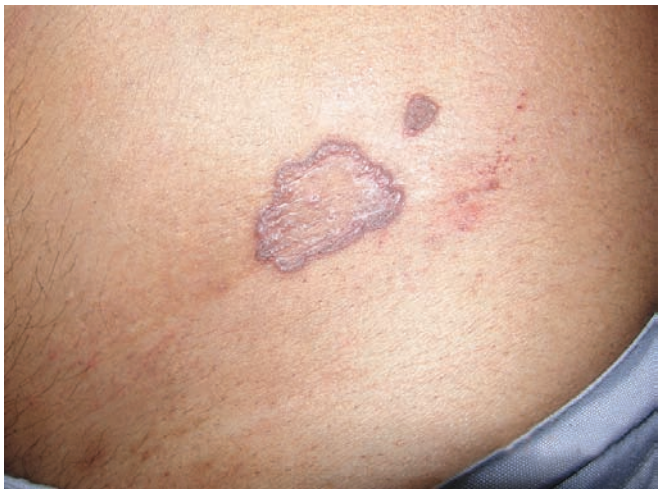

Fig. 4.28 Porokeratosis of Mibelli, note double edged lesions

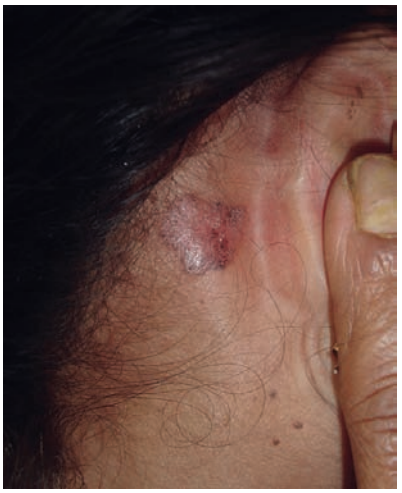

Fig. 4.30 Porokeratosis behind ear

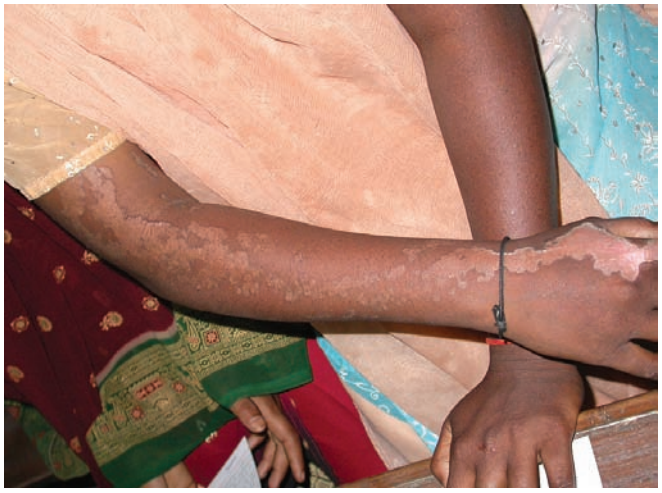

Fig. 4.29 Linear porokeratosis

mutation of *SART3* gene. Various triggers of malignant transformation are immunosuppression, ultraviolate exposure and radiation therapy which promote dysplastic changes of affected keratinocytes. Different clinical types has been described including porokeratosis of Mibelli, disseminated superficial actinic porokeratosis (DSAP), disseminated superficial porokeratosis (DSP), disseminated superficial porokeratosis of immunosuppression including human immunodeficiency virus infection, linear porokeratosis, punctate porokeratosis, hypertrophic variant mimicking hypertrophic lichen planus, Porokeratosis plamaris et plantaris disseminate and associated syndromes.

Treatment

Various treatment modalities include topical 5-FU, oral retinoid, cryotherapy and laser therapy.

5

Infections and Infestations

SCABIES (Figs 5.1 to 5.3C)

This intensely itchy condition is caused by the mite *Sarcoptes scabiei*. The itching is worst at night when the patient is warm. The onset occurs 3–4 weeks after the infection is acquired and it coincides with a widespread eruption of inflammatory papules. The pathognomonic lesions of scabies are burrows which appear as slightly raised, brownish tortuous lesions. They occur commonly on the wrists, borders of the hands, the sides of the fingers and the fingerweb spaces, the feet particularly the in-step and in the male, the genitalia. In babies the head and neck may be involved. With the development of hypersensitivity, pruritic papules develop. Secondary changes may frequently confuse the clinical picture. Eczematous changes are common and may be widespread and severe. Secondary infection, manifests as folliculitis or impetigo, may also be severe and extensive.

In infants in addition to the more extensive burrows seen in older children and adults, here vesicular and

Fig. 5.1 Inflammatory papules and burrows over fingerweb space in scabies

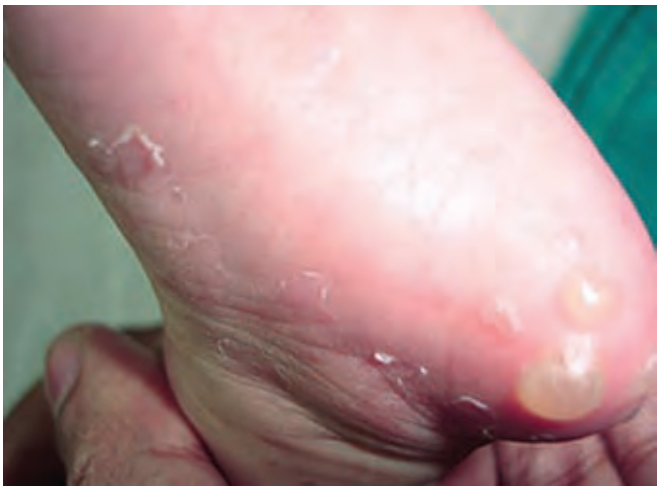

Fig. 5.2 Papulovesicles over sole in infantile scabies

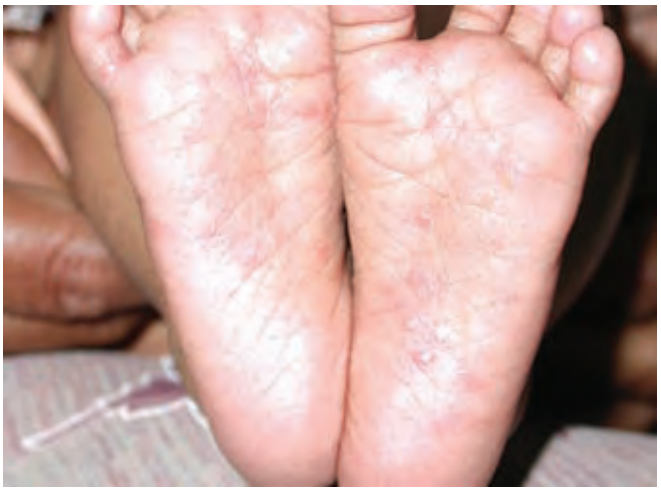

Fig. 5.2A Scabetic vesicles over soles in infants

"All my life I have tried to pluck a thistle and plant a flower wherever the flower would grow in thought and mind."—Abraham Lincoln

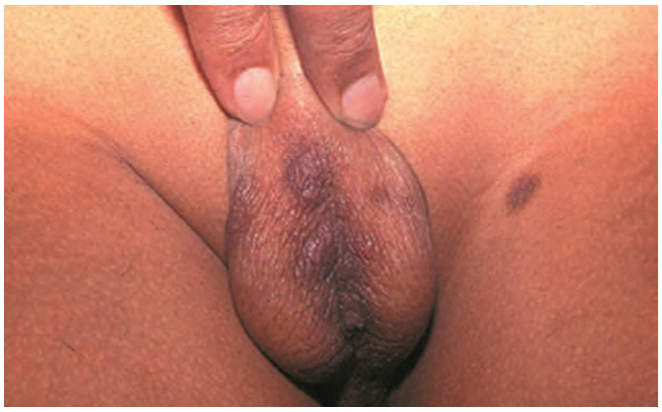

Fig. 5.3 Scabetic nodules over scrotum, very difficult to treat

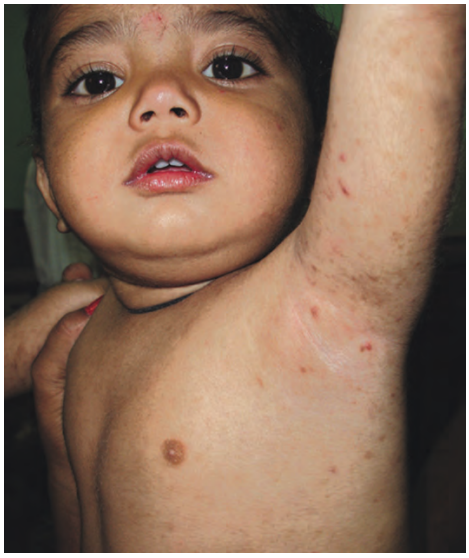

Fig. 5.3A Lesions of scabies in an infant

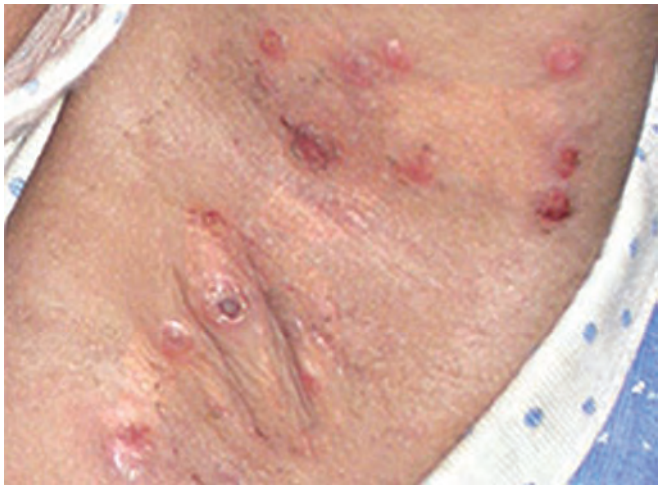

Fig. 5.3B Close-up of scabetic nodules over axilla

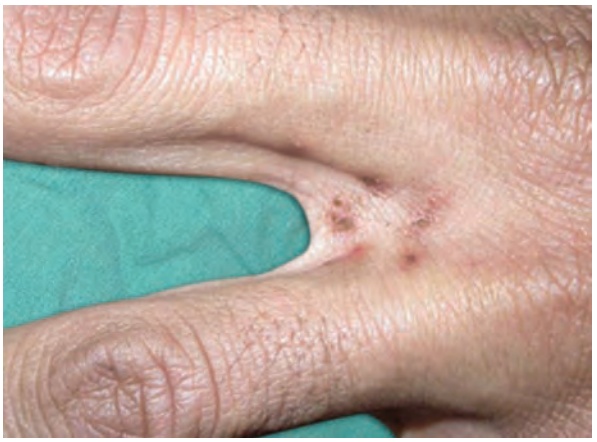

Fig. 5.3C Scabetic Burrow

vesiculopustular lesions on the hands and feet are frequent. Extensive eczematization is often present and there may be multiple crusted nodules on the trunk and limbs. Many children with scabies develop persistent skin colored to reddish nodules over axillae, shoulders, groin, buttocks and scrotum. These lesions result from the hypersensitivity reaction to scabies mite and tend to persist for months together even after treatment of scabies.

Complications

Secondary infections of scabies lead to pustule formation and impetigenization. Nephritogenic strain of *Streptococcus* may rarely cause glomerulonephritis.

Treatment

Permethrin (5%) cream is the treatment of choice in infants and children. It is safe even in infants as young as 2 months of sole in infantile scabies. It is to be applied in adults and young children from neck to toes and in infants from head to toes including palms and soles. It is to be left on for 6–8 hours in infants and 12–14 hours in children. If necessary, it may be repeated after two weeks.

Gamma bezene hexachloride (1%) is the most widely used antiscabetic because of its efficacy and it is being cheaper than permethrin. There are occasional reports of neurotoxicities which are almost exclusively due to its inappropriate, prolonged or repetitive use or accidental ingestion by infants/young children. It is not recommended in infants and small children and cannot be applied over head and face. A second application after one week is a must. The current breakthrough in the treatment of scabies has been oral ivermectin. It is considered to be safe in children above 2 years of age. Two doses of 200 µg/kg of body weight at one week interval has been recommended.

PEDICULOSIS

Pediculosis or louse infestation is a worldwide problem but poor living conditions with resultant poor personal hygiene contribute to epidemic proportions of the infestation in poor countries. The 3 types of lice infest human beings are: Pediculus humanus capitis (the head louse), Pediculus humanus corporis (body louse) and Phthirus pubis (crab louse).

Pediculosis Capitis (Figs 5.3D and E) (Head Louse Infestation)

It is caused by infestation of the scalp with pediculus humanus capitis. Head louse is brown in color and lays about 50–150 ova (nits) during an average adult life of approximately 16 days and it measures 1–2 mm in length. They moult 3 times to develop into an adult over a period of almost 2 weeks. Head louse infestation commonly affects females with long hair. The nits are firmly attached to the hair and can slide along the hair but cannot be shed off like scales and the nits are grayish white, oval in shape and about 0.5 mm in length. The transmission is through close contact, sharing of headgear, combs and hairbrushes. In Head louse itching is the predominant symptom and secondary infection with enlargement of occipital lymph glands is the common presentation. Diagnosis is definitive when crawling lice can be seen on a naked eye but microscopic identification of the louse or the stuck on nits on the hair shafts is confirmatory. Exudation, Crusting, Excoriations and red papules on the neck in females should arouse suspicion of pediculosis capitis.

Treatment consists of treating the associated secondary infection if any. Treatment of scabies consists of application of gamma benzene hexachloride (1%) or malathion (0.5%) or permethrin (1%). Gamma benzene hexachloride and malathion both should be applied at night and should be left on for 10–12 hours and washed off in the morning. Permethrin should also be applied for 30–45 minutes and washed off. Repeat application after a week is desirable. To prevent reinfection, ensure that all family contacts and close friends are also treated.

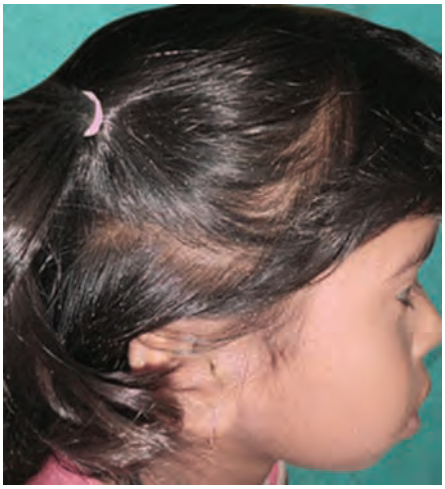

Fig. 5.3D Pediculosis capitis

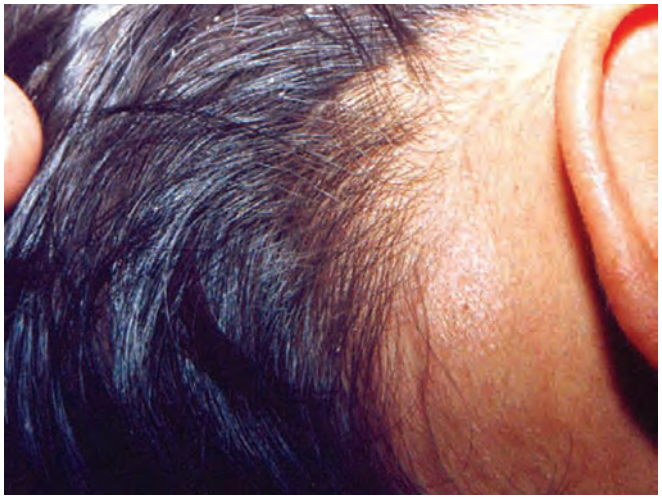

Fig. 5.3E Pediculosis capitis, note nits attached to scalp hairs

Pediculosis Corporis (Figs 5.3F and G) (Body Louse Infestation)

It is generally seen among the poor, homeless or mentally retarded subjects. Body lice generally thrive in conditions of poverty, war and natural disaster.

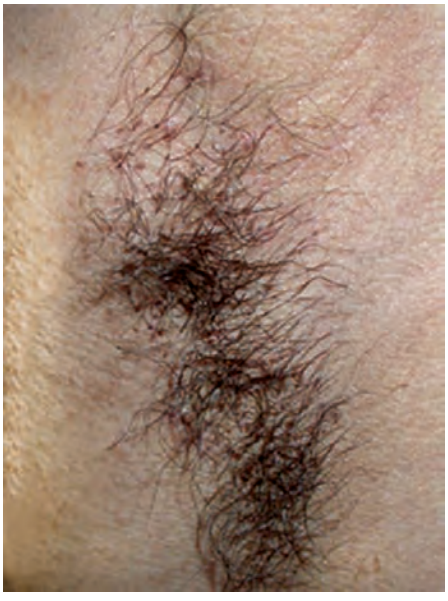

Fig. 5.3F Pediculosis corporis

"The spaces between your fingers were created so that another's could fill them in."—Unknown

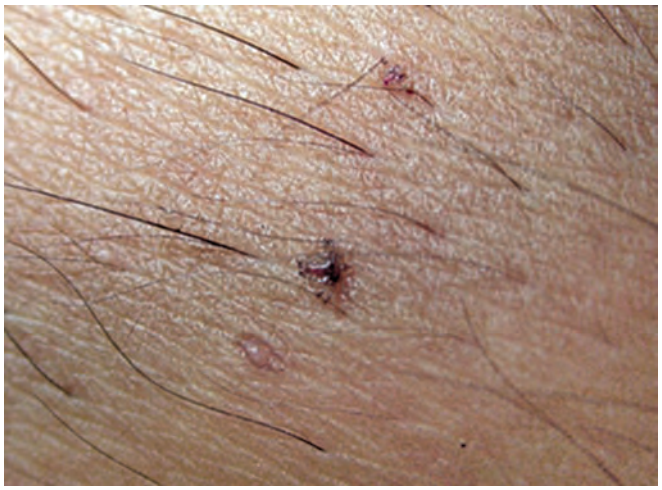

Fig. 5.3G Same patient, close-up

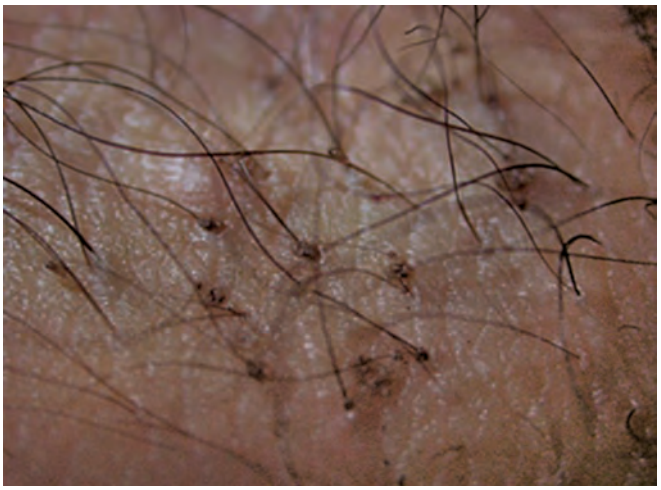

Fig. 5.3H Pediculosis pubis

The body louse is about 4 mm in length and lives in the seams of cloths and lays about 270–300 ova during an average of 18 days of adult life. Nits incubate for 8–10 days and nymphs mature into adults over about 2 weeks.

Severe itching, excoriations, blood crusts and blood stained cloths are the presentation of body louse infestation. In chronic cases hyperpigmentation and lichenification can also be seen. The diagnosis can be made by high degree of suspicion and demonstration or lice or nits from the seams of clothing. Treatment consists of proper hygiene, laundering and ironing of cloths and application of insecticides to clothing. Application of permethrin or gamma benzene hexachloride to body hair may be helpful.

Pediculosis Pubis (Fig. 5.3H)

Pediculosis pubis is caused by crab louse. It is commonly spread by the sexual contact but can be transmitted by clothing or towels. An adult female can lay about 25 eggs during their lifespan. It mainly attaches to the pubic hair but can be spread occasionally to axillary hair, eyebrows, and eyelashes. The patient complains of itching and on examination bluish gray macules (maculae ceruleae) can be seen on the lower abdomen and thighs. The lice looks like brownish spots attached to the hair.

Therapy consists of single applicaton of pediculicides that is gamma benzene hexachloride 1% or permethrin 1%. In case of eyelashes application of petrolatum can be given 3–4 times a day for 7 days. Manual removal, shaving of hair and even oral ivermectin (1 mg/5 kg) can be employed as measures for eradiction. Sexual partners should also be treated.

Furunculosis (Figs 5.4 and 5.5)

This is an acute, usually necrotic infection of a hair follicle with *S. aureus*. A furuncle presents initially as a small, follicular, inflammatory nodule, soon becoming pustular and then necrotic and healing after discharge of a necrotic core to leave a violaceous macule and ultimately a permanent scar. Tenderness is a constant feature. Lesions may be single or multiple and tend to appear in crops. The sites involved are the face and neck, the arms, wrists and fingers, the buttocks and the anogenital region. In some individuals, crops continue to develop for many months or even years.

Folliculitis (Figs 5.5A to C)

Folliculitis is a pyoderma of the hair follicles and is classified according to the depth of involvement and microbial etiology.

Etiology

Staphylococcus aureus is the most common cause of bacterial folliculitis, however the other causes include *Pseudomonas aeruginosa* (hot tub folliculitis), gram negative folliculitis (in patients of acne on long term topical and oral antibiotics) and syphilitic folliculitis.

Fungi implicated include dermatophytes, pityrosporum ovale and candidal species.

Herpes simplex virus and molluscum contagiosum virus have been implicated in the development of folliculitis.

Infestation by demodex mite may also present as folliculitis lesions predominantly in the perioral area.

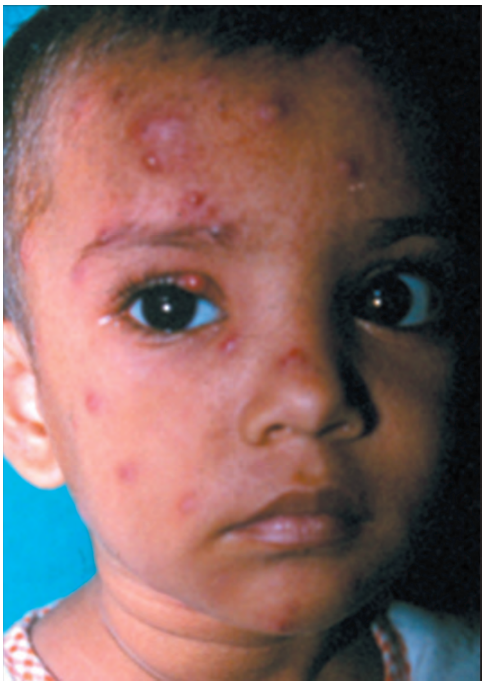

Fig. 5.4 Inflammatory papulopustules of furuncle over forehead

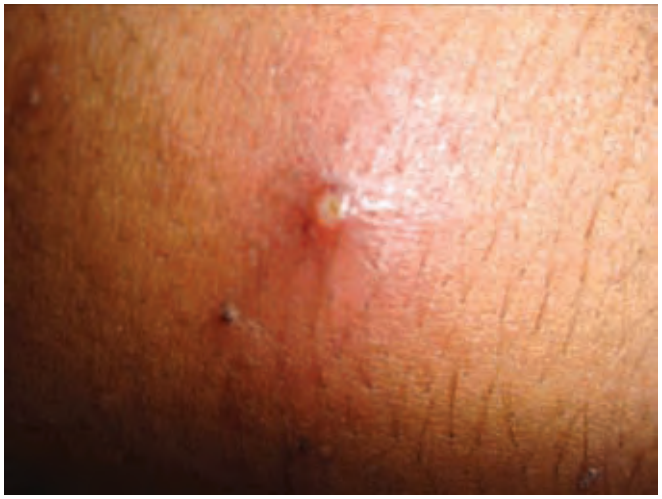

Fig. 5.5 Close-up of furuncle

CLINICAL FEATURES

Superficial Folliculitis

It is also known as Bockhart's impetigo and presents with a fragile pustule at the infundibulum of a hair follicle often on the scalp of children and beard area, axial, buttocks and axilla of adults.

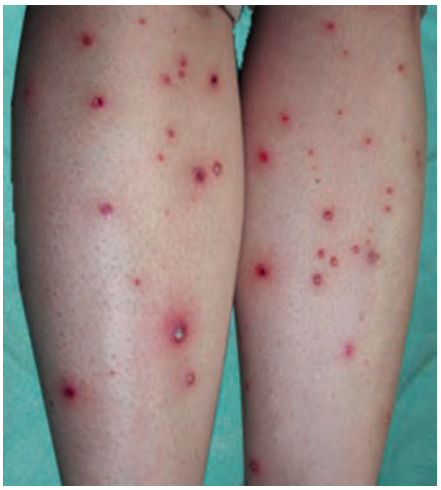

Fig. 5.5A Folliculitis over leg

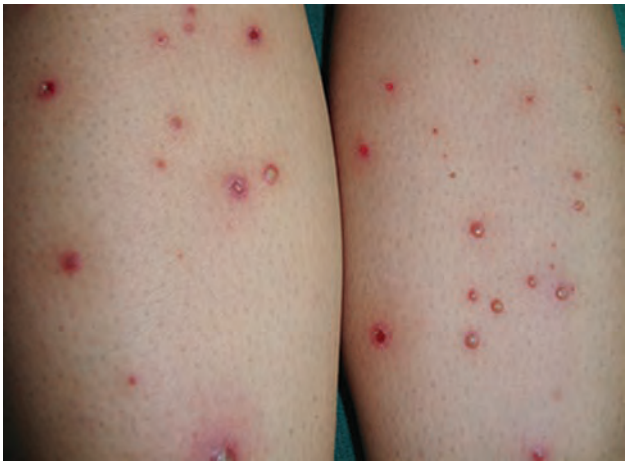

Fig. 5.5B Folliculitis, note erythematous papulopustular lesions

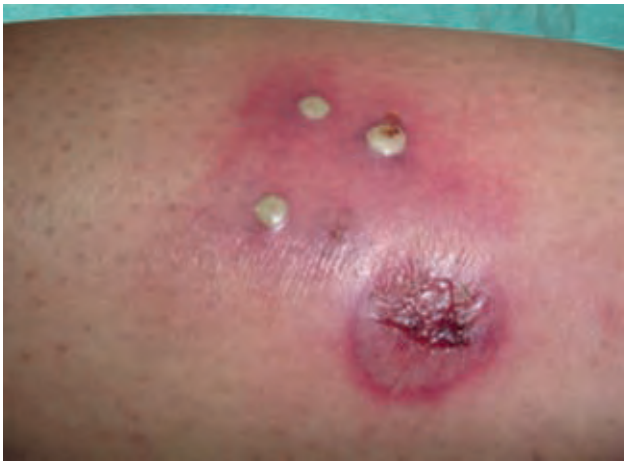

Fig. 5.5C Folliculitis lesions, close-up

"The firm, the enduring, the simple, and the modest are near to virtue."—Confucius

Periporitis (Figs 5.5D to F)

Periporitis is a complication of sweat gland when it gets secondarily infected by staphylococcal aureus. Usually presents as complication of miliaria rubra or profunda. It is seen in newborns, infants and young children. It is seen more in summer seasons. Clinically presents with multiple erythematous papules surmounted by pus in the middle, resembling folliculitis. It is easily misdiagnosed as furuncles or impetigo. Treatment is mainly systemic antibiotics.

Sycosis barbae is a deep folliculitis of the beard region which if untreated can become more deeply seated and chronic.

In fungal infections there are more often suppurative or granulomatous nodules rather than frank pustules and it may be commonly noted on the shins of women using razor for shaving also known as Majocchi's granuloma. Tinea capitis of the inflammatory type may also present with follicular pustular lesions of the scalp in children which heals with scarring alopecia.

Differential Diagnosis

Most common conditions to be considered in neonatal age group includes candidiasis, erythema toxicum neonatorum, occlusional folliculitis, allergic contact dermatitis, impetigo and infectious disease (ID) eruption.

The differentials considered would also include acne, miliaria pustulosa and infected insect bites.

Laboratory Diagnosis

Gram stain from the lesion to determine the etiology should be done followed by pus culture and sensitivity to isolate the organism.

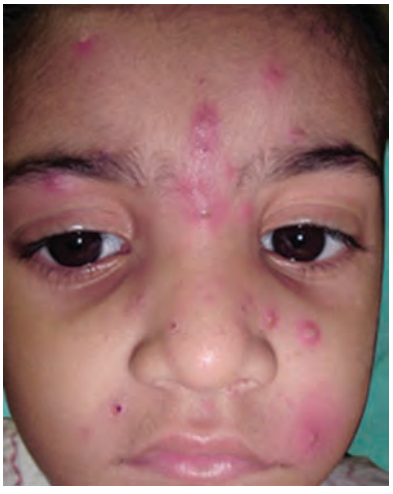

Fig. 5.5D Periporitis over face

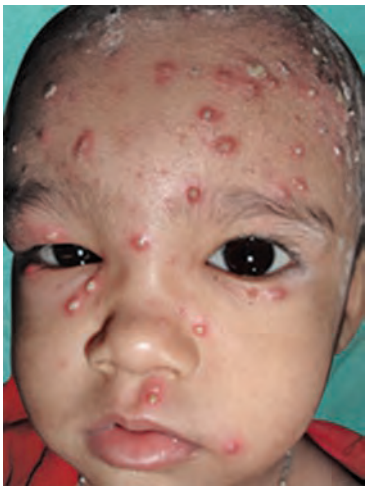

Fig. 5.5E Note small red papules topped by pustules

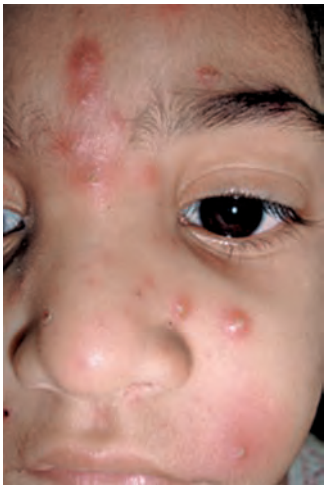

Fig. 5.5F Close-up of lesions

IMPETIGO (Figs 5.6 to 5.8C)

Impetigo is a contagious superficial pyogenic infection of the skin. Two main clinical forms are recognized, nonbullous and bullous impetigo. Bullous impetigo is caused by staphylococci, the nonbullous form may be caused by staphylococci or streptococci or both organisms together. The nonbullous form presents as a thin walled vesicle on an erythematous base. However, the vesicle ruptures rapidly and so may be missed. The exuding serum dries to form yellowish brown crusts. The lesions extend peripherally and multiple lesions may appear. The crusts eventually dry and separate to leave erythema which fades without scarring. The face and the limbs are commonly involved. Spontaneous recovery may occur in 2–3 weeks. In bullous impetigo, the bullae are less rapidly ruptured and become much large; a diameter of 1–2 cm is common but they may be of very considerable

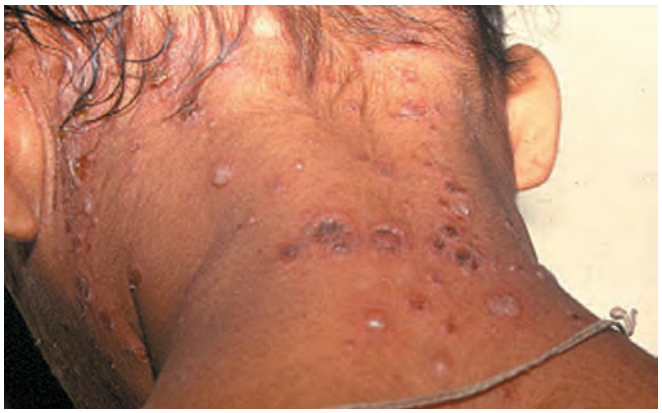

Fig. 5.6 Same boy (close-up)

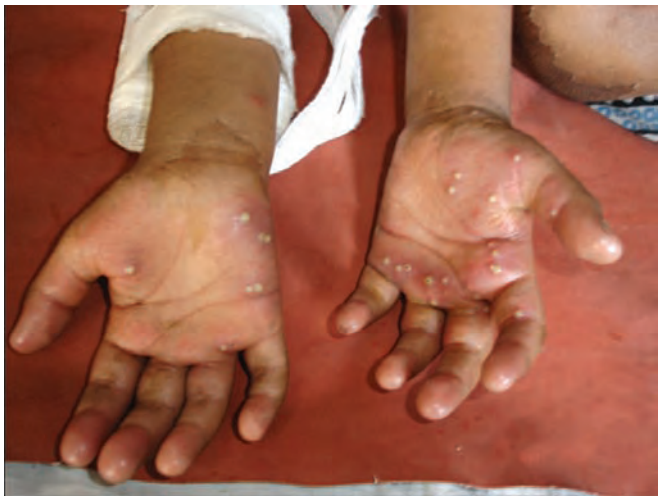

Fig. 5.7 Bullous impetigo over palms

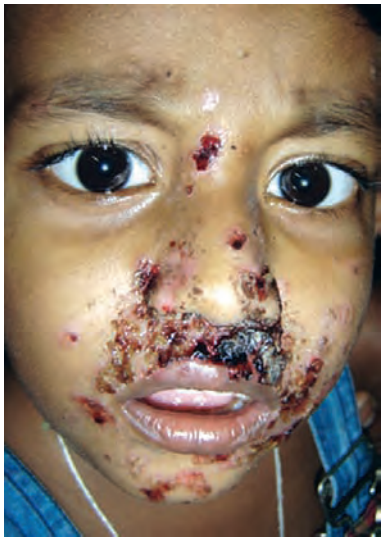

Fig. 5.8 Adherent scab and crust of impetigo contagiosa

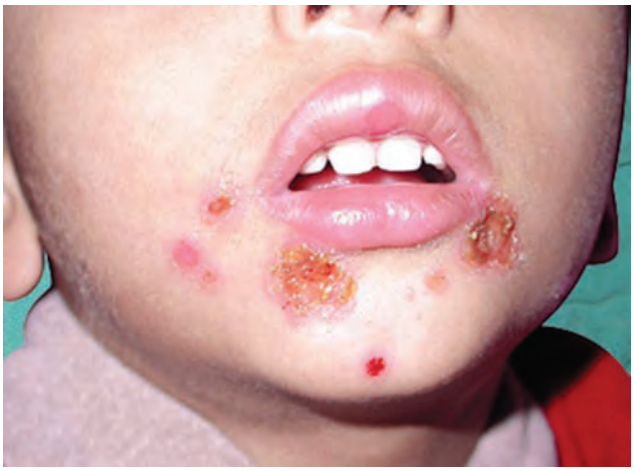

Fig. 5.8A Impetigo contagiosa, note honey colored crust

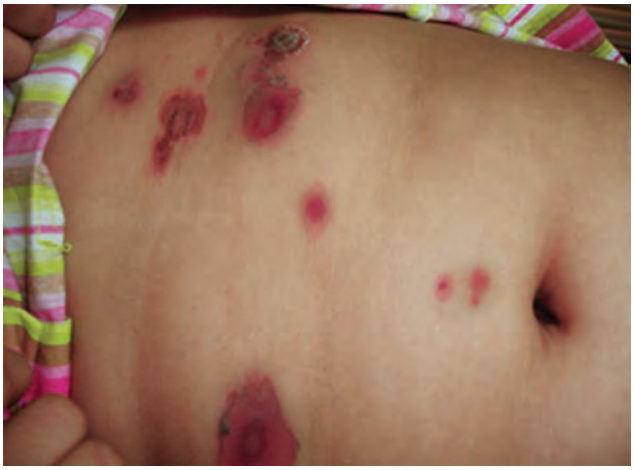

Fig. 5.8B Impetigo bullosa, ruptured bullae with erythematous raw areas

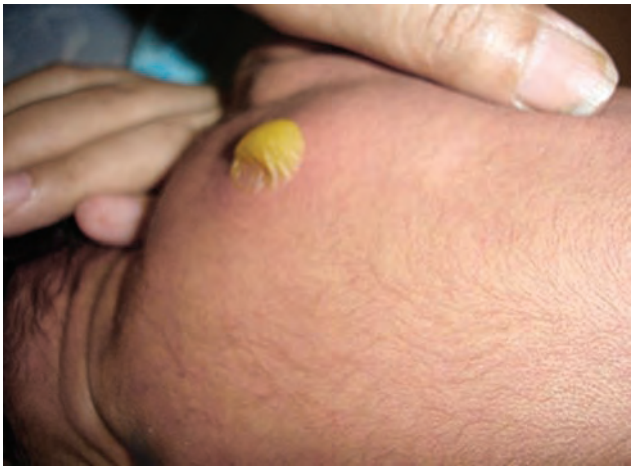

Fig. 5.8C Bullous impetigo in a newborn

"Doctors will have more lives to answer for in the next world than even we generals."—Napoleon Bonaparte

size and persist for 2 or 3 days. After rupture, thin, flat and brownish crusts are formed. The face is most commonly involved, however, the lesions may occur anywhere and may be widely and irregularly distributed.

ECTHYMA (Figs 5.9 to 5.10B)

Ecthyma is a pyogenic infection of the skin characterized by the formation of adherent crusts beneath which ulceration occurs. It begins as small bullae or pustules on an erythematous base which is soon surrounded by a hard crust of dried exudate. The base may become indurated and a red edematous areola is often present. The crust is removed with difficulty, to reveal a purulent irregular ulcer. Healing occurs after a few weeks, with scarring. The buttocks, thighs and legs are most commonly affected. The lesions are usually few but new lesions may develop by autoinoculation over a long period.

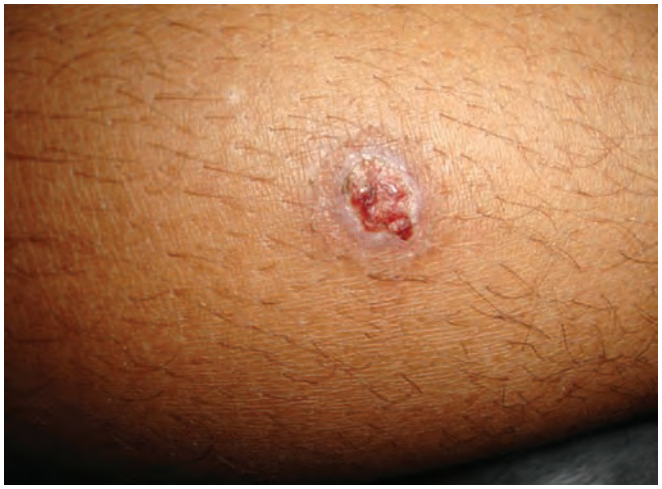

Fig. 5.9 Ecthyma over leg

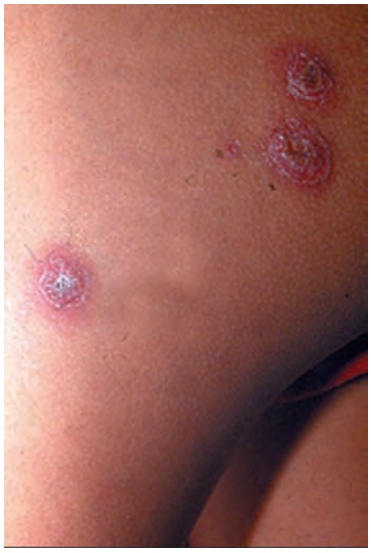

Fig. 5.10 Hard crust on an erythematous base in case of ecthyma over buttock and upper

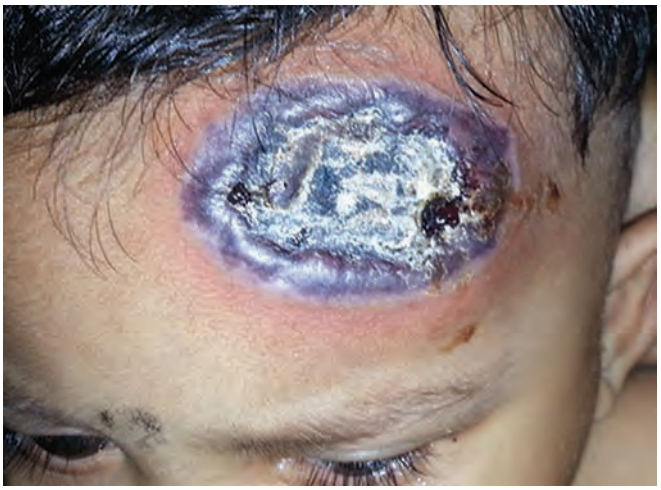

Fig. 5.10A Ecthyma gangrenosum

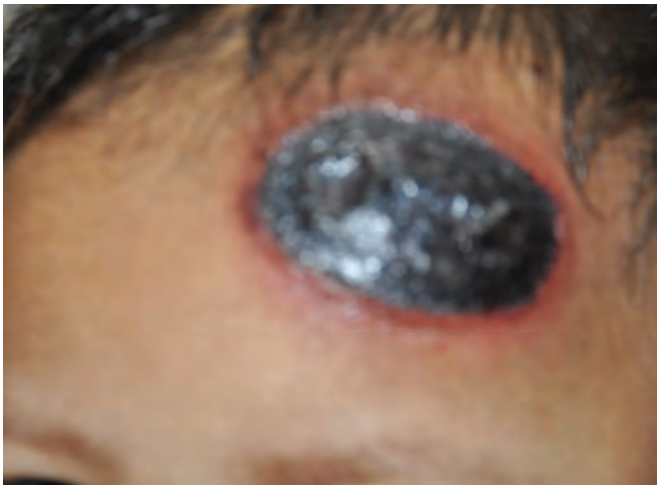

Fig. 5.10B Same child with EG, note erythematous halo around the necrotic slough

Ecthyma Gangrenosum

It is a infectious condition caused by *Pseudomonas aeruginosa* and characterized by necrotic skin lesions. The condition may arise from bacteremic spread of infection or from primary cutaneous infection. During septicemia, multiplication of the organisms in the wall of dermal vasculature leads to

thrombosis of the same, ultimately dermal necrosis. This pathological event is supported by the histopathological finding of paucinflammatory vasculitis mainly involving veins with surrounding edema, necrosis and hemorrhage. Bacteria may be found in perivascular tissue and in adventitia and media of veins leaving intima and lumen uninvolved. Several risk factors have been implicated such as severe burn, leukemia, pancytopenia or neutropenia, functional neutrophilic defect, terminal carcinoma, instrumentation, prematurity, necrotizing enterocolitis, previous bowel surgery and obviously immunocompromised state. Lesions start with painful red or purpuric macule which turns into tense vesicle or pustule with surrounding pink halo. Lesions quickly become hemorrhagic and violaceous and rupture to form ulcer with raised edge and dense, black, necrotic and crusted center. Erythema multiforme like lesions may also be initial presentation. Ulcers may be grouped or solitary and sites of predilection are buttocks, extremities, around mouth or perineum. Full sepsis work-up, gram stain and culture of the tissue sample and histopathology should be done in each case of ecthyma gangrenosum. Demonstration of gram negative bacilli in gram stained smear from scrapping of the ulcer base or from the content of vesicle or pustule points towards diagnosis. Aggressive and immediate institution of broad spectrum antipseudomonal penicillin (ticarcillin or piperacillin) or ceftazidime with amino glycoside should be started empirically without waiting for culture report. After obtaining the culture and sensitivity report therapy can be narrowed. Addition of granulocyte-macrophage colony stimulating factor in patient with myelodysplasia or treatment induced neutropenia stimulate both proliferation and differentiation myeloid precursor, hence hasten recovery. Some of the poor prognostic factors are multiple lesions, delay in diagnosis and institution of therapy and persistence of neutropenia even after completion of antibiotic therapy.

CELLULITIS AND ERYSIPELAS (Figs 5.11 to 5.11B)

The term cellulitis is applied to inflammation of subcutaneous tissue. Erysipelas is a bacterial infection of the dermis and upper subcutaneous tissue. The two have similar bacteriology with streptococcal antigens being demonstrated in both lesions. Erythema, heat swelling and pain or tenderness are constant features. In erysipelas, the edge of the lesion is well-demarcated and raised, but in cellulitis it is diffuse blister formation, with hemorrhage into the blister is seen. Erysipelas and severe cellulitis can give rise to bullae formation progession to dermal necrosis. Fasciitis and myositis are uncommon, however, lymphangiitis and lymphadenopathy are frequent. The leg is most commonly involved followed by the face without effective treatment.

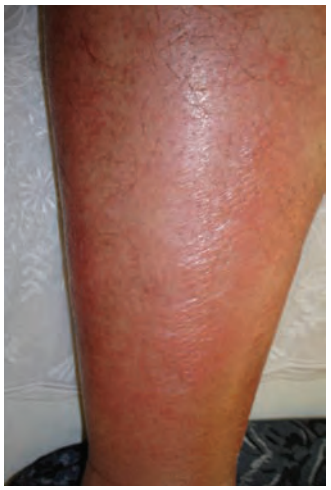

Fig. 5.11 Erythematous boggy plaques of cellulitis

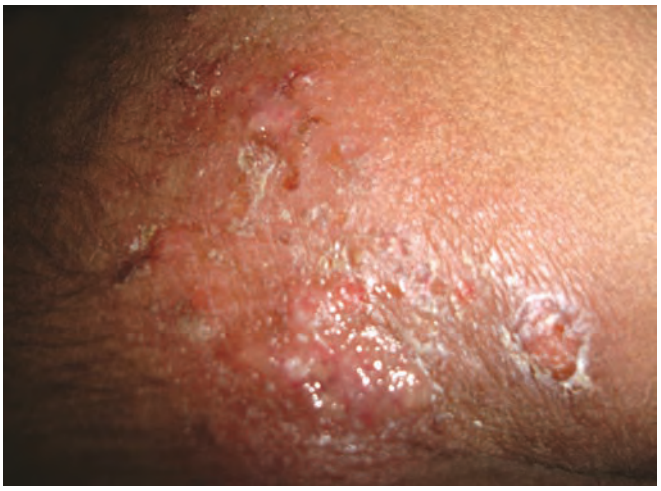

Fig. 5.11A Close-up of cellulitis

Complications

Complications are common with formation of subcutaneous abscesses, septicemia and in some streptococcal cases, nephritis.

Treatment

For furunculosis, impetigo, ecthyma either oral cloxacillin, amoxycillin and clavulenic acid combinations or erythromycin is to be given for 7–10 days. Topical mupirocin or fusidic acid cream can be applied over surrounding skin to prevent contamination.

For erysipelas and cellulitis either cefadroxil, cefixime, erythromycin may be chosen. In severe cases IV Benzyl penicillin at a dose of 600–1200 mg 6 hourly is preferred and

"In law, nothing is certain but the expense."—Samuel Butler

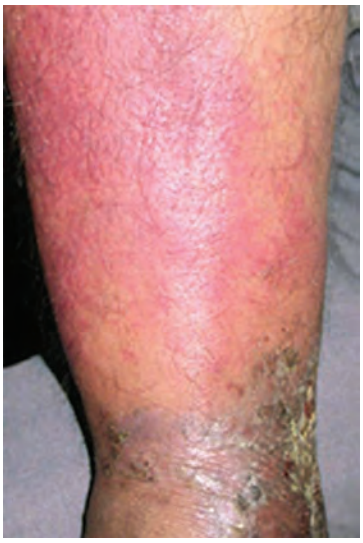

Fig. 5.11B cellulitis of leg, note erythema and boggy swelling of leg

continued for 10 days to combat long-term carriage state of *Staphylococcus aureus* (particularly in atopics) twice daily application of mupirocin cream inside nostril, external auditory meatus and perianal area for at least 6 months has been found to be very effective.

ACUTE LYMPHANGIITIS (Fig. 5.12)

It is a streptococcal infection of lymphatic vessels of the subcutaneous tissue, seen as erythematous, linear streaks of varying width, extending from the local lesion towards the regional lymph nodes. The latter are tender and enlarged.

Differential Diagnosis

Lymphangiitis needs to be differentiated from thrombophlebitis. In cases of thrombophlebitis, the red streak of inflamed vein corresponds to the course of a superficial vein and often a part of vein is visible as bluish line as continuation of the red line.

SYCOSIS BARBAE (Figs 5.12A and B)

Sycosis barbae is a subacute or chronic pyogenic infection involving the whole depth of hair follicle of the beard. It is most commonly seen in young adults and adolescent boys.

The essential lesion is an erythematous edematous papule and pustule with a hair at the center. The individual papule/pustule usually remain discrete. However, there is a tendency to coalesce at times and boggy plaques or noduloplaque lesions studded with pustules may be seen.

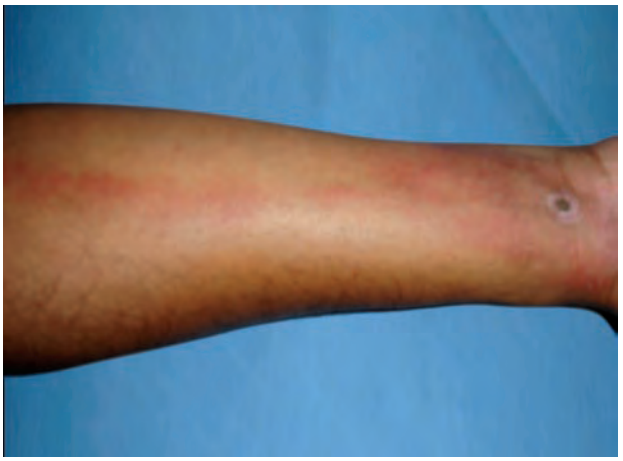

Fig. 5.12 Linear lesions of lymphangiitis over forearm

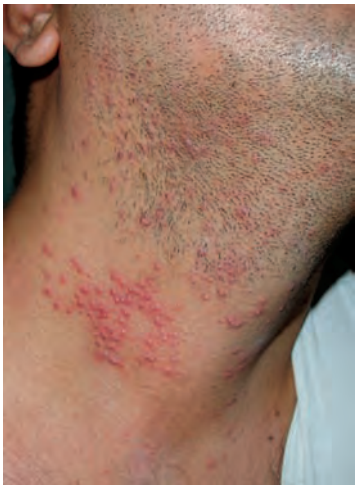

Fig. 5.12A Erythematous follicular papules of sycosis barbae over beard area

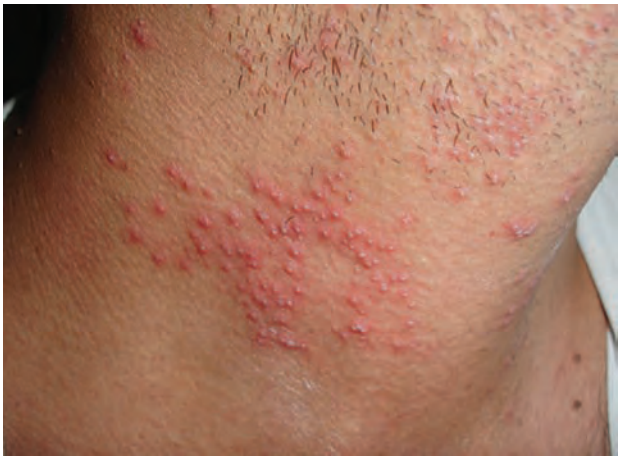

Fig. 5.12B Close-up of sycosis barbae lesions

Etiology

The causative organism is *Staphylococcus aureus*. The bacteria is thought to be either coming from its nasal carriage sites or inoculated from shaving, mostly in a saloon/parlor.

Management

The diagnosis is made in most of the cases going by its typical morphology. However, one may carryout culture of pus for documentation.

The subacute forms can be controlled by topical antibiotics, e.g. mupirocin, fucidin, etc. However in severe cases, several courses of antistaphylococcal antibiotics may be required. Regular cleaning of the beard with soap and water is a must. During acute/subacute stage, it is better to avoid shaving for 7–10 days. Nasal carriage of *S. aureus* can be controlled by application of mupirocin cream twice daily for 3–6 months. Application of aftershave lotions is usually allowed.

CARBUNCLE (Figs 5.12C and D)

Carbuncle is a collection of furuncles that extend deep into the subcutaneous tissue.

Clinical Features

The sites commonly affected include neck, back or thighs. The surface usually demonstrates multiple draining sinus tracts and sometimes ulceration. The affected area is red and indurated. The overlying area soon develops a yellow gray irregular crater at the center which may heal slowly by granulating although the site may remain deeply violaceous for prolonged periods. Fever and malaise are often present and the patient may appear sick. Carbuncles result in dense and evident permanent scars on healing.

Differential Diagnosis

Various differential diagnoses are hidradenitis suppurativa, kerion, ruptured epidermal inclusion cyst, furuncular myiasis and osteomyelitis.

Laboratory Diagnosis

Gram stain and pus culture sensitivity of the purulent discharge helps in isolating the organism. There may be leukocytosis with elevation of blood levels of acute phase reactants.

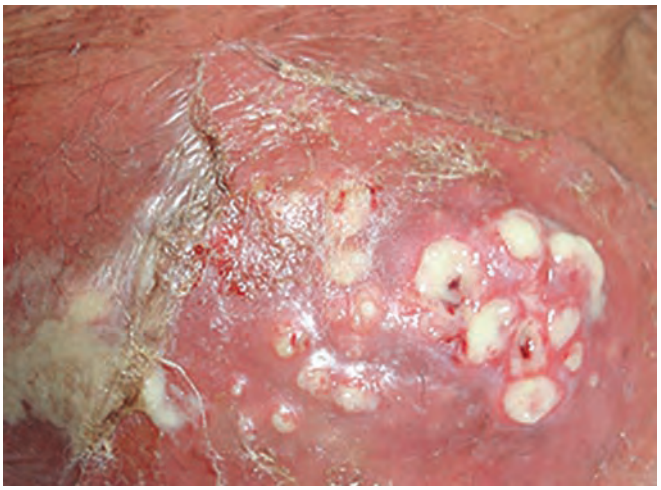

Fig. 5.12C Carbuncle, note multiple opening with pus discharge

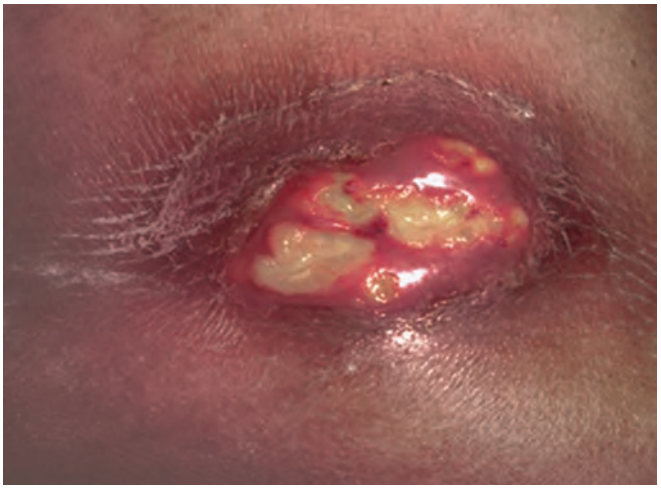

Fig. 5.12D Carbuncle, close-up

Treatment

General skin care to reduce the number of *Staphylococcus* on the skin includes regular usage of chlorhexidine baths and alcohol hand sanitizers.

Use of loose non occlusive clothings.

Regular change of dressings.

Cleansing using dilute chlorhexidine compresses or dilute potassium permanganate soaks.

Topical application of fucidic acid or mupirocin ointment.

Oral antibiotics like penicillin in case of MSSA infections and linezolid in case of MRSA infections. Intravenous antibiotics may be instituted in case the patient is sick with systemic symptoms.

NECROTIZING FASCIITIS (Figs 5.12E to G)

It is a rapidly progressing necrotizing infection of the skin and subcutaneous tissue. This is usually associated with systemic toxicities and can be fatal if not diagnosed and treated at the earliest. Various other names for the condition are staphylococcal gangrene, gangrenous erysipelas and flesh-eating bacterial disease, etc. In neonates, it is associated with balanitis, omphalitis and septicemia. The condition is caused by group A betahemolytic *Streptococcus*.

Diagnosis

It usually affects extremities with erythema edema and excruciating pain over localized areas. Subsequently bulla formation and necrosis develops and extends to fascial plane and hence the condition is known as necrotizing fasciitis. There may be associated streptococcal toxic shock syndrome. Routine examination of blood reveals a very high ESR and leukocytosis. The serum CPK is highly raised and blood culture grows either only GABHS or polymicrobes. Smear from necrotic area should be sent for Gram stain and culture sensitivity tests.

Treatment

Early diagnosis of the condition and surgical debridement of necrotic tissue is of paramount importance. On admission intravenous antibiotics should be started promptly. Subsequently the antibiotic may be changed according to culture sensitivity report. Other essential measures are resuscitation of the newborn and maintenance of fluid and electrolyte balance.

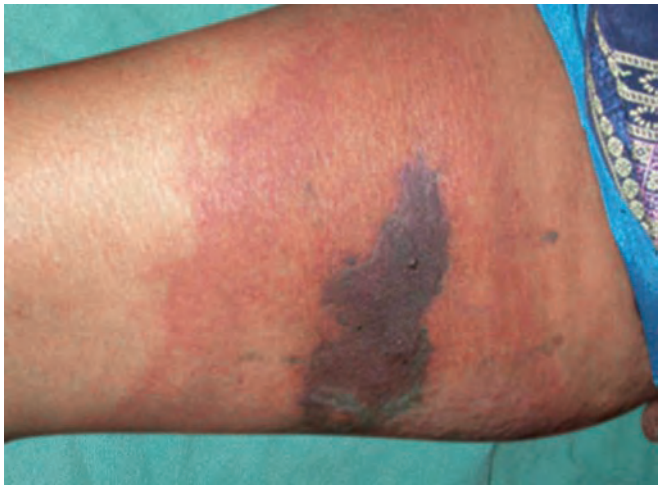

Fig. 5.12E Early lesions of necrotizing fasciitis

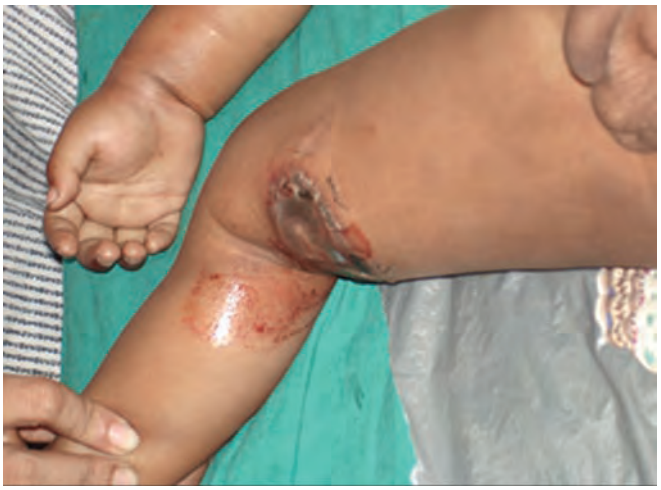

Fig. 5.12F Necrotizing fasciitis in a 4-year-old girl

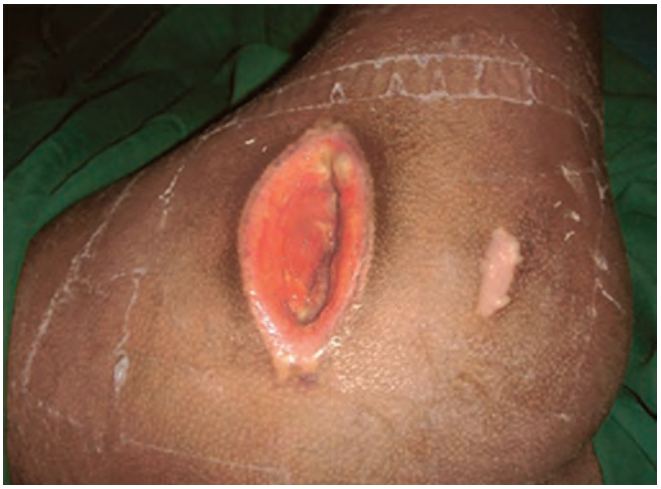

Fig. 5.12G Necrotizing fasciitis, close-up

NOMA (FIGS 5.12H AND I)

Noma, also known as necrotizing ulcerative stomatitis or cancrum oris, is a gangrenous condition affecting mainly children between the ages of 1–4 years that destroys the soft and hard tissue of the face.

Etiopathogenesis

It has been postulated that there is an immune dysfunction that occurs due to the following:

1. Malnutrition and deficiencies of vitamin A, B6, C, E; trace elements like iron and zinc and certain amino acids.
2. Adrenal hyperfunction in protein energy malnutrition.
3. Early weaning leading to malnutrition and chronic infections.

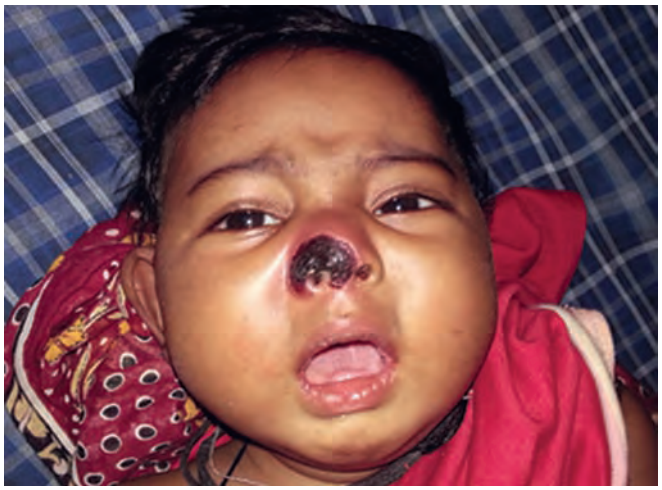

Fig. 5.12H Noma in a malnourished child

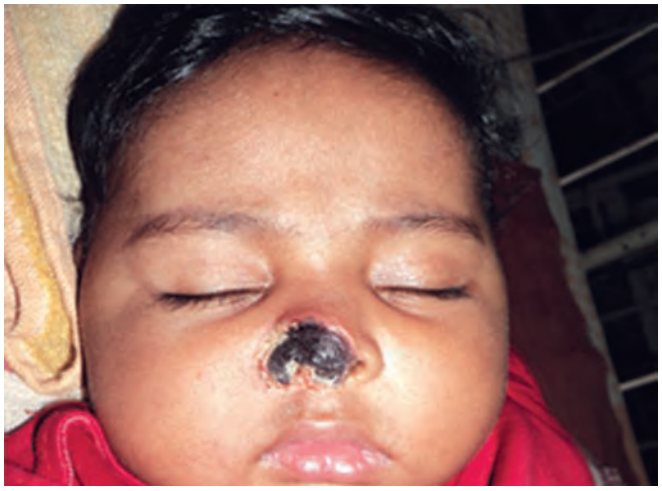

Fig. 5.12I Noma, close-up, note severe necrosis of nose leading to gangrene

It is a polymicrobial infection with *Prevotella intermedia* and *Fusobacterium necrophorum*. Other frequently found organisms include Tannerella, *Peptostreptococcus*, *Campylobacter*, Streptococci and enteric gram negative rods.

Clinical Feature

It starts with initial fever and apathy. Acute noma presents with soreness of mouth, halitosis, tenderness of the orofacial area, cervical lymphadenopathy and purulent oral discharge.

The intraoral lesion starts as necrotizing stomatitis starting on the alveolar margin and extending to mucosal surface of the cheeks in 24–48 hours. The overlying area develops a blackish blue discoloration. As the lesions expand it forms a classic cone shape, cone gangrenous with internal destruction greater than external involvement.

Acute necrotizing gingivitis occurs in patients with poor oral hygiene and dental caries is a precursor to noma.

Noma neonatorum is thought to be related but a separate entity from noma. Its caused by *Pseudomonas aeruginosa* and gangrenous lesions appear on the nose, eyelid oral cavity and anogenital area. The course is almost always fatal.

The lesions heal with extensive scarring, fibrosis, strictures, dental malpositioning and sometimes complete closure of mouth.

Treatment

1. Correction of dehydration and electrolyte imbalance
2. Treatment of predisposing conditions
3. Antibiotics: Broad spectrum along with metronidazole
4. Oral hygiene with regular chlorhexidine rinsing
5. Local wound care
6. Reconstructive surgeries with physiotherapy.

ERYTHRASMA (Fig. 5.12J)

It is a common bacterial superficial infection of the skin characterized by irregular red brown patches occurring predominantly in the intertriginous areas associated with maceration or fissuring.

Etiology

Corynebacterium minutissimum, is a short gram-positive rod which is the etiologic agent of erythrasma.

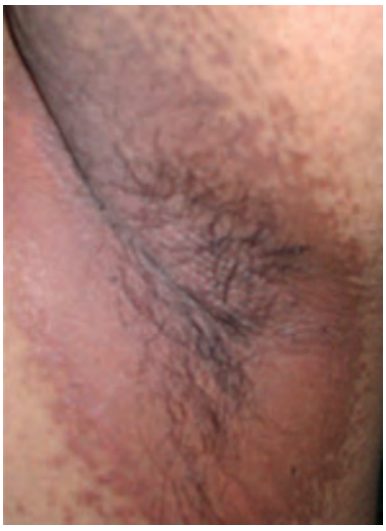

Fig. 5.12J Erythrasma over axilla in an adolescent obese boy

Clinical Features

Symptoms vary from a completely asymptomatic form to an intensely pruritic genitocrural form and a generalized form with scaly plaques on trunk, inguinal area and web spaces. The most common areas affected are the webspaces between he fourth and the fifth toe where it presents with a macerated hyperkeratotic white plaque. The other sites affected include genitocrural, axillary and submammary areas where it presents with hyperpigmented velvety patches with finely wrinkled surface.

Differential Diagnosis

1. Tinea versicolor
2. Tinea cruris et corporis
3. Inverse psoriasis.

Laboratory Diagnosis

Wood's lamp examination of the affected site reveals coral red fluorescence. Gram stain show rod like gram-positive organisms in large numbers. Culture of the organism may also be done however in most cases it is not necessary.

Treatment

Systemic Therapy

For widespread involvement and recurrent lesions systemic therapy with oral erythromycin, roxithromycin or clarithromycin may be used.

Topical Therapy

Benzoyl peroxide washes and gels are found to be effective. Clindamycin 2% gels may also give similar results. Prophylactic use of benzoyl peroxide bar may be helpful.

PITTED KERATOLYSIS (Figs 5.12K and L)

Pitted keratolysis involves the stratum corneum of the palms and soles along with webspace involvement.

Etiology

It is caused by *Kytococcus sedentarius* (formerly *Micrococcus sedentarius*) which is a *Staphylococcus* related gram-positive organism, that invades the stratum corneum softened by sweat production. The predisposing factors include sweating, prolonged occlusion and increased skin surface PH.

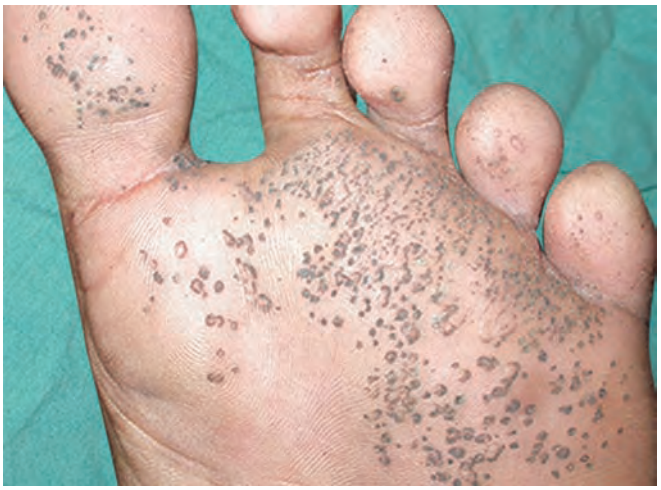

Fig. 5.12K Pitted keratolysis of sole

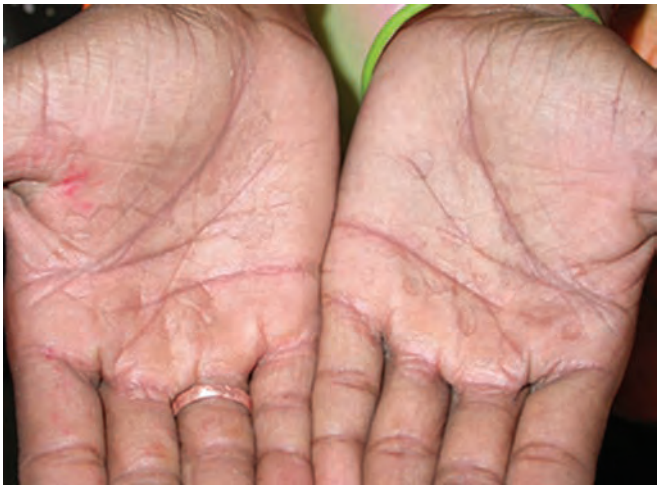

Fig. 5.12L Pitted keratolysis over palms

Cinical Features

Small 1–7 mm crateriform pits coalescing to form a large discreet defects with serpiginous borders on the plantar aspect of the foot. It generally affects the pressure bearing areas however the instep of the sole may also be involved. The webspace involvement may be the only manifestation in early stages.

Differential Diagnosis

1. Palmoplantar punctate keratoderma
2. Palmoplantar warts
3. Pits of nevoid basal cell carcinoma syndrome
4. Tinea pedis

Laboratory Diagnosis

The diagnosis is mainly clinical. Gram stain from the lesions may detect the microorganism. There is no fluorescence on Wood's lamp examination.

Treatment

Topical mupirocin, clindamycin, erythromycin, tetracycline and azole antifungals have all been reported to be useful. Aluminum chloride 20% solution may be used in associated hyperhidrosis. Oral erythromycin or roxithromycin is occasionally indicated for extensive involvement.

PERIANAL STREPTOCOCCAL DERMATITIS (Fig. 5.12M)

It is also known as perianal cellulitis.

Etiology

It is caused by infection with group A Streptococcus.

Clinical Features

Children, most commonly boys under 4 years of age are most commonly affected. It presents with sharply demarcated bright erythema extending 2–3 cm around the anal verge. Patients may complain of perianal pruritus, irritation, painful defecation, soling of undergarments and blood streaked stools. Systemic symptoms are absent. It can be preceded by pharyngitis and should be considered in patients with an outbreak of guttate psoriasis.

Differential Diagnosis

Various mimickers are *Staphylococcus aureus* infection, candidiasis, seborrheic dermatitis, pinworm infestation, inflammatory bowel disease, child abuse, early phase of Kawasaki's disease.

Laboratory Diagnosis

It can be diagnosed by skin swab culture.

Treatment

A 7–10 days' course of cefuroxime leads to resolution.

BLISTERING DISTAL DACTYLITIS (Fig. 5.12N)

It is also known as bulla repens and commonly affects children and adolescents.

Etiology

Majority of the cases is caused by group A Streptococcus; however group B also can cause this infection.

Clinical Features

It presents with a large tense blister filled with seropurulent fluid over the volar skin pad of distal fingers or toes. The blisters are surrounded by an erythematous base. The lesion may be more proximally located on the finger or extend to the nailfold.

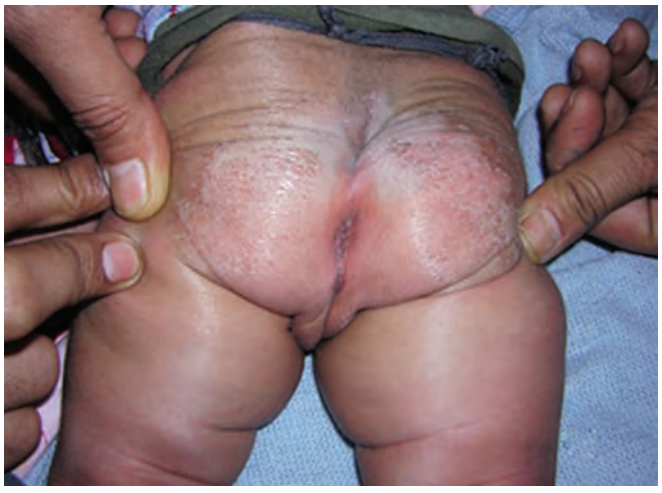

Fig. 5.12M Perianal streptococcal dermatitis

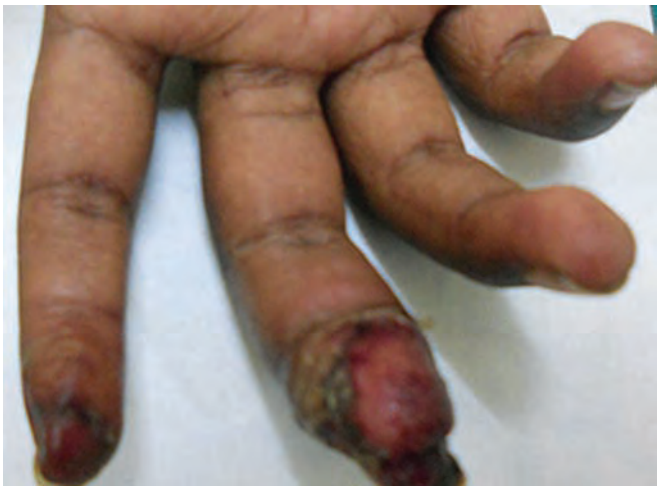

Fig. 5.12N Blistering distal dactylitis

Differential Diagnosis

Various mimickers are Staphylococcal blistering distal dactylitis and herpetic whitlow.

Laboratory Diagnosis

Gram stain from the lesional fluid reveals organisms in chains. Confirmation of the diagnosis is done by culture of the seropurulent fluid.

Treatment

This condition may be treated using oral penicillins or erythromycin. Release of subungual pus is often required.

LUPUS VULGARIS (Figs 5.13 to 5.13C)

This is a progressive form of cutaneous tuberculosis which occurs usually on the head or neck. The skin of and around the nose is frequently involved. The lesions consist of one or a few well demarcated, reddish-brown patches containing deep seated nodules, each about 1 mm in diameter. If blood is pressed out of the skin with a glass slide, these nodules stand out clearly as yellow-brown macules, referred to as apple jelly nodules, because of their color. The disease is very chronic, with slow peripheral extension of the lesions. In the course of time the affected areas become atrophic, with contraction of the tissue. Characteristically new lesions may appear in areas of atrophy. Superficial ulceration or verrucous thickening of the skin occurs occasionally.

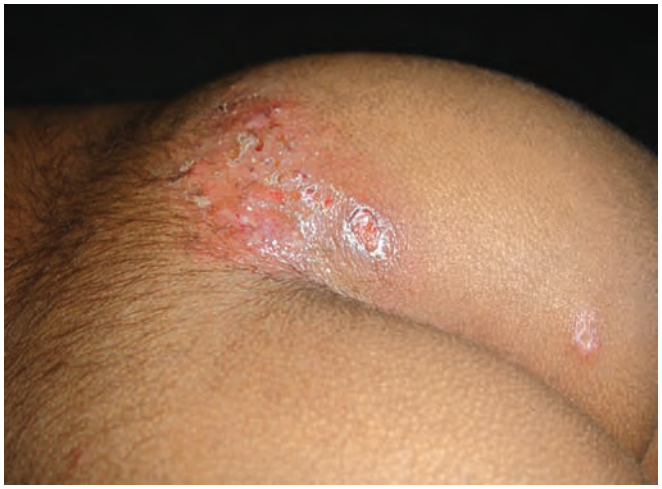

Fig. 5.13 Erythematous infiltrated mildly scaly plaque with central clearing over buttock in a 5-year-old boy with lupus vulgaris

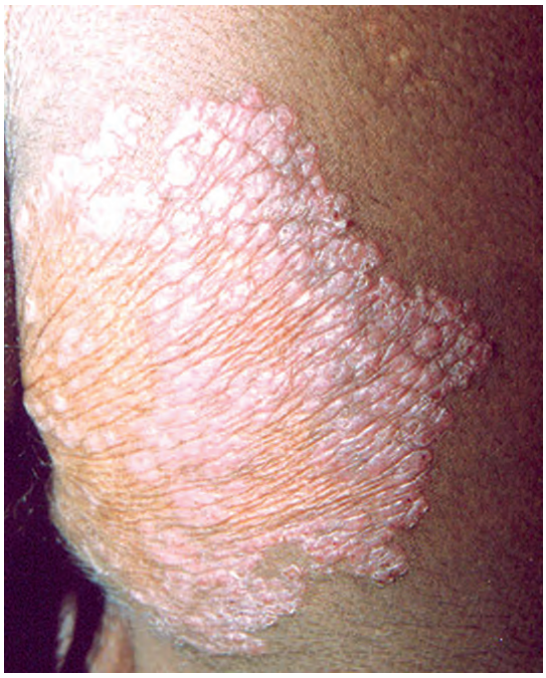

Fig. 5.13A Lupus vulgaris lesion over knee in a 10-year-old boy

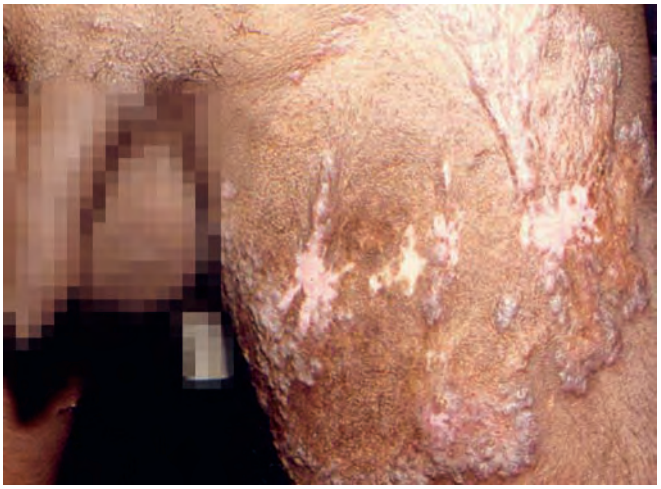

Fig. 5.13B Lupus vulgaris over thigh in a 15-year-old boy, note central healing and scarring

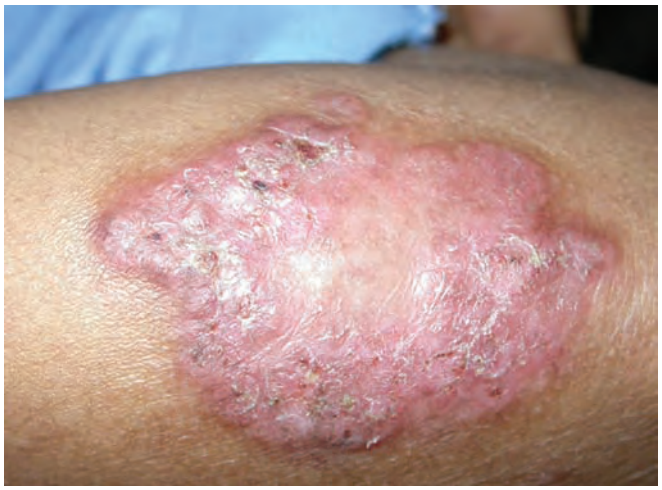

Fig. 5.13C Indurated scaly erythematous plaque of lupus vulgaris with central clearing

SCROFULODERMA (Figs 5.14A to D)

Scrofuloderma represents a direct intension to the skin of an underlying tuberculous infection, present most commonly in a lymph node or a bone. The lesion first manifests itself as a blue-red, painless swelling that breaks open and then forms an ulcer with irregular, undermined blue borders. Numerous fistulae may intercommunicate beneath ridges of a bluish skin. Progression and scarring produce irregular adherent masses, densely fibrous places and fluctuant or discharging in others. After healing, characteristic puckered scarring marks the site of the infection.

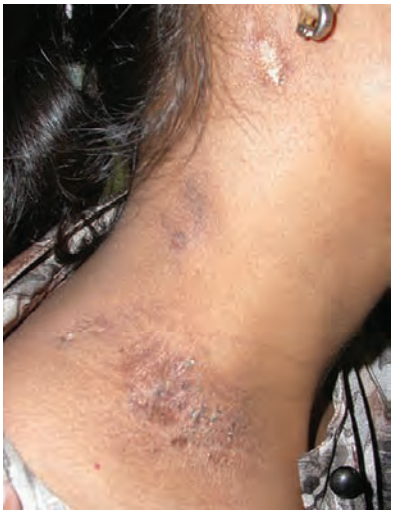

Fig. 5.14A Scrofuloderma over cervical region

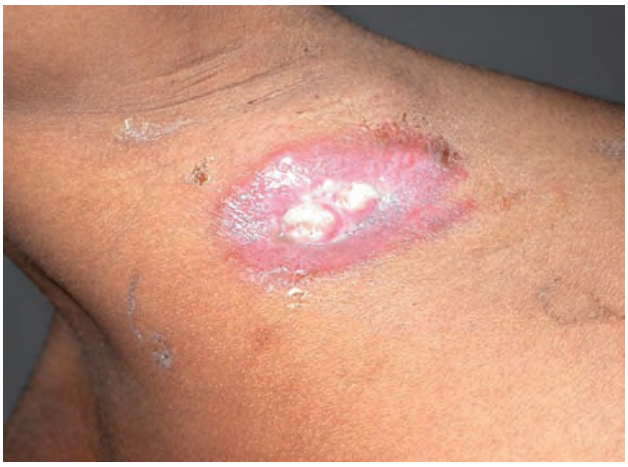

Fig. 5.14B Close-up, note cutaneous ulcer adherent to underlying lymph nodes

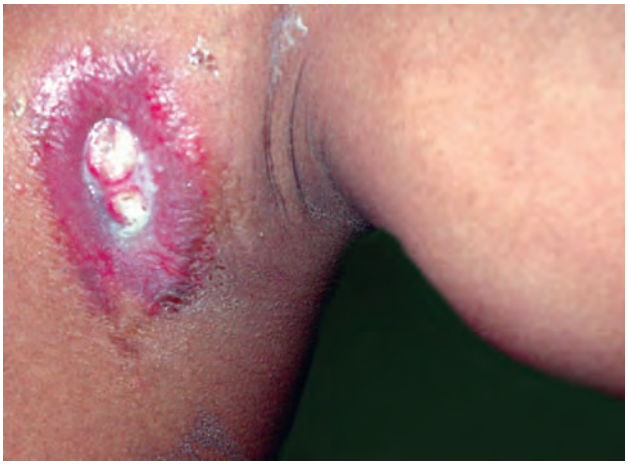

Fig. 5.14C Close-up of ulcer

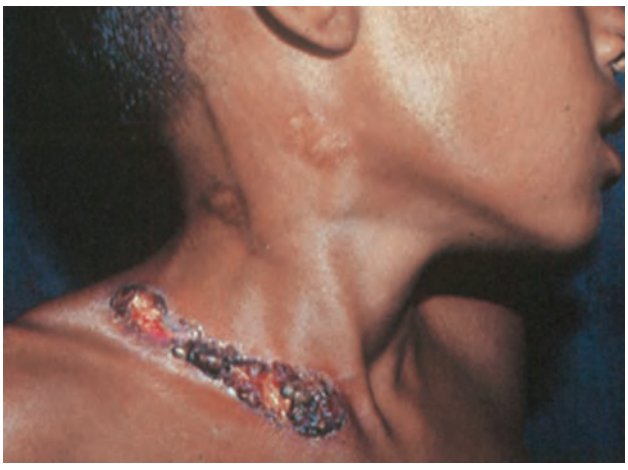

Fig. 5.14D Scrofuloderma over neck, a very common site

TUBERCULOSIS VERRUCOSA CUTIS (Figs 5.14E to H)

This type of cutaneous tuberculosis results from inoculation in a person who has moderate or high degree of immunity. Laboratory laborers and manual workers are often the victims and is secondary to trauma and commonly lower limbs are affected. It is an occupational hazard in veterinarians, pathologists, anatomists and butchers who handle the diseased tissue and hands are often affected (Prosector's wart, Butcher's wart).

The clinical features are variable but large warty lesions of long duration affecting the hands or feet should arouse suspicion. Initially the lesions are dull red, deep-seated papule or nodule which slowly enlarge and become warty over the period. These lesions sometimes become warty over the period. These lesions sometimes become worse during summer season and may become crusted. On healing, there are atrophic scars left behind.

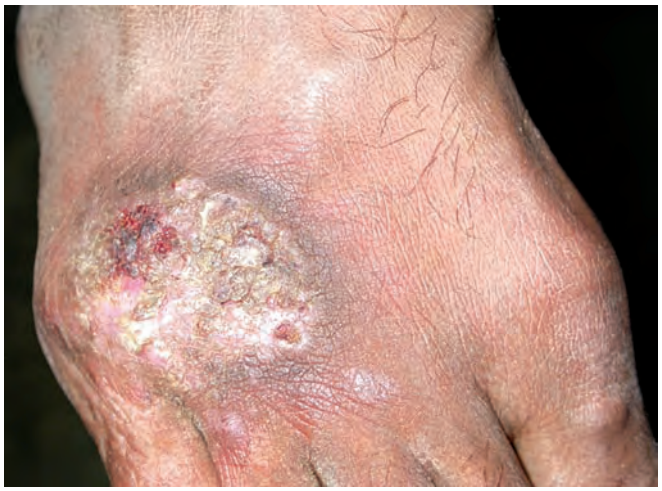

Fig. 5.14E Warty lesion of tuberculosis verrucosa cutis over dorsum of foot

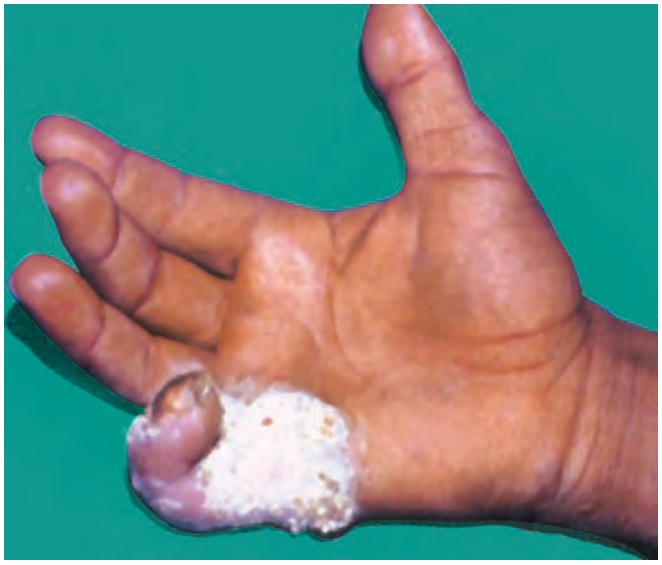

Fig. 5.14F Tuberculosis verrucosa cutis

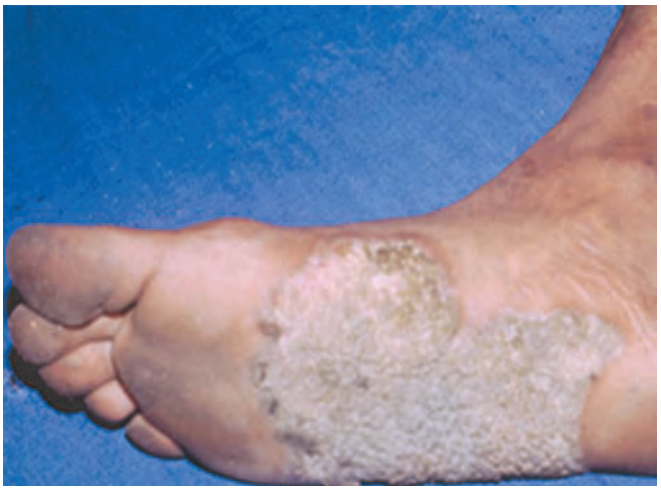

Fig. 5.14G TBVC over sole

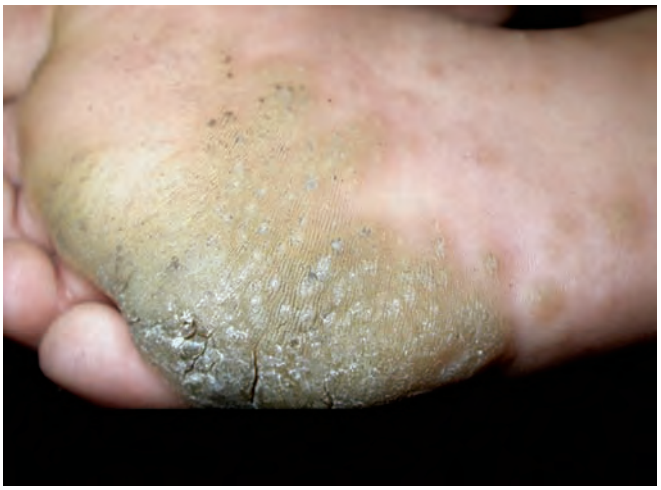

Fig. 5.14H TBVC over sole, close-up

LUPUS MILIARIS DISSEMINATUS FACIEI (Figs 5.14I and 5.14J)

It is a chronic granulomatous disease of unknown etiology characterized by multiple, smooth, discrete, 1–3 mm, monomorphic, reddish brown papules and nodules with predilection for centrofacial region. Previously this entity was thought to be a delayed type of hypersensitivity

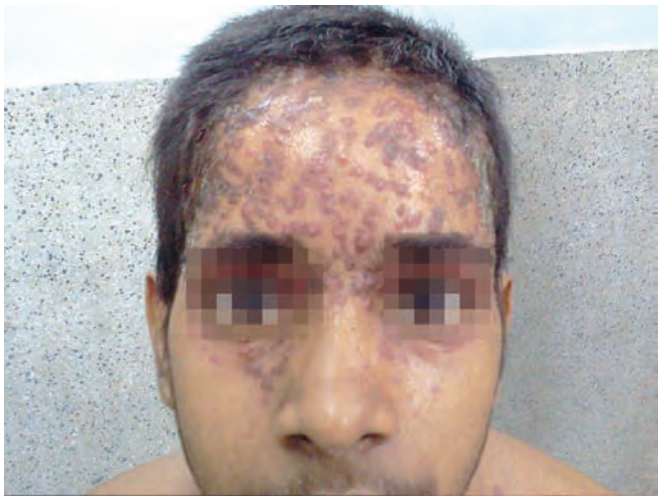

Fig. 5.14I LMDF lesions on classical site face in a 10-year-old boy

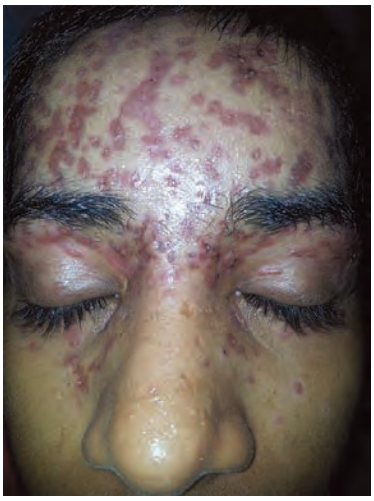

Fig. 5.14J Lesions after treatment with Doxycycline

reaction to tuberculosis. Even it was conceptualized to be a variant of rosacea. But both hypotheses were proved wrong subsequently. Lesions appear yellow-brown on diascopy. Though lesions are chiefly distributed over eyelids, upper lip, periorbital area and butterfly area of face, lateral aspect of the face and below mandibular regions are also affected. Reports also state about extra facial involvement. Adolescent and young adults are common victim with slight male preponderance. Histopathology is typified by caseating epitheloid cell granuloma within the dermis. Potential squeal is atrophic disfiguring scar. Acne vulgaris can be differentiated by absence of comedones, lack of eye lid involvement and poor response to therapy. Differentiating features from rosacea are absence of flushing, telangiectasia or persistent erythema, upper eyelid involvement and scarring. Though the disease is self limited, several years are required for proper subsidence. Recurrence is uncommon. Long term treatment with minocycline or isotretinoin may show some favorable result. Other treatment modalities ate corticosteroids, dapsone, doxycycline, clofazimine, isoniazide, erythromycin and metronidazole.

Treatment

Multidrug therapy has eased the treatment of cutaneous tuberculosis and the outcome is very good. The total duration of treatment is essentially 6 months, which is divided into initial 2 months intensive phase and continuation phase for 4–7 months. During intensive phase, various drugs used are isoniazide (5 mg/kg/day), rifampicin (10 mg/kg/day), pyrazinamide (30 mg/kg/day) and ethambutol (15 ug/kg/day). For cutaneous tuberculosis without any systemic involvement, four months' continuation phase is adequate. However, if there is underlying systemic involvement, the duration may need to be prolonged. During isoniazide therapy, pyridoxine supplementation is routinely given. Associated malnutrition, if any, needs to be treated simultaneously.

LEPROSY

Three cardinal features of leprosy are hypopigmented or erythematous hyposthetic patch, thickened peripheral nerves with sensory and/or motor deficit and presence of acid-fast bacilli in the skin lesions. The pasence of at least one of them is sufficient to make a diagnosis of leprosy. As per Ridley-Jopling classification, leprosy is divided into 5 clinical types: lepromatous, borderline lepromatous, mid borderline, borderline tuberculoid and tuberculoid types. Other clinical forms of leprosy seen in India are indeterminate, pure neuritic and histoid leprosy.

Two types of lepra reactions are seen in clinical practice. Type I lepra reaction occurs usually within first 6 months of treatment of BT leprosy with MDT and may last for few months. There may be erythema, edema and tenderness over the lesions and the affected limbs may become tender. Tender nerves or neuritis is a constant feature. In severe cases associated constitutional features like fever, malaise, arthralgia may develop.

Type II lepra reaction or erythema nodosum leprosum (ENL) reaction, occurs in BL or LL cases mostly within first 6 months of treatment, with MDT, sometimes in untreated cases. Erythematous tender evanescent papules and nodules develop over extremities, face and sometimes back. It is associated with high fever and constitutional symptoms. There may be associated neuritis, inflammation of eyes, testes, liver, kidneys, spleen and lymph nodes.

INDETERMINATE LEPROSY (Figs 5.15 and 5.15A)

It presents as hypopigmented ill-defined macules or patches over the face, trunk and extremities. This type of leprosy is mostly seen in children. There is very negligible hypoesthesia over the patches, if at all. Slit skin smears do not reveal presence of any AFB, and skin histopathology does not show any granuloma. Therefore, the patients are always kept under observation. In more than 80% of the cases the lesions subside spontaneously as their immunity is supposed to be good.

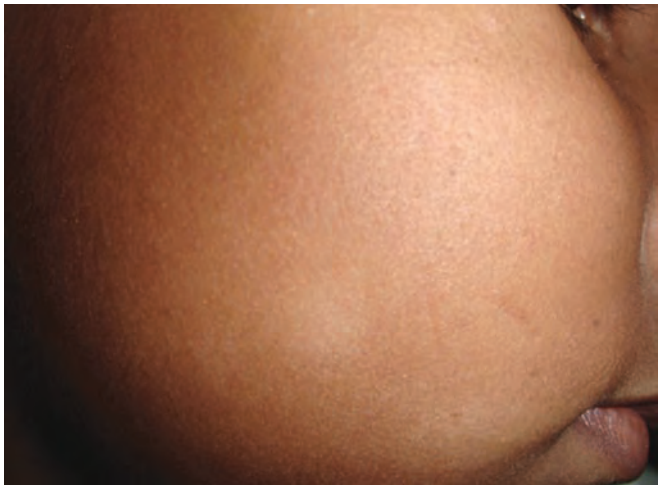

Fig. 5.15 Hypopigmented patch of indeterminate leprosy over face

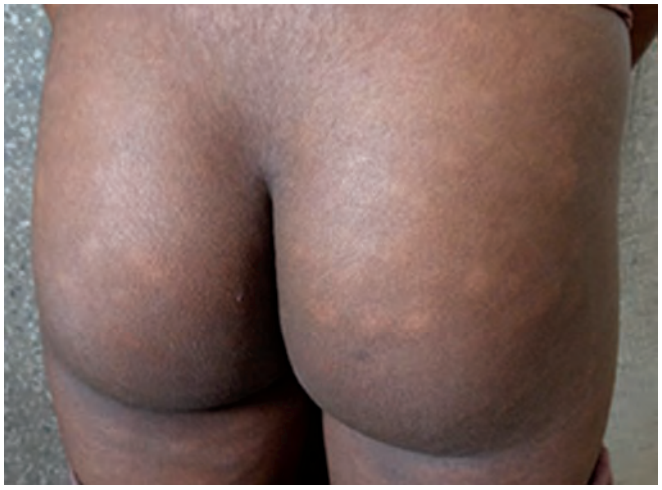

Fig. 5.15A Indeterminate leprosy lesions over buttocks

BORDERLINE TUBERCULOID LEPROSY (Figs 5.16 to 5.17D)

It presents as hypopigmented patch or plaque with variable degree of hypoesthesia. The border of a lesion is irregular with breakage of the lesion to form satellite lesions. The lesions may be distributed over the trunk or extremities. The feeding nerve to the patch may be palpable. The nerve proximal to the lesions is usually thickened. There may be redness and scaling over the lesion(s) because of type I reaction and the lesion(s) may be tender.

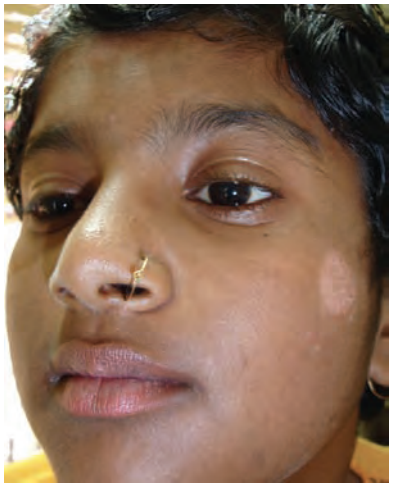

Fig. 5.16 Well-defined hypoesthetic hypopigmented patch of BT leprosy

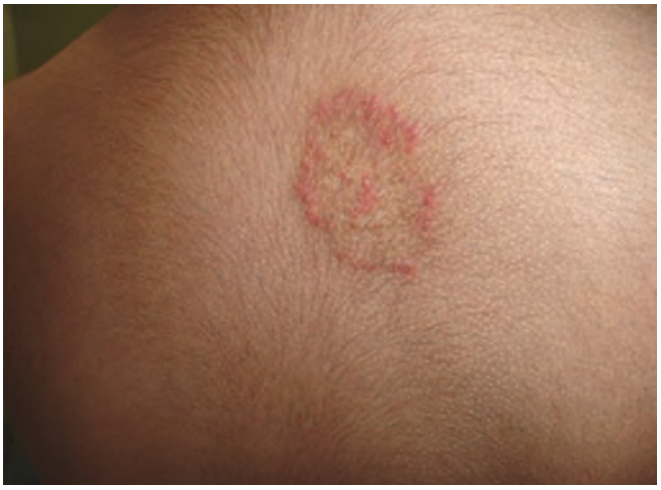

Fig. 5.16A Classical lesion of BT Hansen, note beaded margin

"Some men can live up to their loftiest ideals without ever going higher than a basement."—Theodore Roosevelt

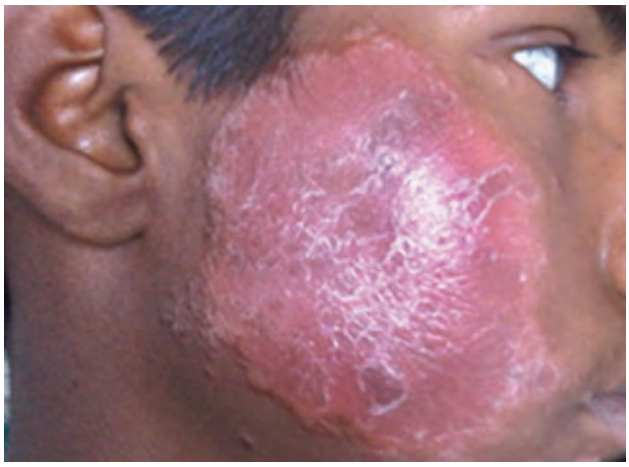

Fig. 5.16B BT HD over face with Type 1 reaction

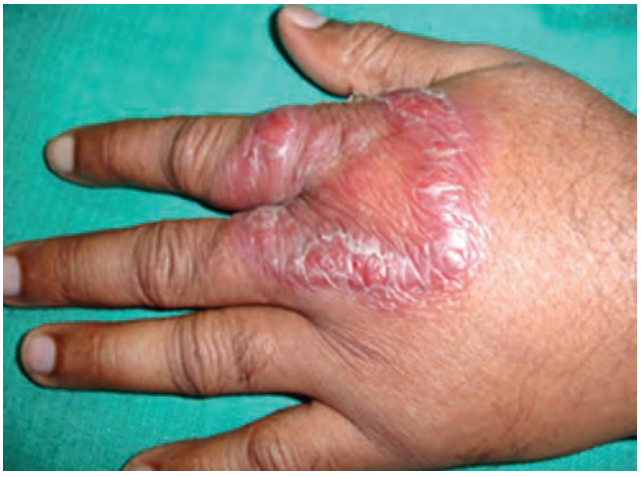

Fig. 5.16C BT Hansen's disease with type 1 reaction

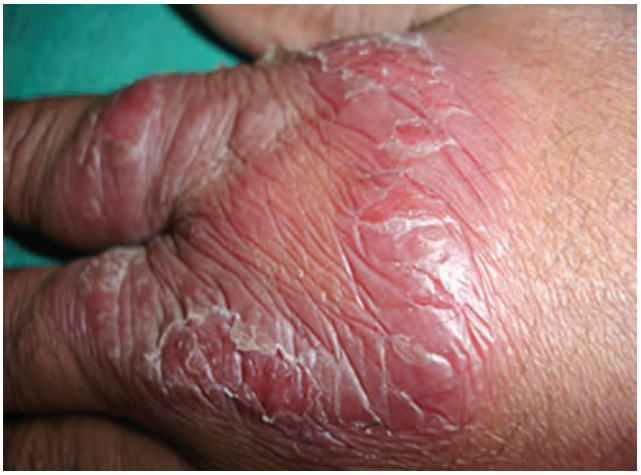

Fig. 5.16D Same patient, close-up

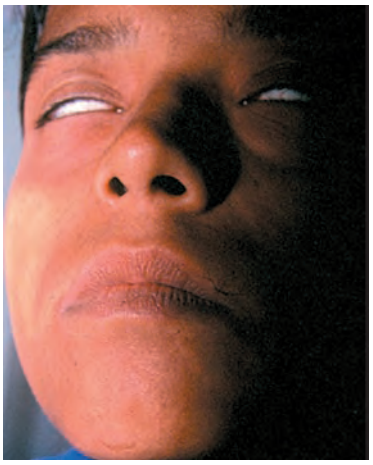

Fig. 5.17A BT leprosy with facial palsy during type 1 reaction

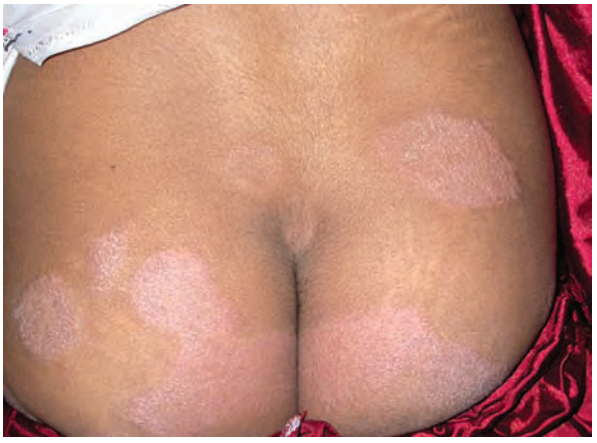

Fig. 5.17B Multiple erythematous scaly plaques over the buttock in a 4-year-old boy with BL leprosy

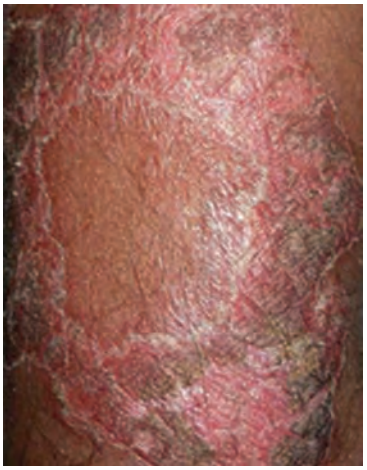

Fig. 5.17C Close-up of BT lesion, note irregular border with satellite lesions

"I don't know who my grandfather was; I am much more concerned to know what his grandson will be."—Abraham Lincoln

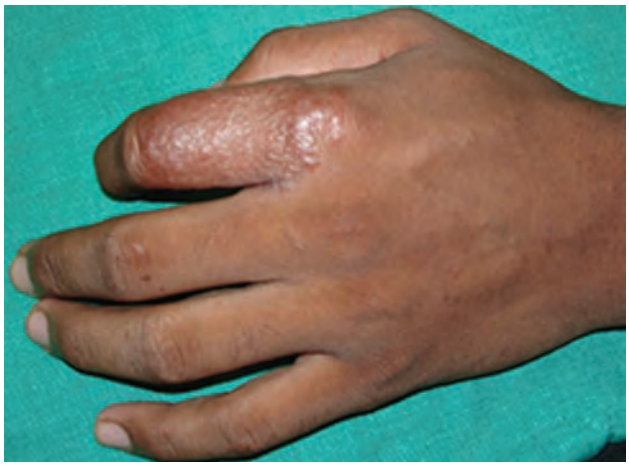

Fig. 5.17D BT in reaction with arthropathy

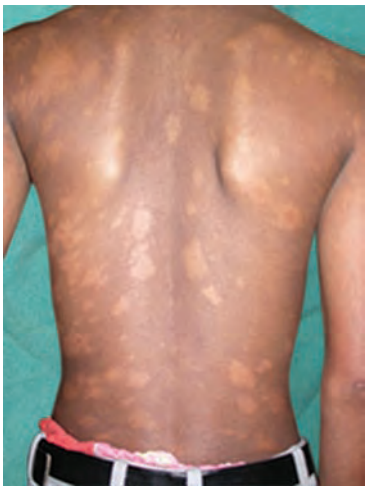

Fig. 5.17E Borderline Lepromatous (BL) lesions over back

BORDERLINE LEPROMATOUS LEPROSY (Fig. 5.17E)

It starts as macular lesions which become infiltrated plaques and nodules. The infiltration begins in the center rise to a margin into normal skin. Lesions are numerous, more symmetrical and bilateral. Many large peripheral nerves are symmetrically thickened. The thickening occurs earlier in the course of the disease than lepromatous leprosy. Borderline tuberculoid lesions are present in a patient whose leprosy has downgraded.

LEPROMATOUS LEPROSY (Figs 5.17F to K)

Lepromatous leprosy rates in children are very low ranging from 1.6 to 4.9%. The course of leprosy in childhood is unpredictable. Progression and regression of lesions are common.

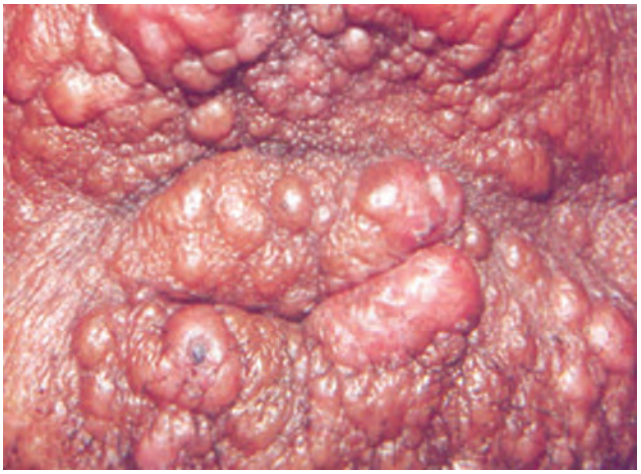

Fig. 5.17F LL nodules and infiltration of skin, close-up

Clinical Features

The early lesions of lepromatous leprosy are small innumerable macules distributed symmetrically may or may not have slight infiltration. As the lesions progress infiltration of the skin results in the following presentation pattern:

1. *Diffuse lepromatous leprosy:* It results from gradual coalescing of the macules. The skin has a stretched shiny look with mild infiltration.
2. *Infiltrated lepromatous leprosy:* It is an advanced stage of the macular lepromatous leprosy with easily visible infiltration. Lesions are often shiny and succulent in consistency.
3. *Nodular lepromatous leprosy:* It occurs from the deterioration of the above mentioned two forms of leprosy. It occurs most commonly over the elbows, fingers, joints and buttocks. The infiltrated plaque accentuates the skin fold giving rise to leonine facies.

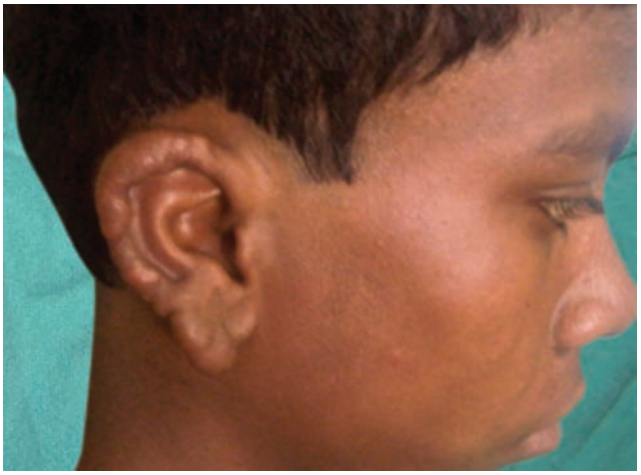

Fig. 5.17G LL leprosy, note nodules over pinna and ear lobe

"Common sense is not so common."—Jessica Truman

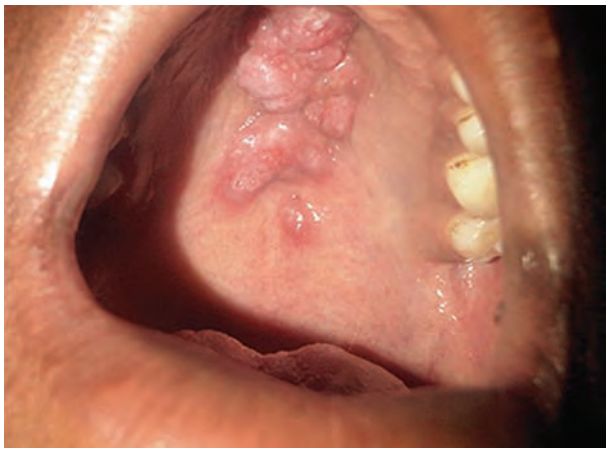

Fig. 5.17H Leprous nodules over palate, a rare observation

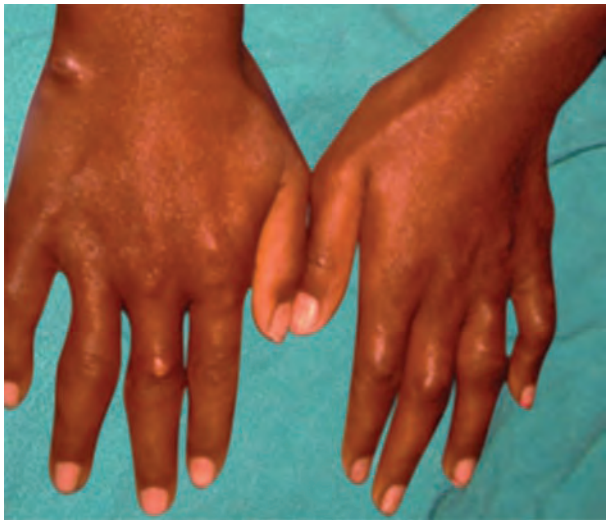

Fig. 5.17I Dactylitis in LL patient

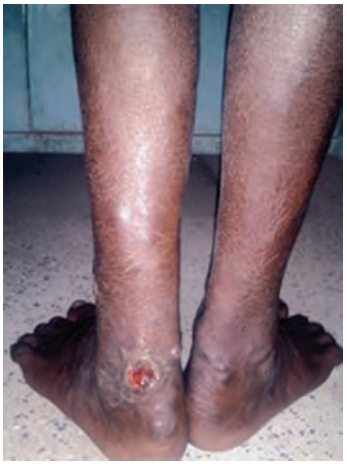

Fig. 5.17J LL patient with trophic ulcer of foot

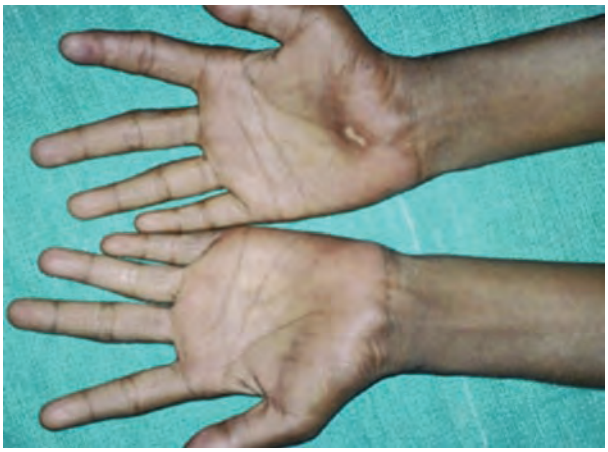

Fig. 5.17K LL patient with claw hand. Note atrophy of thenar and hypothenar eminences

Other features include anhidrosis with compensatory hyperhidrosis of face, axilla and trunk. The sensory loss being symmetrical gives rise to the glove and stocking anesthesia. There may fusiform swelling of the digits with resorption. Involvement of the upper respiratory tract results in stuffy nose along with epistaxis. Ocular manifestation in the form of lagophthalmos, uveitis and corneal opacity and perforation may also occur.

Differential Diagnosis of Facial Infiltration

1. Post kala-azar dermal leishmaniasis
2. Rosacea
3. Reticulohistiocytosis
4. Sarcoidosis
5. Disseminated cutaneous leishmaniasis
6. Lipoid proteinosis.

Laboratory Diagnosis

Slit skin smear with smear positivity and high bacillary index. Biopsy done from the skin lesions show a granuloma without caseation necrosis and numerous foamy macrophages. AFB stain is generally positive.

HISTOID LEPROSY (Figs 5.17L to N)

Histoid leprosy is an expression of multibacillary leprosy characterized by typical cutaneous features with unique histopathology and bacterial morphology. It has rarely been reported in children however, the lowest age of occurrence has been recorded as 10 years. It generally manifests in patients treated with dapsone monotherapy. Development of drug resistance to dapsone and mutant organisms are the other two hypothesis for the development of histoid leprosy.

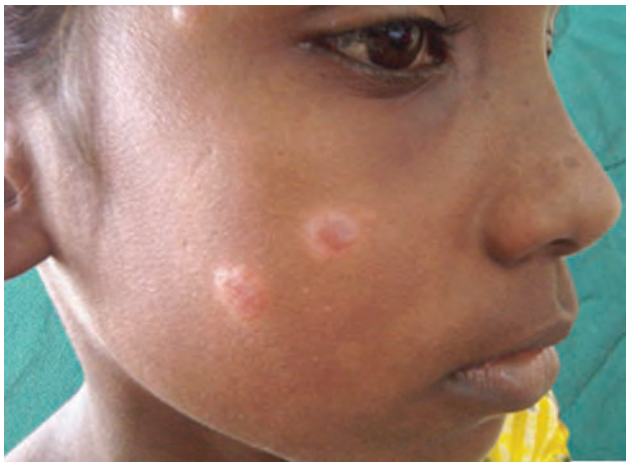

Fig. 5.17L Histoid lesions

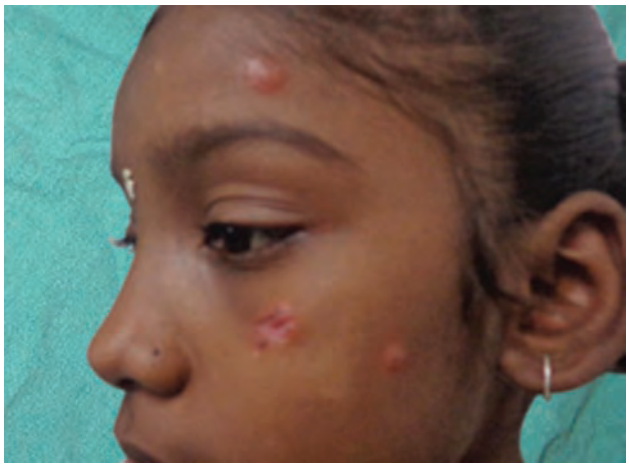

Fig. 5.17M Histoid leprosy

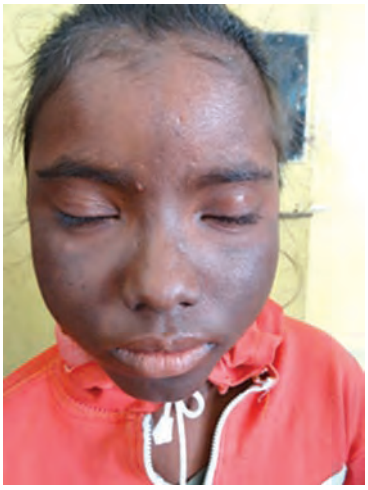

Fig. 5.17N Clofazimine induced slate gray hyperpigmentation

Clinical Features

Histoid leprosy can present with cutaneous nodules that may be superficial, subcutaneous or deep and also plaques or pads. The number of lesions vary from 3 to 50 located generally on the limbs, back, buttocks, face and bony prominences.

The typical lesions have been described as dome shaped, reddish to skin colored papules with shiny smooth surface and a stretched overlying skin. The plaques and pad type of lesions are more common over the bony prominences.

Two types of facies have been described:

1. Resembling relics of a burnt out leprosy
2. Normal facies.

The noticeable features of histoid leprosy includes:

1. Persistance of eyebrow
2. Sparing of nasal mucosa and cartilage
3. Good general health of the patient.

Differential Diagnosis

1. Lepromatous nodules
2. Erythema nodosum leprosum
3. Neurofibromatosis
4. Molluscum contagiosum
5. Sarcoidosis.

Laboratory Diagnosis

Slit skin smears show smear positivity with a high bacillary index. Biopsy done from the lesion shows a well circumscribed granuloma with lepra bacilli in a histoid habitus.

Treatment

MB-MDT for children.

MB Child Treatment (10–14 Years)

Once a month: Day 1–2 capsules of rifampicin (300 mg + 150 mg)
–3 capsules of clofazimine (50 mg × 3)
–1 tablet of dapsone (50 mg)

Once a day:
Days 2–28–1 capsule of clofazimine every other day (50 mg)
–1 tablet of dapsone (50 mg)

Full course:
12 blister packs
Adverse effect is of Clofazimine pigmentation over photo-exposed area which appears prominently (Fig. 5.17M).

"There are three types of people in this world: those who make things happen, those who watch things happen and those who wonder what happened."—Mary Kay Ash

COMMON WARTS (VERRUCA VULGARIS) (Figs 5.18 and 5.19A to D)

Common warts are caused by human papillomavirus (HPV) 1, 2, 4, 7. They are most commonly present over the knees in children but also anywhere on the skin. Being firm papules with a rough, horny surface, they range in size from 1 mm to over 1 cm in diameter and by confluence may form large masses. About 65% of warts disappear spontaneously within 2 years and tend to do so earlier in boys.

Natural History

Warts are known to regress spontaneously over a period of 6 months to 2 years. However, treatment is required to stop their spread as well as transmission to others.

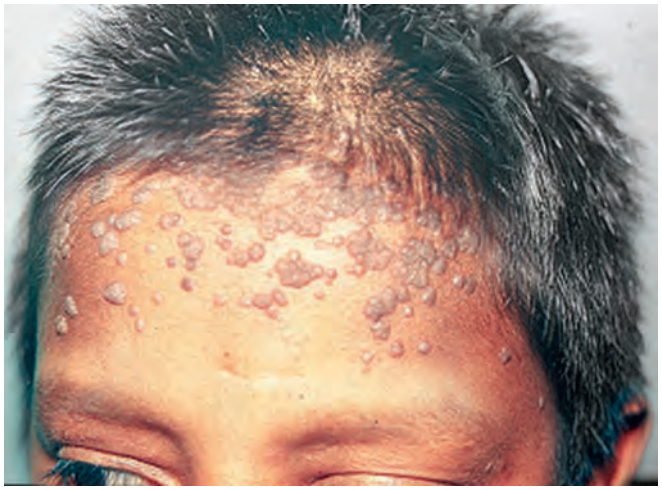

Fig. 5.18 Classical warty lesions of verruca vulgaris over forehead

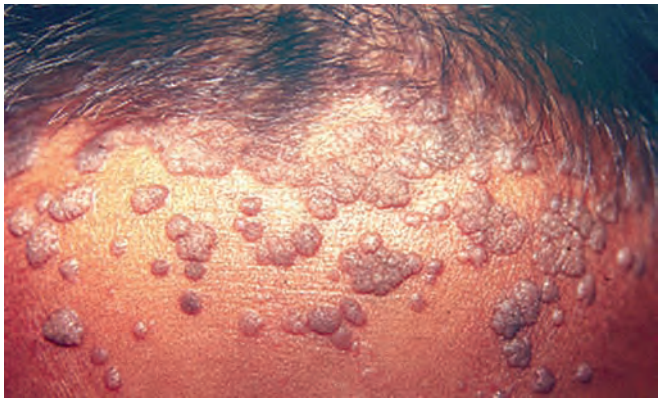

Fig. 5.19A Close-up of same child

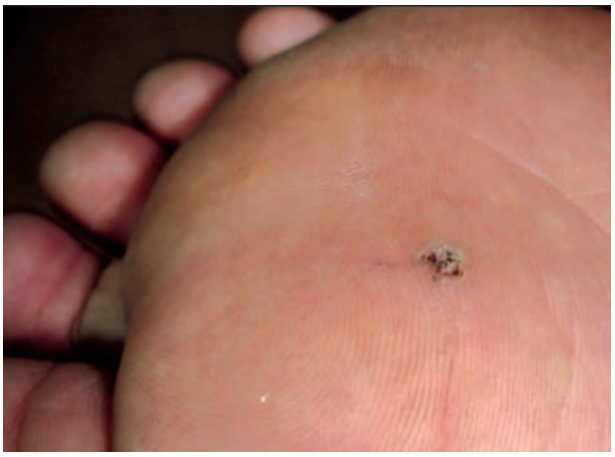

Fig. 5.19B Plantar wart, note black hemorrhagic dots on scraping it with a scalpel blade

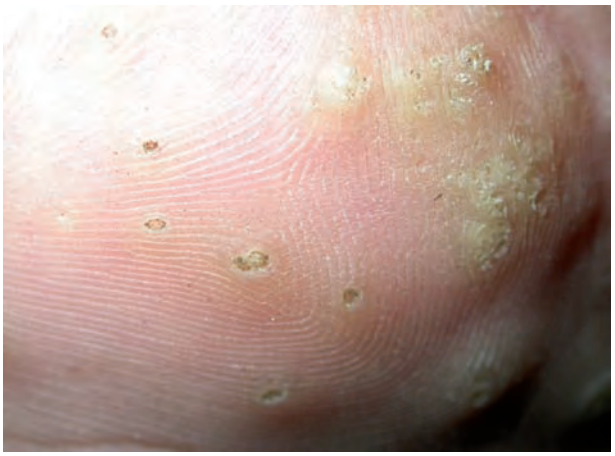

Fig. 5.19C Multiple warts over sole

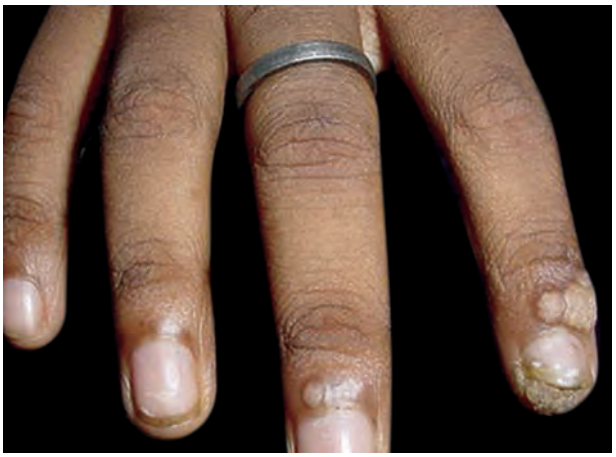

Fig. 5.19D Warts over anterior, posterior and lateral nail folds of index finger

"What you do not want done to yourself, do not do to others."—Confucius

Treatment

Treatment of warts is essentially done either by cauterization with 50–60% trichloracetic acid, phenol, podophyllin (15–20%), etc. or by electrodesiccation, cryotherapy or CO_2 laser treatment.

VERRUCA PLANA (Figs 5.19E and F)

Plane warts occur primarily on the face, neck, arms and legs, and are present as skin colored, grayish-brown, smooth, flat and slightly elevated Papules, 2 to 5 mm in diameter with a round or polygonal base. Young children are mostly affected by this infection. Koebner's phenomenon is seen frequently. Plane warts spread in the bearded areas of men and in the legs of women. It may be caused by irritation of shaving. Contiguous wart often coalesce to form firm, popular or plaque-like lesions; slightly elevated lesions in areas of scratch marks are characteristic of this disorder. Spontaneous regression after a few months is seen quite often.

Treatment

Treatment is more or less same as that of common warts.

Differential Diagnosis

Lymphangiitis needs to be differentiated from thrombophlebitis. In cases of thrombophlebitis, the red streak of inflamed vein corresponds to the course of a superficial vein and often a part of vein is visible as bluish line as continuation of the red line.

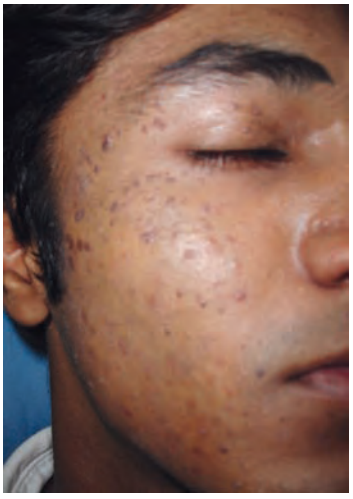

Fig. 5.19E Involvement of face in a 16-year-old boy with verruca plana

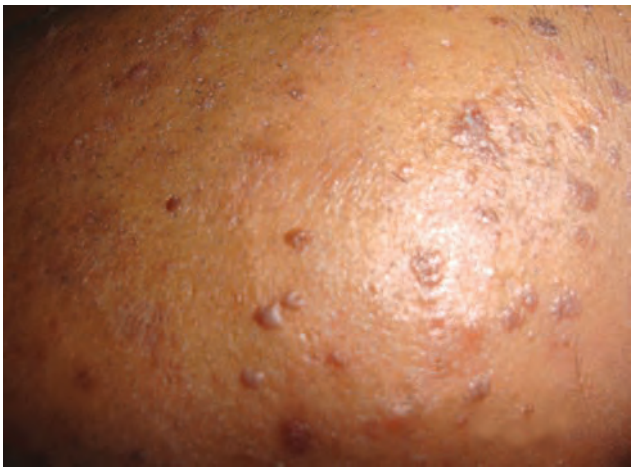

Fig. 5.19F Close-up of lesions of verruca plana

MOLLUSCUM CONTAGIOSUM (Figs 5.20 to 5.24C)

This condition caused by pox viridae is characterized by the appearance of umbilicated skin nodules. The incubation period varies from 14 days to 6 months. The individual lesion is a shiny, pearly, white hemispherical, umbilicated papule which may show a central pore. It grows to a diameter of 5–10 mm in 6–12 weeks. The lesions spread frequently and are sometimes present in large number. After trauma or spontaneously after several months, inflammatory changes result in suppuration, crusting and virtual destruction of the base. The most common sites affected are the limbs. But it may also affect the scalp, face, oral mucous membrane or any other part of the body. Most cases are self-limiting in 6–9 months.

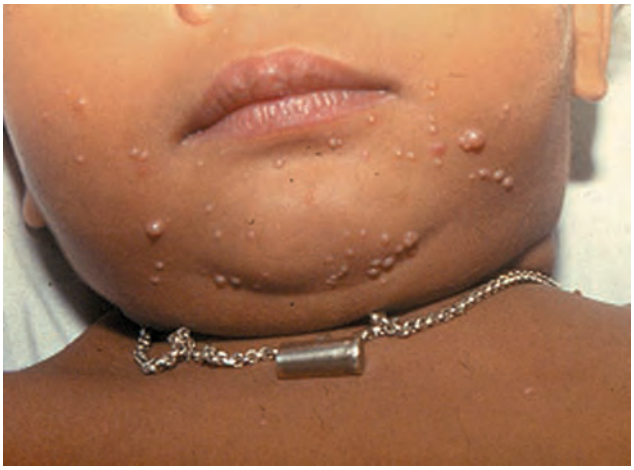

Fig. 5.20 Pearly white umbilicated papules of molluscum contagiosum

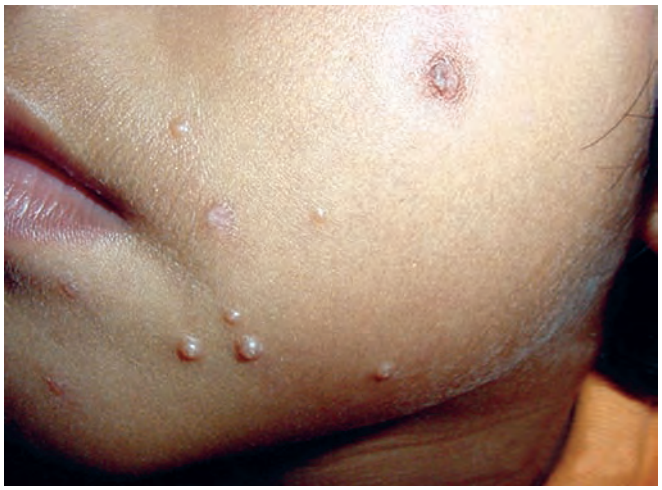

Fig. 5.21 Multiple umbilicated papules of molluscum contagiosum

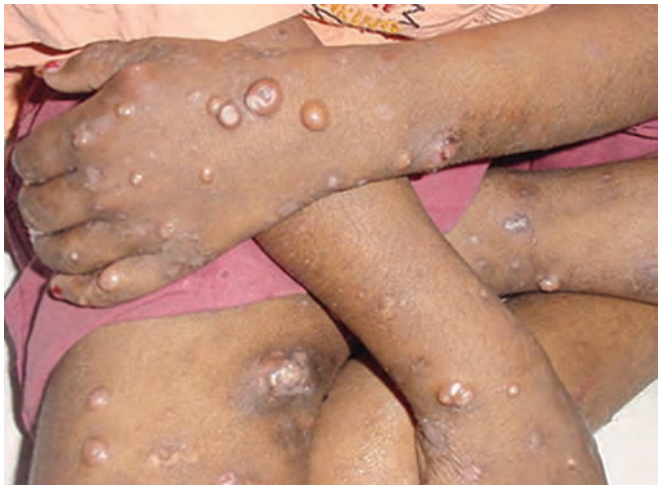

Fig. 5.22 Extensive and giant MC in an immunocompromised child

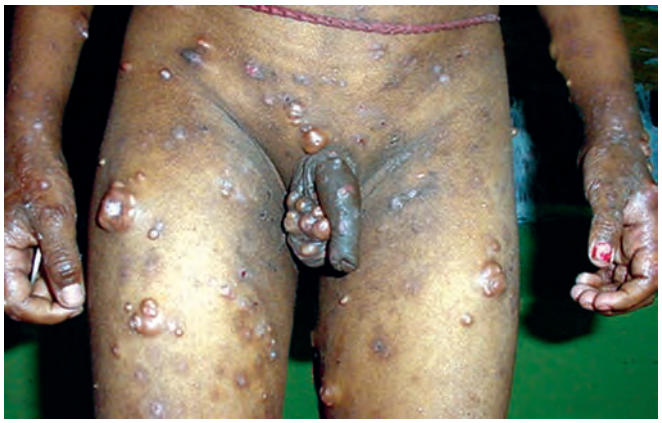

Fig. 5.23 Same child, note giant lesions

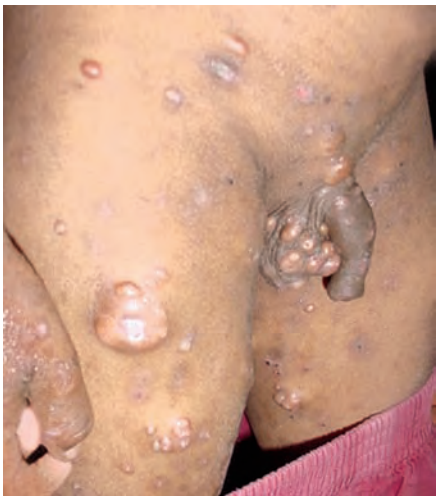

Fig. 5.24 Close-up of giant MC lesions

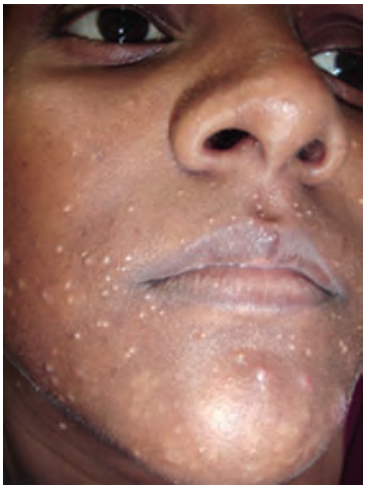

Fig. 5.24A Multiple micropapules of MC

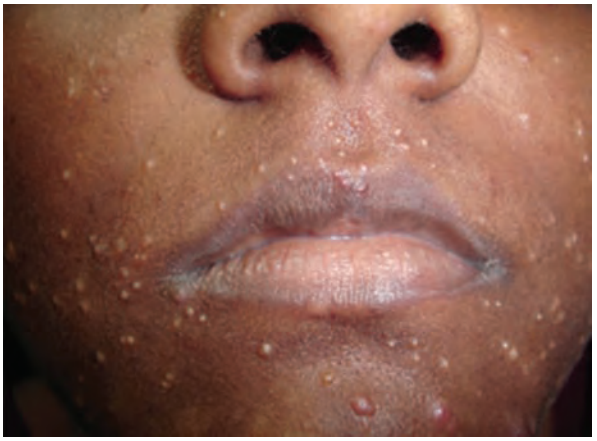

Fig. 5.24B Same patient, close-up

"Imagination rules the world."—Napoleon Bonaparte

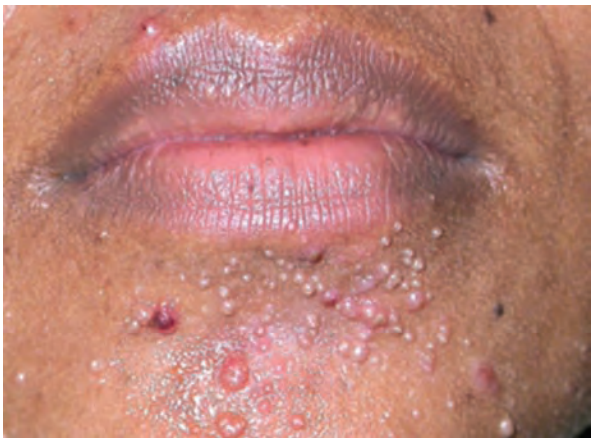

Fig. 5.24C Close-up of Molluscum Contagiosum lesions

Treatment

Lesions are treated by chemical cautery by 50–60% trichlor acetic acid, phenol, cantharidin or silver nitrate. The caustic is applied with either a needle or a tooth pick. Other options are electrodesiccation, cryotherapy or application of currently available imiquimod, an immunomodulator.

PITYRIASIS ROSEA (Figs 5.25 and 5.26)

Pityriasis rosea is an acute and self-limiting disease characterized by a distinctive skin eruption and minimal constitutional symptoms. The etiology is considered to be infective with the appearance of the herald patch, which is larger and more conspicuous than the lesions of the later eruption, usually situated on the thigh, upper arm, the trunk or the neck. It is a sharply defined, bright-red, round or oval plaque soon covered by a fine scale which reaches a size of 2–5 cm. After an interval of 5–15 days, the general eruption begins to appear in crops at 2–3 days interval over a week or 10 days. They appear in the forms of discrete medallions, dull pink in color covered by fine dry, silvery-gray scales. The center tends to clear, assumes a wrinkled, atrophic appearance and a tawny color with a marginal collarete of scales attached peripherally, with the free edge of the scales internally. The medallions are commonly associated with pink macules of varying sizes. The lesions are usually confined to the trunk, the base of the neck and the upper third of the arms and legs. Involvement of the face and scalp are common in children. The skin lesions commonly fade after 3–6 weeks.

Natural History

It is a self-limiting condition and resolves spontaneously in 2-4 weeks time although rarely it may persist up to 3 months or even longer.

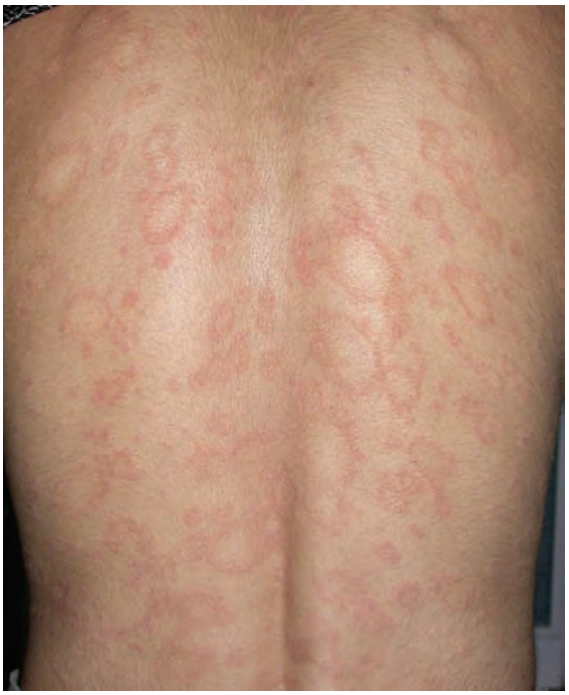

Fig. 5.25 Distribution of PR lesions over trunk

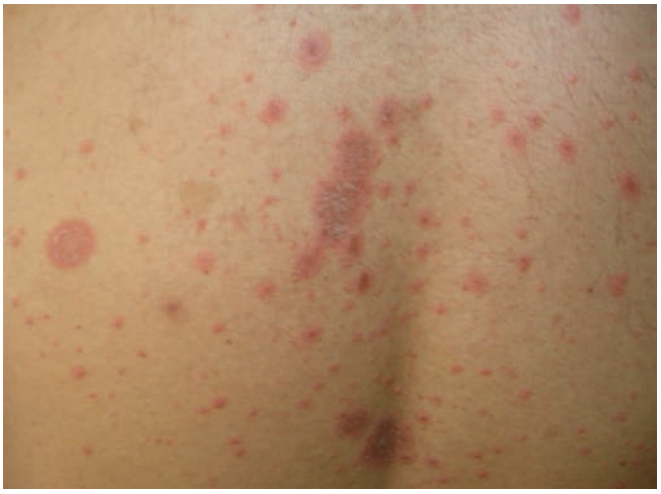

Fig. 5.26 Same girl (close-up), note multiple ringworm like lesions with peripheral colarette of scales

Treatment

For mild itching, oral antihistamines are prescribed as well as local application of calamine. In severe cases, to cut down the severity of the disease and to improve the quality of life (QOL), oral corticosteroids at a dose of 10–30 mg is given for a duration of 7–21 days.

"What is fame? The advantage of being known by people of whom you yourself know nothing, and for whom you care as little."—Lord Byron

HERPES SIMPLEX INFECTION (Figs 5.27 to 5.30)

Herpes simplex is one of the most common infections throughout the world and is caused by herpes simplex virus types 1 and 2. Primary infection may be sub-clinical but when clinical lesions develop, the severity is generally greater than that in recurrences.

Herpetic Gingivostomatitis

This is the most common clinical manifestation of primary infection by type 1 herpes virus (HSV 1). Children between 1 and 5 years are usually affected. After an incubation period of approximately 5 days, the stomatitis begins with fever, malaise, restlessness and excessive dribbling. Drinking and eating become painful and the breath is foul. Gums are swollen, painful and bleed easily. Vesicles presenting as white plaques appear on the tongue, pharynx, palate and buccal mucous membrane. Regional lymph nodes are enlarged and tender. The fever subsides in 3 to 5 days and recovery is complete in 1 week.

Herpes Genitalis

Infection with type 2 herpes simplex virus occurs after the onset of sexual activity. Penile ulceration from herpetic infection is the most frequent type of genital ulceration. The ulcers which may be preceded by a general malaise, are most frequent on the glans, prepuce and shaft of the penis. They are small and painful and last for 2–3 weeks if untreated. In females similar ulcerations occur on the external genitalia and mucosae of the vulva, vagina and cervix. Pain and dysuria are common.

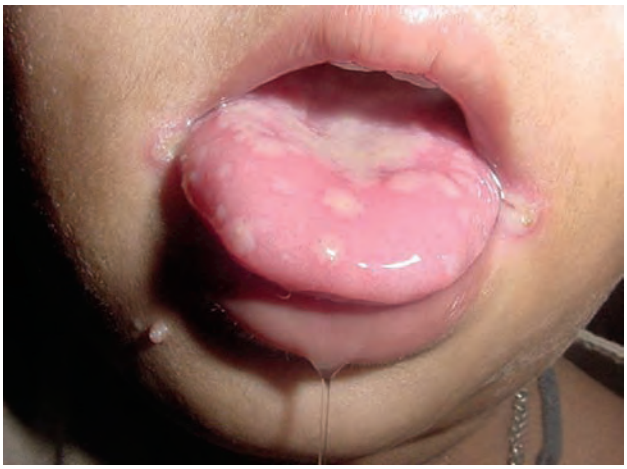

Fig. 5.28 Herpes lesions on tongue in the same girl

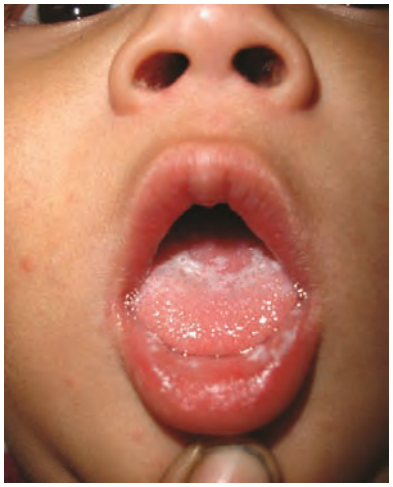

Fig. 5.28A Candidiasis over tongue and lip, to be differentiated from herpes infection

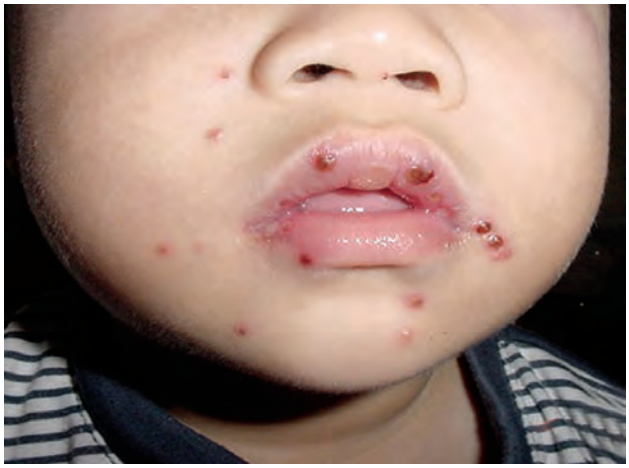

Fig. 5.27 Vesicular lesions of herpes labialis

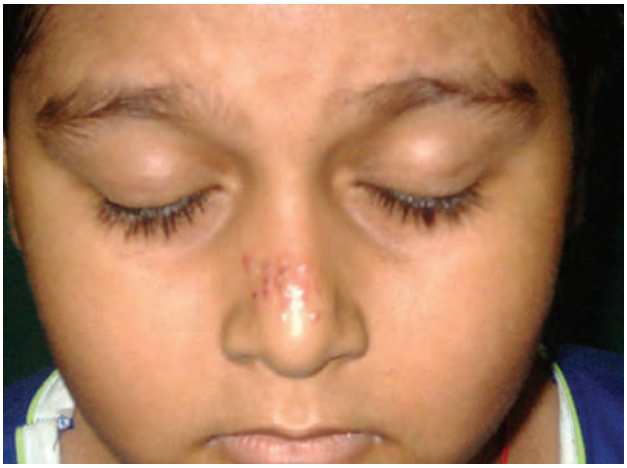

Fig. 5.29 Herpes simplex lesions over nose

"Logic is like the sword-those who appeal to it, shall perish by it."—Samuel Butler

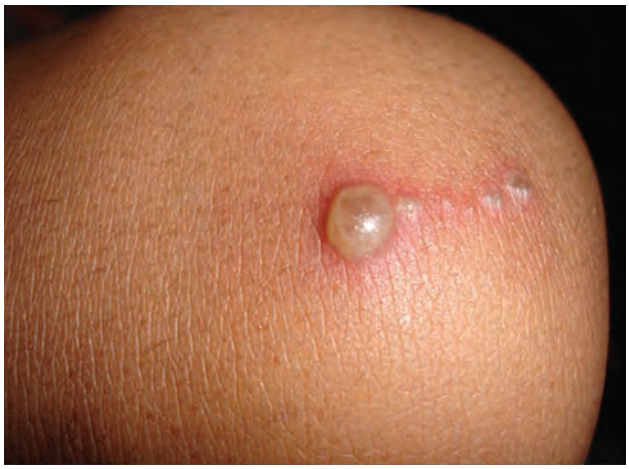

Fig. 5.30 Insect bite reaction in a 3-year-old boy, simulating herpes

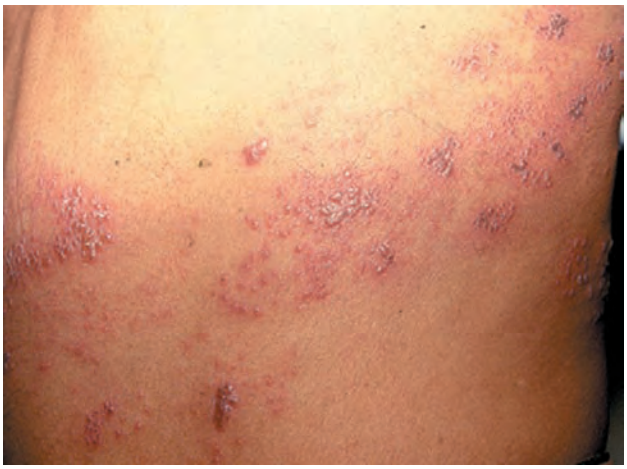

Fig. 5.31 Grouped vesicles on an erythematous base in a band-like fashion following a dermatome in herpes zoster

Keratoconjunctivitis

Primary herpes infection of the eye causes a severe and often purulent conjunctivitis with opacity and superficial ulceration of the cornea.

HERPES ZOSTER (Figs 5.31 to 5.33A)

Varicella and zoster are caused by the same virus, herpes virus varicellae. Varicella is the primary infection with a viremic stage, after which the virus persists in nerve ganglion cells, usually sensory. Zoster is the result of reactivation of the residual latent virus. The first manifestation of zoster is usually painful which may be severe and may be accompanied by fever, headache, malaise and tenderness localized to areas of one or more dorsal roots. Within 2–4 days, closely grouped red papules rapidly becoming vesicular and then pustular develop in a continuous or interrupted band in the area of one, occasionally two and rarely more contiguous dermatomes. Mucous membranes within the affected dermatomes are also involved. New vesicles continue to appear for several days. The lymph nodes draining the affected area are enlarged and tender. The pain and the constitutional symptoms subside gradually as the eruption disappears. In uncomplicated cases recovery is complete in 2–3 weeks in children and young adults.

Treatment

Acyclovir is the drug of choice for oral, genital and other herpes infections. For primary infection the dose is 200–400 mg 3 times/day for 10 days. To prevent frequent attacks, long-term prophylaxis with 200–400 mg 2 times/day for 6 months to 1½ years has been recommended. Valaciclovir and famciclovir need to undergo adequate trials before being prescribed in pediatric age group.

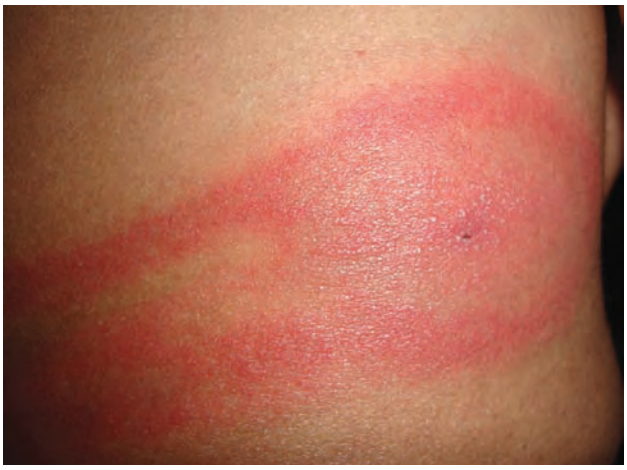

Fig. 5.31A Insect allergy mimicking herpes zoster

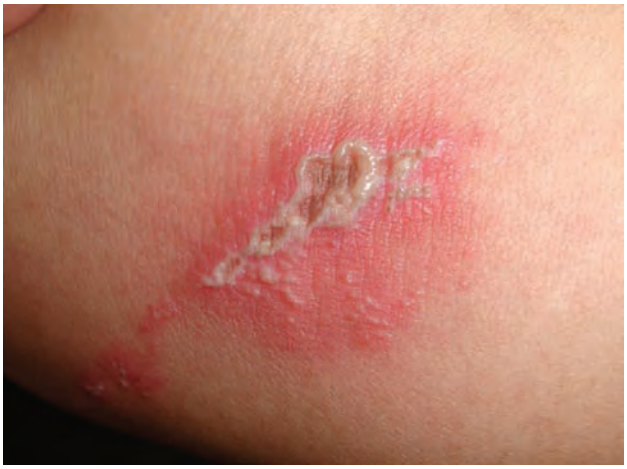

Fig. 5.31B Insect hypersensitivity mimicking herpes zoster

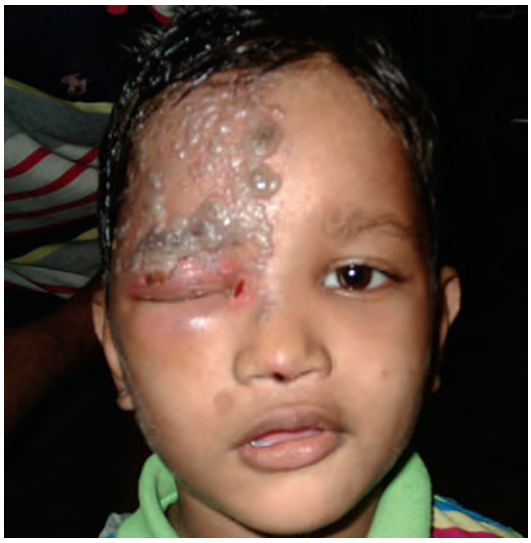

Fig. 5.32 Herpes zoster ophthalmicus in a 5-year-old boy

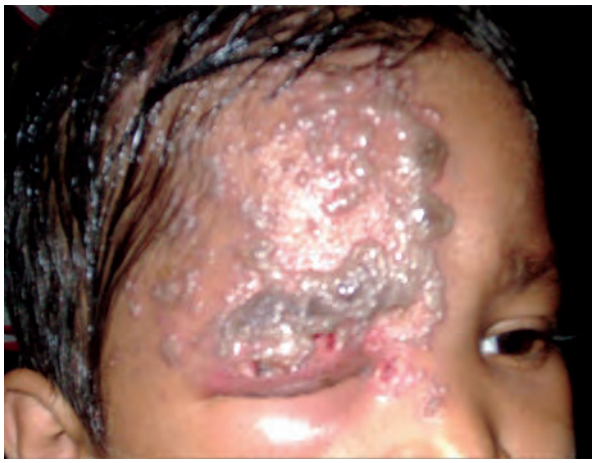

Fig. 5.33 Same boy, note lesions do not cross midline

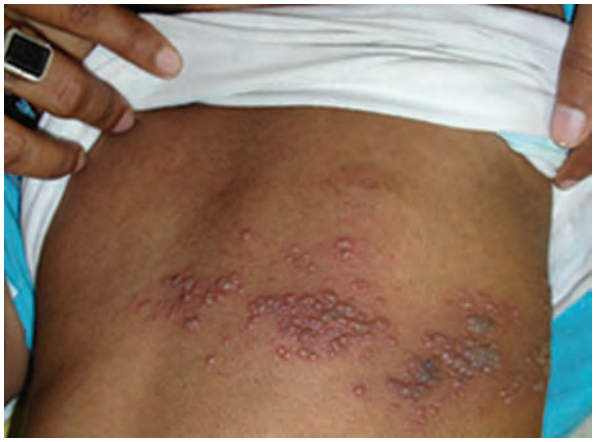

Fig. 5.33A Herpes zoster in a 3-year-old girl

In milder cases of herpes zoster, topical calamine lotion and NSAIDs suffice. In severe and symptomatic cases, oral acyclovir 400–800 mg 5 times/day or famciclovir 250–500 mg 3 times day for 7–10 days is advised. Supportive measures related to the local organ involvement (i.e. ocular involvement) are to be taken. Incidence of postherpetic neuralgia is fairly uncommon in cases of herpes zoster in children.

TINEA CORPORIS AND TINEA FACIEI (Figs 5.34 to 5.36)

Tinea corporis is a dermatophyte infection of the glabrous skin typically occurring on exposed areas. Lesions are circular, sharply marginated with a raised edge. Single lesions occur or there may be multiple plaques. The degree of inflammation is variable. In inflammatory lesions, pustules or vesicles may dominate. Central resolution is common but not complete and the central skin may show post-inflammatory pigmentation, a change of texture or residual erythematous dermal nodules.

Tinea faciei is infection of the glabrous skin of the face with a dermatophyte fungus. Complaints of itching, burning and exacerbation after sun exposure are common. Lesions may be simple papular lesions or flat patches of erythema. Sometimes annular or circinate lesions, indurated lesions with raised margins may be seen.

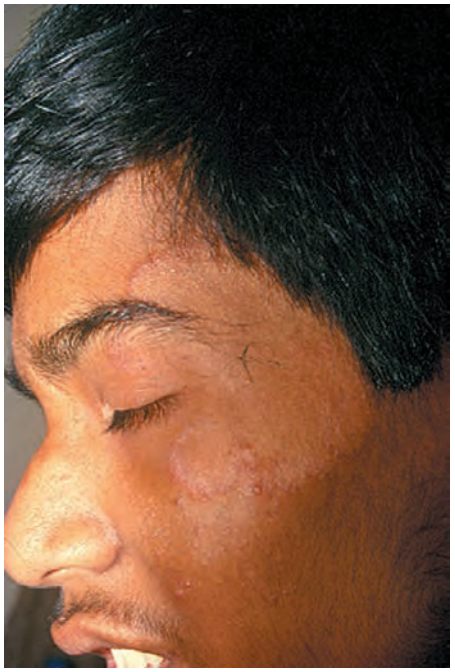

Fig. 5.34 Itchy papulovesicular ring of T. faciei

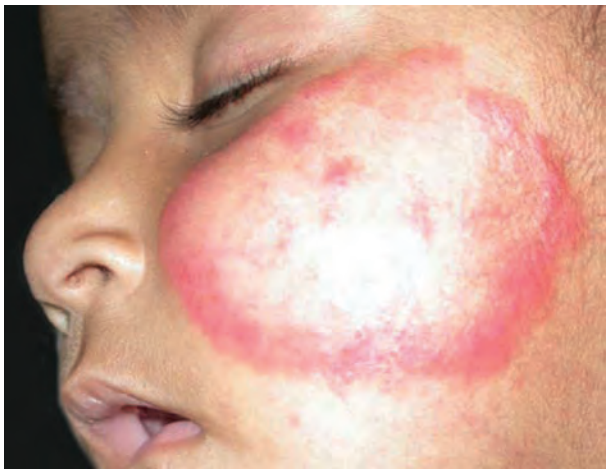

Fig. 5.34A Tinea faciei in a newborn

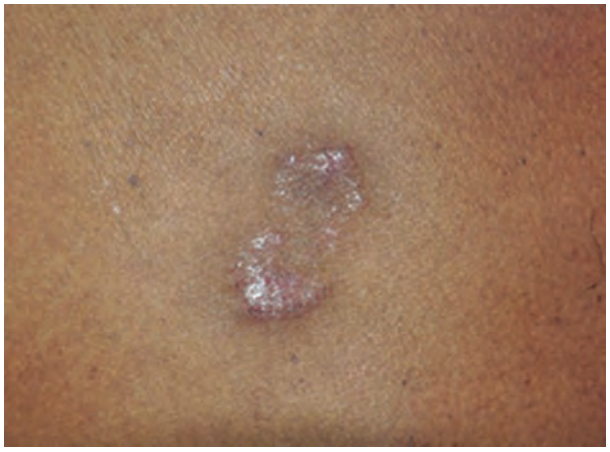

Fig. 5.35 Tinea corporis

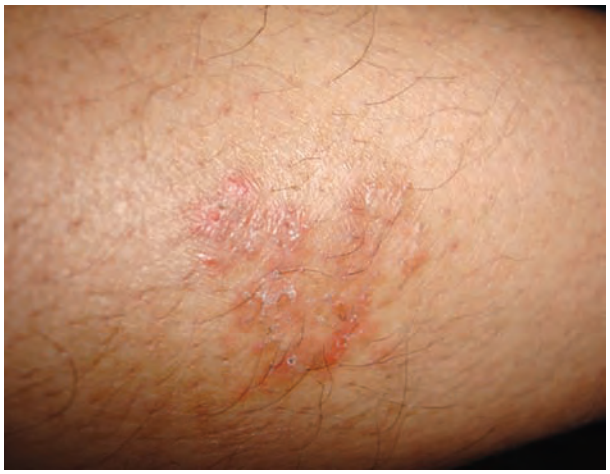

Fig. 5.35A Scaly erythematous papular ring-like lesion of tinea corporis

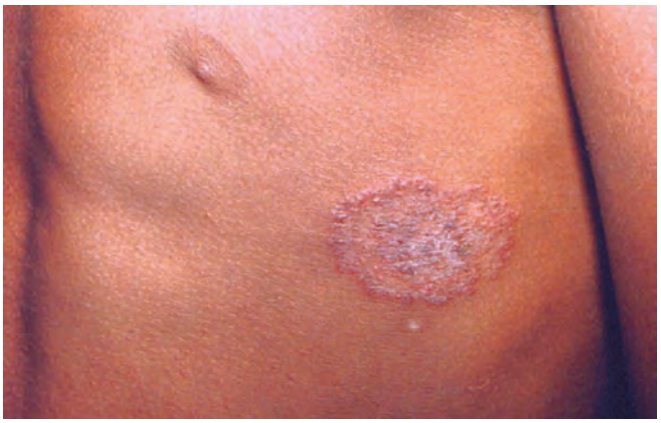

Fig. 5.35B Tinea corporis in a 7-year-old boy

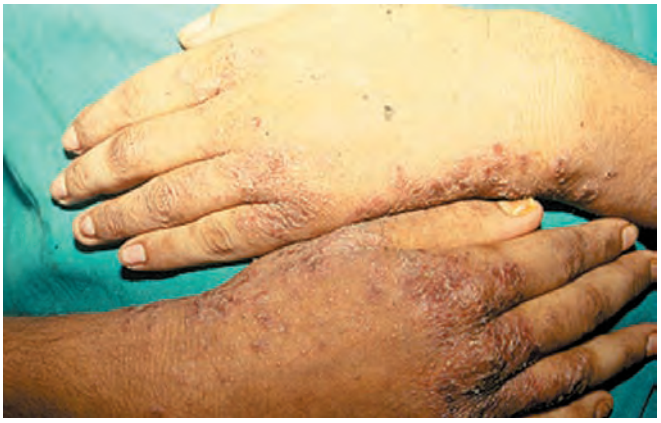

Fig. 5.36 T. corporis over forearms and hands

Management

For a single patch, topical antifungals are enough. Various topical antifungals used are clotrimazole (1%), miconazole (2%), xiconazole (1%), ketoconazole (2%) terbinafine (1%), butenafine (1%) and ciclopirox olamine (1%). Once or twice a day application for 2–3 weeks is recommended.

Systemic antifungals are required for extensive and/or persistent infection, infection over scalp and nails. Griseofulvin is the drug of choice for tinea capitis and is also fairly effective for other types of dermatophytosis. Ultramicronized form of griseofulvin has enhanced bioavailability and lower dosage schedule. It is given in a dose of 5-10 mg/kg of body weight/day. For skin infections 4–6 weeks and for scalp infection 6–8 months courses are required.

In case of intolerance to griseofulvin other drugs which can be given are terbinafine 250 mg/day for older children and adolescents for 14 days. Ketoconazole 4–7 mg/kg/day for 2–4 weeks, fluconazole 50 mg weekly for 4–6 weeks, itraconozole 100 mg daily for 10–14 days are alternative drugs.

"A hen is only an egg's way of making another egg."—Samuel Butler

For kerion, along with antifungals oral antistaphylococcal antibiotics for 7–10 days and systemic corticosteroids for 7–14 days are to be given. Local application of clotrimazole or miconazole gel or lotion for 3–4 weeks prevents the spread of fungal spores to others.

TINEA CAPITIS (Figs 5.37 to 5.40)

It is a dermatophytosis of the scalp caused by the *Trichophyton* and *Microsporum* species.

Etiology

Microsporum canis and *Trichophyton tonsurans* are the most common species. Other organisms include *M. audonii*, *M. gypseum*, *M. nanum*, *M. ferrugineum*, *T. mentagrophytes*, *T. schoenleinii*, *T. tonsurans*, *T. verrucosum*, *T. violaceum*.

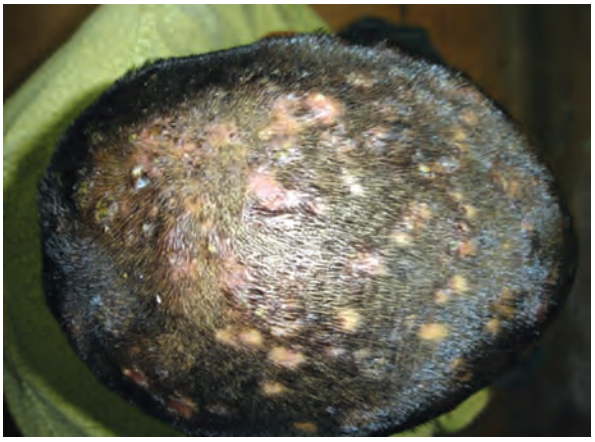

Fig. 5.37 Multiple punched out areas of alopecia in Tinea capitis in a 11-year-old boy

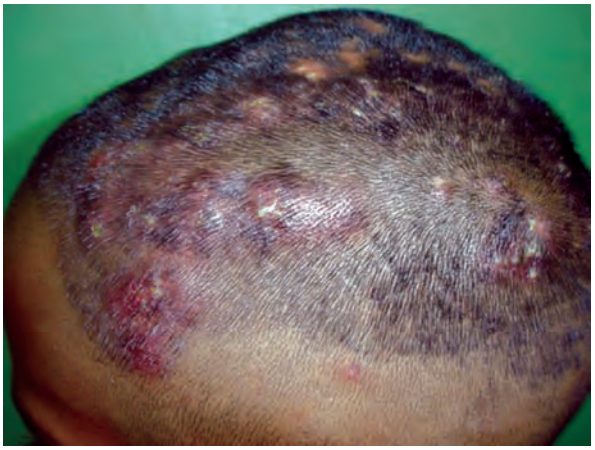

Fig. 5.38 Close-up of scalp showing inflammatory papules and pustules

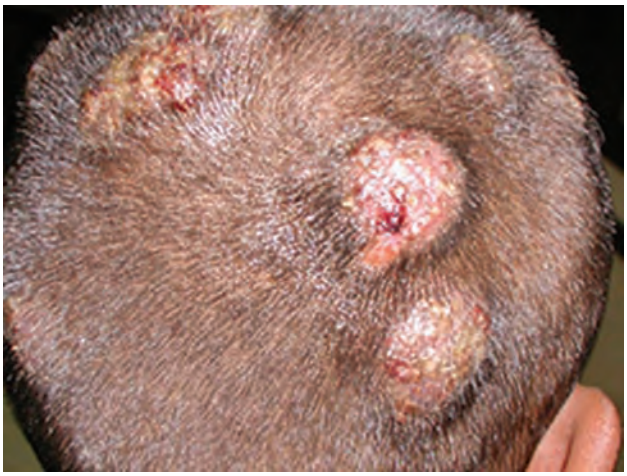

Fig. 5.39 Multiple lesions of Kerion

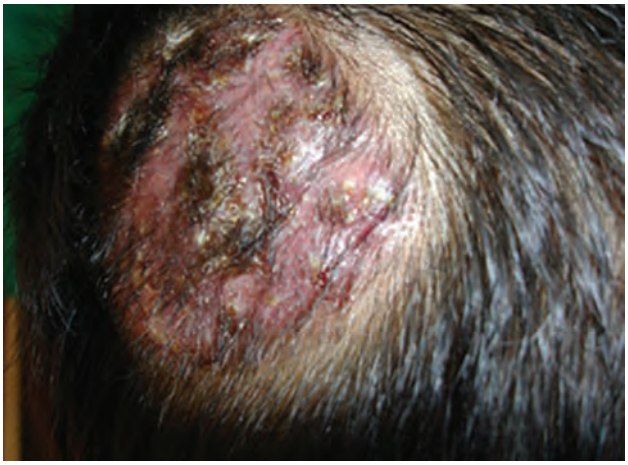

Fig. 5.39A Kerion, close-up

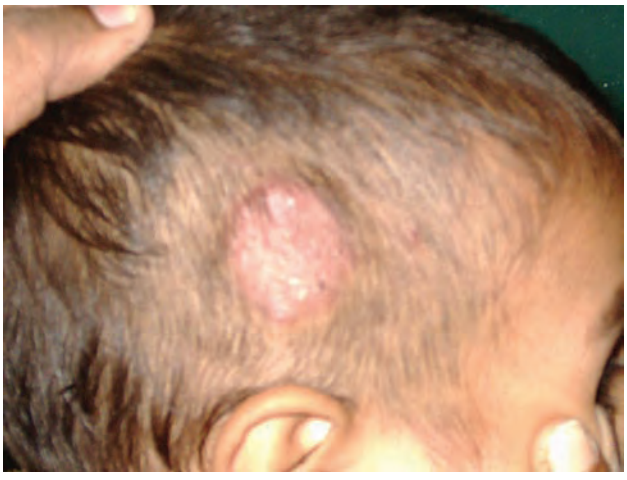

Fig. 5.40 Kerion in a 2-year-old girl

"God grant me the serenity to accept the things I cannot change, courage to change the things I can, and wisdom to know the difference."—The Serenity Prayer (Reinhold Niebuhr)

Pathogenesis

Ectothrix dermatophytes establish in the perifollicular stratum corneum spreading around and into the hair shaft. In endothrix infection the arthroconidia produced remain within the hair shaft replacing the intrapilar keratin.

Clinical Features

The noninflammatory pattern is the most common occurring due to ectothrix organisms. This form is also called the seborrheic or gray patch type of tinea capitis. Hair in the affected area are dry and lustreless, break off easily just above the level of the scalp. They also can present as areas of well defined round, hyperkeratotic scaly areas of alopecia.

Black dot tinea capitis is caused by the endothrix organisms. When hair loss occurs it is broken off at the level of the scalp giving rise to the grouped black dots with diffuse scaling.

Inflammatory type of tinea capitis is seen by the geophilic or zoophilic fungi. It is a result of hypersensitivity reaction to the infection. It presents as an inflamed boggy swelling with studded hair and discharge. It generally heals with scarring alopecia. There may be associated pain, pruritus and cervical lymphadenopathy.

Tinea favosa is a chronic dermatophytic infection of the scalp characterized by thick yellow crusts called scutula within the hair follicles which leads to scarring alopecia.

Differential Diagnosis

1. Seborrheic dermatitis
2. Scalp psoriasis
3. Pyodermas
4. Perifolliculitis capitis
5. Alopecia areata
6. Trichotillomania.

Laboratory Diagnosis

The diagnosis can be made by a KOH mount of the hair and scales on the scalp. Fungal culture is warranted in view of strong suspicion of a negative KOH or a partially treated case. Sabouraud's dextrose agar is the most commonly used culture medium.

Treatment

Griseofulvin: 15 mg/kg/day of the ultramicronized form for 6–8 weeks taken with a fatty meal, 20–25 mg/kg/day of the micronized form for 6–8 weeks. The disadvantages include poor compliance, bitter taste, photosensitivity and gastrointestinal side effects.

Fluconazole: 6 mg/kg/day for a total of 2–3 weeks

Itraconazole: 5 mg/kg/day for 4–6 weeks have been effective. Pulse therapy at 5 mg/kg/day for 1 week/month for 3 pulses has also been used successfully.

Terbinafine: 3–6 mg/kg/day for 2–4 weeks.

Adjuvant therapies include shampoos consisting of selenium sulphide, zinc pyrithione, povidone iodine and ketoconazole shampoos.

Ketoconazole shampoos may be used to prevent household transmission.

TINEA PEDIS AND TINEA MANUM (FIGS 5.40A TO C)

Tinea pedis is a fungal infection of the toe with predilection for web space involvement. It is commonly seen in adolescents and sometimes in prepubertal children. While in some cases scaling and fissuring predominate.

In others vesicopustular lesions, erythema and maceration are found. The infection starts and may remain in between and along toes. However, the lesions can spread over the dorsal and plantar surfaces as well. Patients complain of intense itching and at times burning sensation. Similarly involvement of palm is known as tinea manum.

Diagnosis

Diagnosis is confirmed by KOH preparation and culture of fungus.

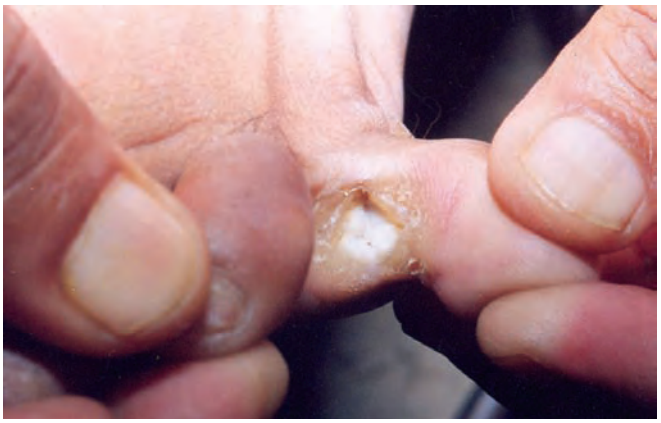

Fig. 5.40A Tinea pedis in a small child, note interdigital involvement

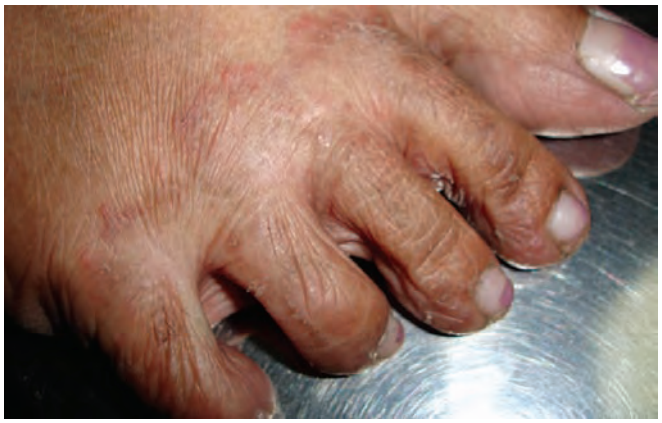

Fig. 5.40B Tinea pedis in a 15-year-old boy, note dorsal involvement

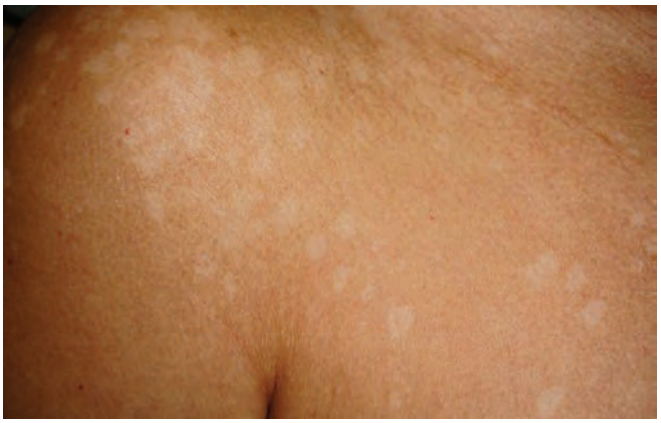

Fig. 5.41 Hypopigmented macules of pityriasis versicolor over the chest in an adolescent boy

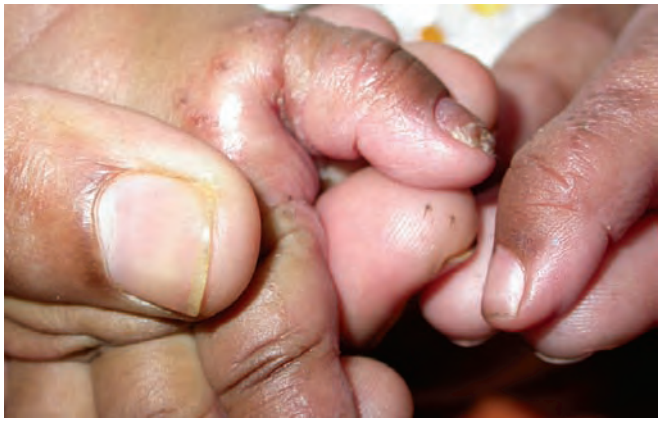

Fig. 5.40C Tinea manum in an infant

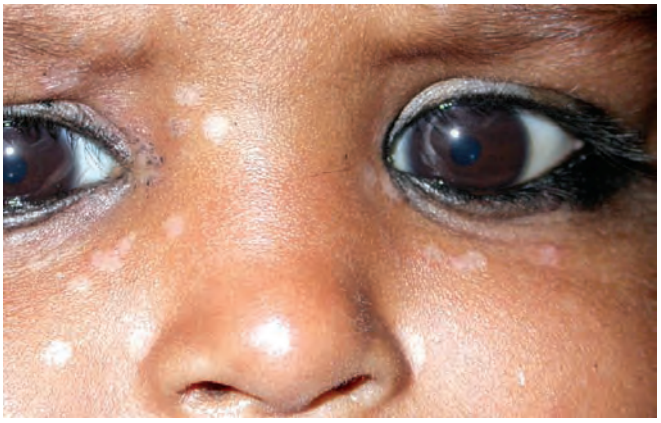

Fig. 5.42 Multiple hypopigmented scaly macules of P. versicolor over face in a child

Treatment

It is carried out by topical clotrimazole, miconazole, ketoconazole or recently available terbinafine creams in mild cases and in severe cases oral antifungals like griseofulvin, fluconazole or lately available terbinafine preparations.

PITYRIASIS VERSICOLOR (Figs 5.41 and 5.42)

This is a mild chronic infection of the skin caused by *Malassezia* yeasts and characterized by discrete or concrescent scaly discolored or depigmented areas mainly on the upper trunk. The primary lesion is a sharply demarcated macule characterized by a fine branny scaling. The eruption shows large confluent areas, scattered oval patches and outlying macules. The upper trunk is most commonly affected followed by the upper arms, the neck and the abdomen.

Treatment

Topical application of 2.5% selenium sulfide solution once a week for 3–4 weeks, then once a month for 3–4 months is effective. Other agents are topical crotrimazole, ketocanazole, miconazole, terbinafine. For extensive and persistent lesions various systemic antifungals which can be used are oral ketoconazole 100–200 mg/day for 5–7 days, Fluconazole 50–100 mg single dose or itraconazole 100–200 mg/daily for 5–7 days.

PARONYCHIA (Figs 5.43 and 5.44)

'Paronychia' means inflammation of the periungual skin. The etiology of paronychia can be chronic or acute. Chronic paronychia is mostly caused by candidal and other yeasts. Acute paronychia is predominantly a staphylococcal infection; clinically paronychia present as swelling of the

posterior and lateral nail folds. The swelling is associated with redness. In most of the cases the cuticle is lost in acute or chronic paronychia. In acute paronychia the nail fold swelling is associated with acute localized pain over the nail folds. In chronic paronychia this is associated with a mild tenderness over the nail folds. The nail plates remain unaffected.

Treatment

For acute paronychian a course of antistaphylococcal antibiotic for 5–7 days usually suffices. If there is collection of pus below the nail folds, an incision and drainage of the pus is mandatory. In cases of chronic paronychia, oral fluconazole, intraconazole or terbinafine on a long-term weekly basis for 3–6 months is often helpful. Local antifungal, although, has a limited role, is often helpful when applied over the nail folds regularly for few months.

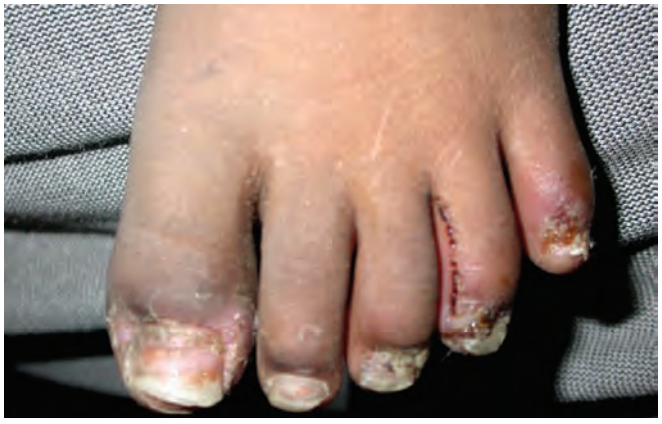

Fig. 5.43 Swelling and oozing from multiple nail folds in acute paronychia, nail plates are intact

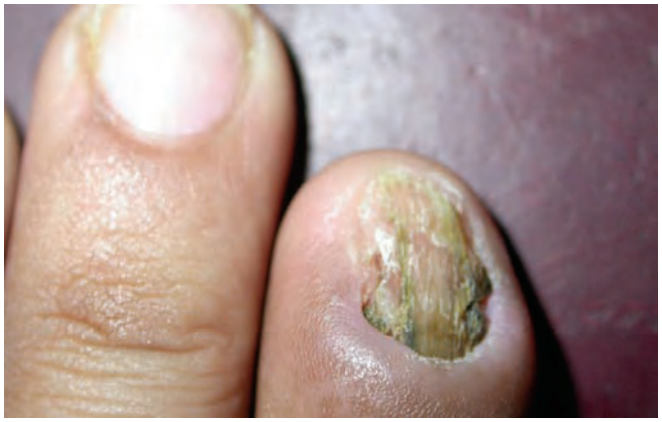

Fig. 5.44 Swelling of lateral and posterior nail folds in a single nail with destruction of nail plate in chronic paronychia

CANDIDIASIS OF SKIN (Fig. 5.44A)

It is the infection of baby's skin with candida yeast. In infants it usually presents small pustules, exfoliating erythematous papulovesicles. Application of topical antifungal creams is usually enough.

CHRONIC MUCOCUTANEOUS CANDIDIASIS(CMC) (FIGS 5.45 TO 5.50)

It represents a group of disorders characterized by progressive and recurrent infections of the nails, skin and mucous membranes with *Candida albicans*. Affected individuals have an ineffective immune response against this organism.

Etiopathogenesis

Affected individuals have a defective T cell mediated immunity which hampers the clearance of the organism. Autoimmune polyendocrinopathy candidiasis ectodermal dystrophy syndrome (APECED) is a condition where there is failure to delete autoreactive T cells thus leading to an autoimmune response. CMC can result due to IL17F mutations, dectin 1 mutation, increased production of IL6 or inadequate production of IL23.

Clinical Features

The clinical severity ranges from recurrent treatment resistant oral thrush or a few erythematous scaly plaques and dystrophic nails to severe generalized, crusted granulomatous plaque. These plaques mostly occur on the scalp, periorificial and intertriginous sites. Scalp infection may lead to scarring alopecia. The nails are thickened, brittle and discolored with associated paronychia.

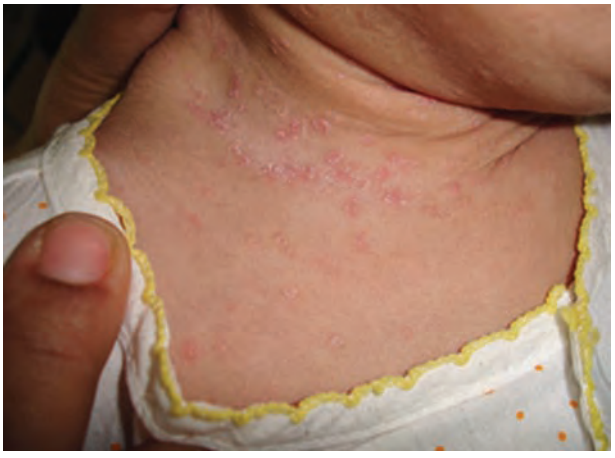

Fig. 5.44A Candidiasis over neck folds

"Never ascribe to malice that which is adequately explained by incompetence."—Napoleon Bonaparte

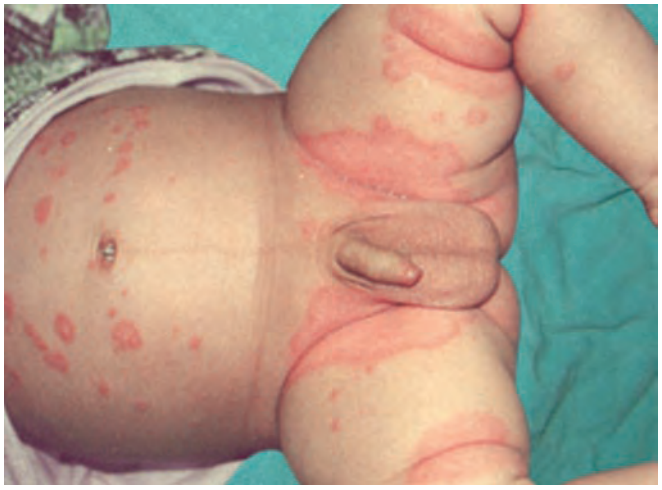

Fig. 5.45 Extensive involvement of folds in chronic mucocutaneous candidiasis

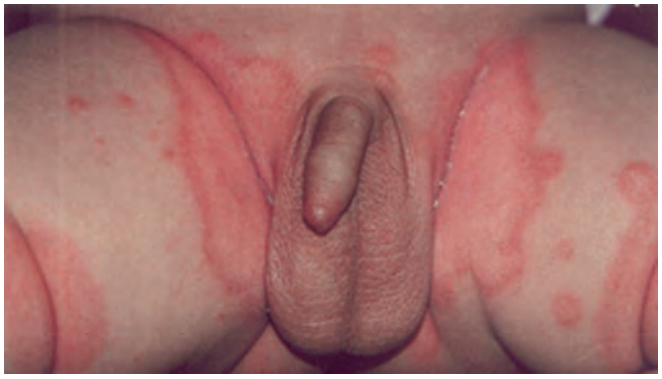

Fig. 5.46 CMC, close-up

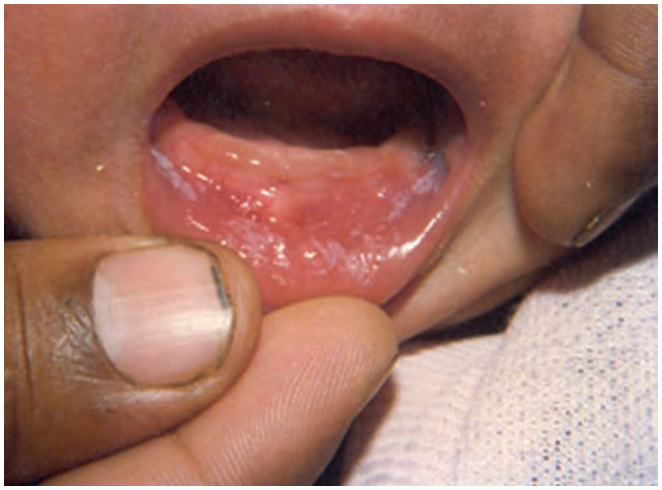

Fig. 5.47 Oral candidiasis in CMC

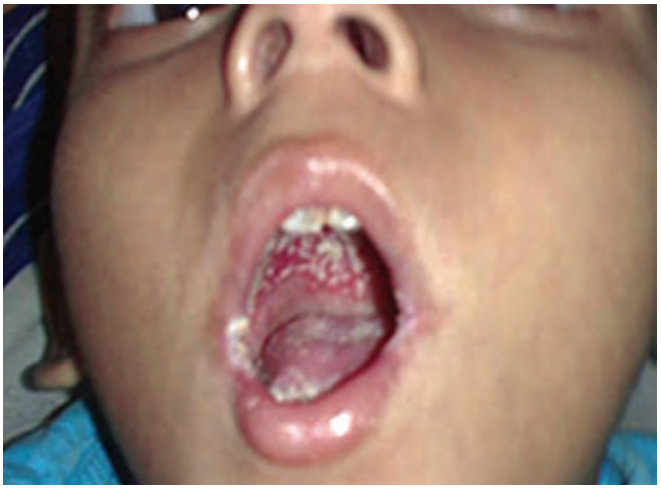

Fig. 5.48 Oral lesions of CMC

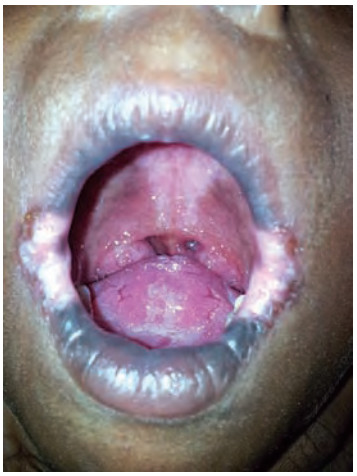

Fig. 5.48A Oral lesions in CMC in a child

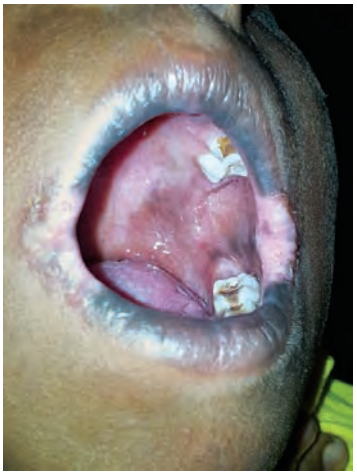

Fig. 5.48B Same child, another view

"When you are asked if you can do a job, tell 'em, 'Certainly I can!' Then get busy and find out how to do it."—Theodore Roosevelt

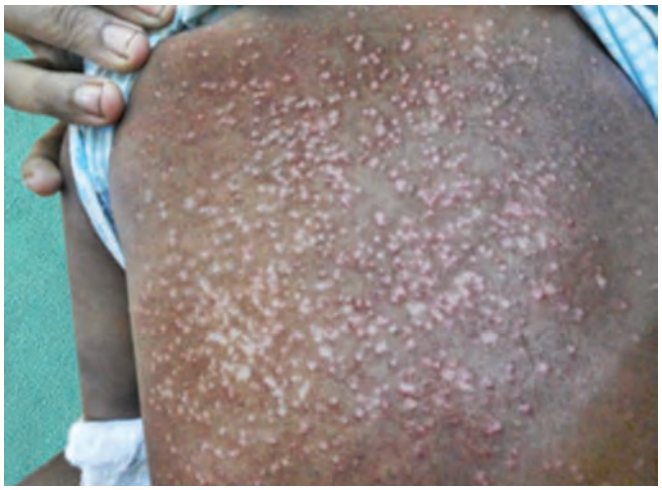

Fig. 5.49 Extensive skin involvement in CMC

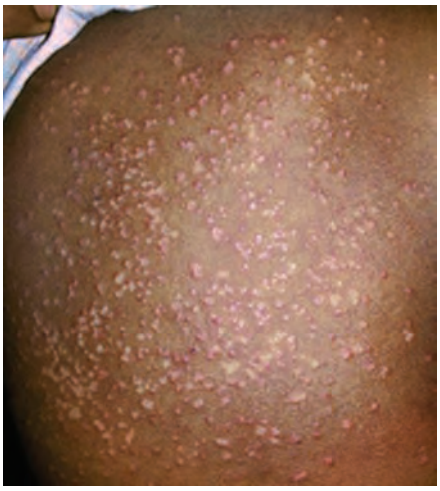

Fig. 5.50 Involvement of back in CMC

Chronic lesions in the mouth, esophageal, genital and laryngeal mucosae can lead to stricture formation.

Subgroups of CMC described in children and adolescents are as follows:

1. *Familial pure CMC:* It is an autosomal dominant condition. Oral candidiasis begins by the age of 2 years and nail and skin involvement occurs commonly.
2. *Chronic localized candidiasis:* Majority have cutaneous lesions by 5 years with thick adherent crusts with concomitant oral candidiasis.
3. *APECED:* It is caused by mutations of the AIRE gene. In this condition candidal infections begin by the age of 5 years and presents with candidal granuloma of the scalp and face. Associate endocrinopathies include hypoparathyroidism, hypoadrenocorticism hypogonadism, thyroid dysfunction, diabetes mellitus and hypopituitarism. Cutaneous associations include alopecia areata, vitiligo and lupus like panniculitis. Other disorders like pernicious anemia, chronic diarrhea and malabsorption with dental anomalies may be present.
4. *CARD9 associated CMC:* Chronic oral and vulvovaginal candidiasis is present. Fatal candidal infections of the brain in the second decade of life may occur in some individual.
5. *Dectin-1 deficiency:* It presents with chronic or recurrent vulvovaginal candidiasis and onychomycosis.
6. *Late onset CMC:* Infections present during early adolescence and is milder than other subgroups.
7. Familial chronic nail candidiasis: The onset is in infancy and is limited to the nails of the hands and feet.
8. CMC associated with keratitis: CMC can occur with alopecia and keratitis. It has also been described with APECED syndrome and KID syndrome.
9. CMC associated with other immunodeficiency disorders like severe combined immunodeficiency, DiGeorge syndrome, hyper IgE syndrome and acrodermatitis enteropathica.

Differential Diagnosis

1. Candidal infections
2. Consideration for HIV infection
3. IPEX syndrome.

Oral candidiasis needs to be differentiated from median rhomboid glossitis.

MEDIAN RHOMBOID GLOSSITIS (Figs 5.50A and 5.50B)

This entity, also known as glossal central papillary atrophy, is characterized by red, smooth, shiny, oval or diamond shaped elevated patch situated in the central part of the dorsum of the tongue in front of the circumvallate papillae or sulcus terminalis. Sometimes few yellow papillae may be noticed over this area. Rarely the lesion may be lobulated, hyperplastic or exophytic. It is an absolutely benign asymptomatic condition which persists indefinitely. Sometimes lesion may becomes tender. Several etiological factors are implicated for causation of this benign condition. Abnormal fusion of the posterior portion of the tongue is one of the hypotheses. Most commonly it is said to be one of the presentation of candidal infection (chronic atrophic or erythematous) transmitted from palatal infection (kissing lesion). Other associations are smoking, denture, corticosteroid inhaers, AIDS and pachyonychia congenital. Histopathology demonstrates chronic inflammation and fibrosis with fungal hyphae confined to the parakeratic layer. Presence of pseudoepitheliomatous hyperplasia may be

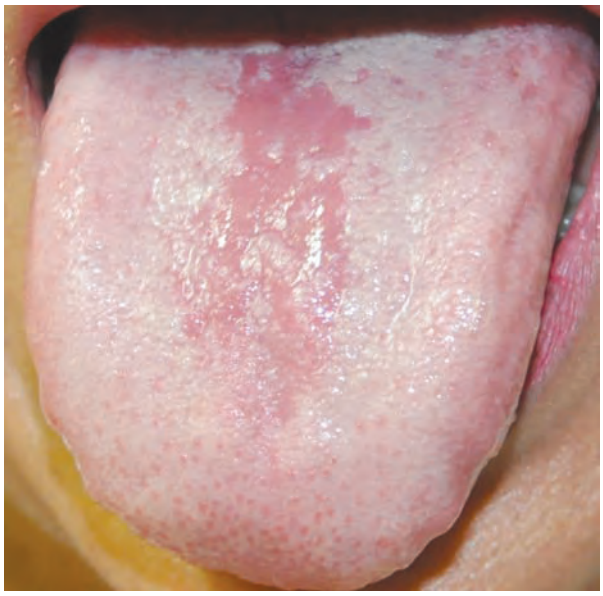

Fig. 5.50A Median rhomboid glossitis

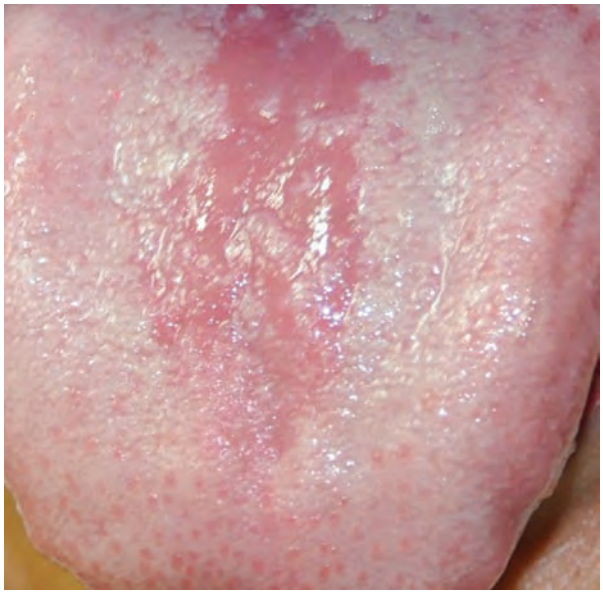

Fig. 5.50B Same patient, close-up

mistaken as carcinoma. Culture of the lesion yields mixed candidal and bacterial growth. Treatment with oral and topical antifungal might be tried.

Laboratory Diagnosis

Demonstration of candida repeatedly from the lesional site inspite of treatment. Gene mutation analysis study may be done.

Treatment

Patients may benefit from long term therapy with systemic antifungals like itraconazole, fluconazole and terbinafine.

Hematopoietic stem cell transplantation, fetal thymus grafts and leukocyte infusion have also been tried.

Annual evaluation of patients for the development of endocrinopathies needs to be done in cases with family history of CMC or APECED syndrome.

NOCARDIOSIS

Nocardiosis is caused by a group of aerobic, gram-positive and weakly acid fast filamentous bacteria *Nocardia* sp. occur predominantly in soil, house dust and decaying organic plant material. Nocardiosis are of two types, primary cutaneous and disseminated. Primary cutaneous Nocardiosis is seen mostly in immunocompetent individuals; source of infection is exogenous through trauma and most common causative organism is *Nocardia brasiliensis*. Skin involvement is seen in 10% of disseminated cases. Underlying common causes of immunosuppression seen in disseminated form are organ transplant, acquired immunodeficiency syndrome, hematological malignancy and prolonged steroid use. Immunocompromised patients mainly present with lung infection most commonly caused by *N. asteroides.*

Clinical Features

Cutaneous lesions vary from cellulitis, nodulo-pustule, ulcero-bullous to lymphocutaneous nodules in sporotrichoid pattern. Cellulitis most commonly involves lower extremities where as sporotrichoid form involves upper extremities.

Laboratory Investigations

Direct microscopic examination reveals gram-positive delicate filamentous bacteria branching at right angle. But filaments are short and fragmentary than those of actinomyces. Chance of getting sulphur granules is rare; only in disseminated cases, if present. Culture is difficult. Splendore-Hoeppli phenomenon reveals smooth eosinophilic deposits than club shaped seen in actinomyces.

Differential Diagnoses

Important differentials are sporotrichosis, atypical mycobaterial infection leishmaniasis and deep fungal infections.

Treatment

Appropriate antibiotics and surgical debridement are two mainstay of treatment modalities. Trimethoprim-sulfamethoxazole and amikacin are highly effective.

"When one door closes, another opens; but we often look so long and so regretfully upon the closed door that we do not see the one that has opened for us."—Alexander Graham Bell

ACTINOMYCOSIS

Actinomycosis is caused by a group of anaerobic, gram-positive filamentous bacteria named actinomyces, previously wrongly classified as fungi due to their branching filaments producing tendency. These are the part of normal flora of respiratory, gastrointestinal and genitourinary tract. Several species have been implicated; few of them are *Actinomyces israelii*, *A. gerencseriae*, *Propionibacterium propionicum*. Though actinomyces are the main culprit but in most of the cases it is a poly-microbial infection with other members of normal flora acting synergistically.

Clinical Features

Middle aged men are most commonly affected. Infection most commonly affects cervicofacial area followed by abdominal wall, pelvis and thoracic region. Mode of infection is endogenous; organism gains entry through a breach in mucous membrane. For cervicofacial cases source of infection is periapical abscess or following any dental procedure. Whereas extension of infection to the thoracic and pelvic wall occurs from lung infection and ascending infection of female genital tract using intrauterine device respectively. Abdominal Actinomycosis is a consequence of ruptured appendix, diverticulitis or gastrointestinal surgery. Patients initially present with inflammatory infiltrative firm plaque or nodule ultimately turn into abscess and draining sinuses.

Investigations

Sulfur granules, a clump of filamentous bacteria may be present in exudates but not always and not specific. Direct examination of gram stained material shows delicate branching filaments. Brown-Brenn or giemsa staining of tissue sample may reveal Splendore-Hoeppli phenomenon, eosinophilic club of immunoglobulin around granules. Culture is difficult.

Differential Diagnoses

Differentials vary according to site. Few important differentials are tuberculosis, odontogenic abscess, neoplasm, inflammatory bowel disease and hidradenitis suppurativa.

Treatment

Effective antibiotics are large dose of penicillin G, ampicillin and erythromycin. Debulking surgery with removal of sinus tract and draining of sinuses are required in many cases.

LEISHMANIASIS (Figs 5.51 and 5.52)

It is a protozoal disease caused by the *Leishmania* species. It can be divided into 3 types: cutaneous, mucocutaneous and visceral leishmaniasis. It has a characteristic geographic prevalence in the areas of Afghanistan, Iran, Brazil, Peru and the northern belt of India extending eastwards.

Etiology

Cutaneous leishmaniasis-Old world disease is caused by *L. tropica*, *L. major*

-New world disease is caused by *L. braziliensis, L. mexicana*

Mucocutaneous leishmaniasis-*L. braziliensis*

Visceral leishmaniasis-*L. donovani*

Transmission is by the *Phlebotomus* species of sand fly. Recently here has been a surge in leishmaniasis with the advent of HIV infection.

Clinical Features

Cutaneous leishmaniasis presents with an indolent skin ulcer with an incubation period of around 1–12 weeks. Sometimes there may be a subclinical infection. It starts as an erythematous papule which progresses to a painless ulcer with raised margin and a necrotic base. The lesions can vary from 1 to 2 in number to multiple. They may be distributed in a lymphatic distribution giving rise to the sporotrichoid appearance. There can be associated lymphadenopathy and secondary infection of the lesion gives rise to pain. It can also present as a dry ulcerative lesion which turns to a brown

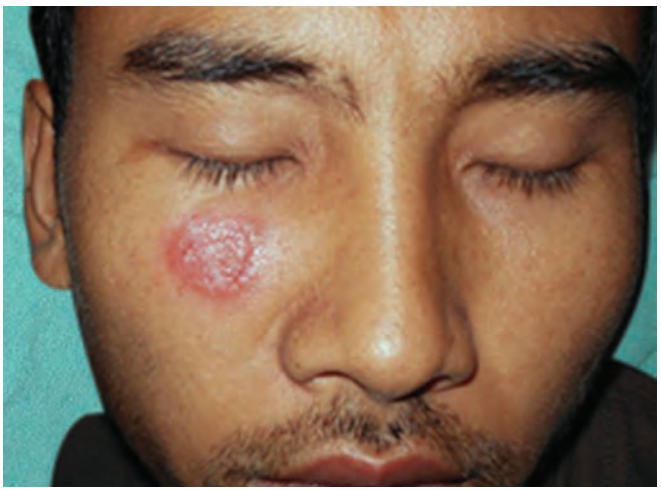

Fig. 5.51 Erythematous infiltrated asymptomatic plaque of leishmaniasis

"When 'I' becomes 'we', even the 'illness' becomes 'wellness'."—Unknown

nodule that further ulcerates with an overlying adherent crust.

L. recidivans gives rise to red colored to yellowish hued papules in the old scars of a resolved cutaneous leishmaniasis lesion.

There can be nonulcerating generalized form resembling lepromatous leprosy and these patients are the reservoir of infection posing a threat to the community.

Differential Diagnosis

1. Foreign body reaction
2. Tropical or traumatic ulcer
3. Infected insect bite reaction
4. Myiasis
5. Impetigo
6. Fungal infection
7. Sarcoidosis.

Laboratory Diagnosis

The diagnosis generally can be made by the characteristic lesions and a history of travel to the endemic areas. However it can be confirmed by doing a smear stained with Giemsa which shows the amastigotes within the cells. Culture of the tissue can be done along with isoenzyme analysis to confirm the diagnosis.

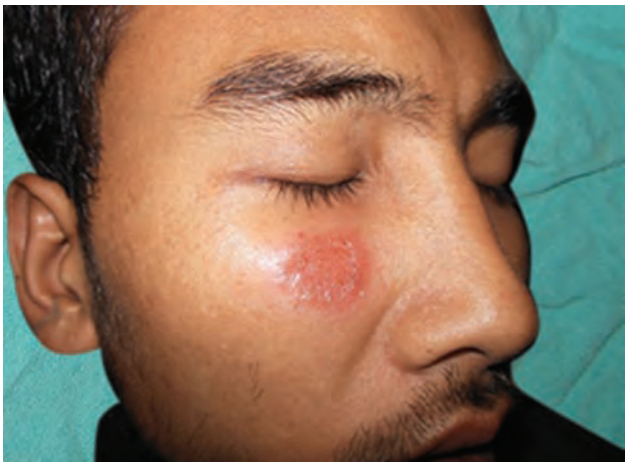

Fig. 5.52 Close-up of leishmaniasis

Treatment

Cutaneous leishmaniasis generally heals spontaneously however infection with *L. braziliensis* can progress to muco-cutaneous disease.

The drugs which have been used and are effective include pentavalent antimonials, sodium stibogluconate, meglumine antimoniate and amphotericin B.

Cryosurgery and intralesional sodium stibogluconate have also given good response in case of limited disease.

6

Exanthems of Infective Etiology

MEASLES (RUBEOLA) (Figs 6.1 to 6.3)

This is one of the most common viral exanthem of childhood. Transmitted by direct contact with droplets from infected persons, rubeola is caused by measles virus (a RNA containing paramyxovirus) with an incubation period of 14 days. The prodromal period lasting 3–4 days is characterized by fever, chills, malaise, headache, perspiration, prostration, conjunctivitis, photophobia, coryza with mucopurulent discharge and persistent dry cough. The appearance of the typical morbilliform rash is preceded by the Koplik's spots which appear in the buccal mucous membrane opposite the first molar teeth and spread all over inside the cheek. The spots are 1–3 mm, white to bluish white elevations resembling grains of salt, sprinkled on a bright erythematous background. Highly diagnostic of measles, the Koplik's spots disappear as the exanthem become full blown. The exanthem appears after 3–4 days of onset of illness as an erythematous maculopapular eruption, first seen on the scalp and hairline, the forehead, the area behind the earlobes and the upper part of the neck. It then spreads downward to involve the face, neck, trunk and finally the feet by the 3rd day. The rash fades in the same order as it appeared. On the 2nd and 3rd day of the rash, the child looks very toxic with high fever, puffy and congested eyes, coryza and distressing cough. Within the next 24–36 hours, the fever subsides, the conjunctivitis and coryza clear and cough decreases with the child feeling normal.

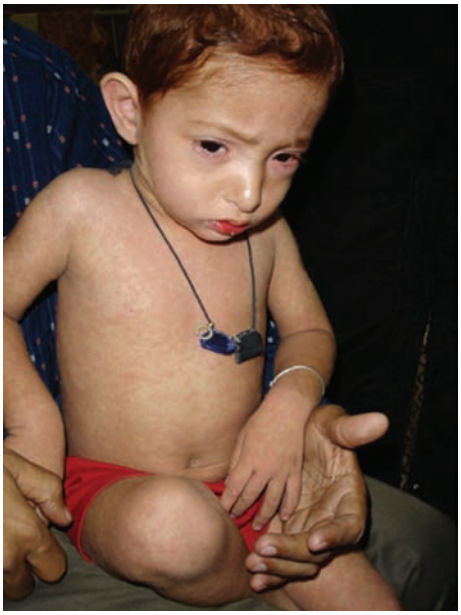

Fig. 6.1 Generalized maculopapular eruption of measles

Prophylaxis

The management of measles reached a landmark in 1963 with the development of two measles vaccines, a 'killed' formalin inactivated alum precipitated vaccine and an attenuated Edmouston-B type live vaccine.

Fig. 6.2 Close-up of the rash

"The empires of the future are the empires of the mind."—Winston Churchill

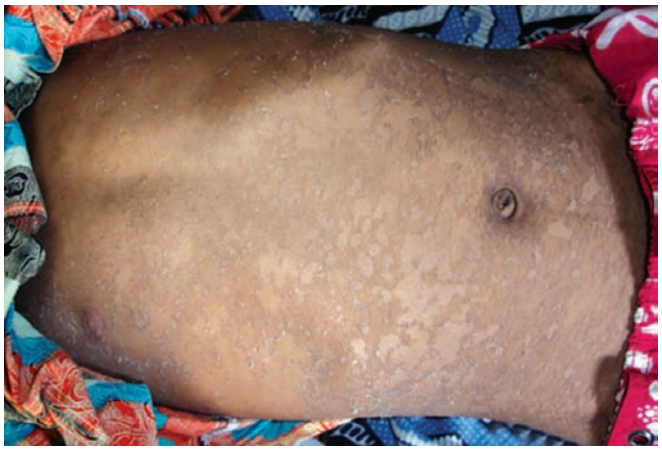

Fig. 6.3 Subsiding rash of measles with scaling

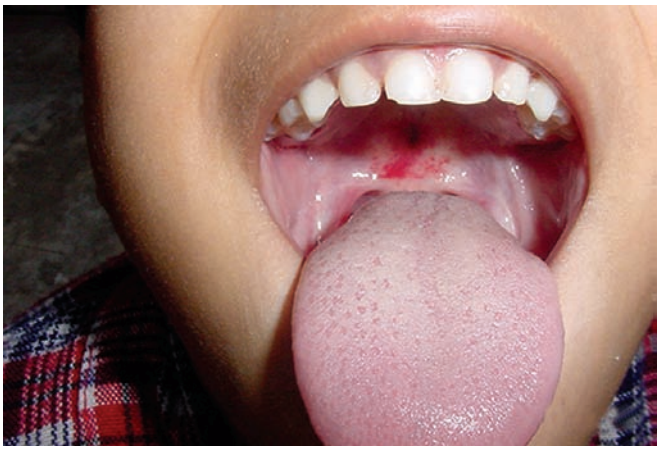

Fig. 6.4 Palatal hemorrhagic rash in German measles

GERMAN MEASLES (RUBELLA) (Figs 6.4 and 6.5)

It is a common viral disease in children and young adults manifested by a generalized maculopapular rash and enlargement of the posterior sub-occipital lymph nodes. The virus enters by the respiratory route and the incubation period is 16–18 days (range 14–21 days). Older children, adolescents and young adults are more commonly affected. The rash comprises of innumerable small, discrete, rose pink maculopapules which are generalized and discrete on the first day, fade on the face and coalesce over the trunk on the 2nd day and disappear by the 3rd day. In children, the temperature may be normal or slightly raised, rarely persisting beyond the first day of exanthem. In adolescents and young adults, however, there is prodromal phase of headache, malaise, anorexia, conjunctivitis, coryza, sore throat and cough. Enlargement of posterior auricular and suboccipital lymph nodes precede the appearance of rash by 1–5 days, lasts for 2–7 days and subsides quickly after the rash disappears. In older children and adults, arthritis may affect around 30% of females and 5% of males. It characteristically involves the small joints of the hands and feet, occasionally the elbows, shoulders and spine. A pregnant woman who contracts rubella in the first trimester of pregnancy has a high probability that intrauterine transmission will give rise to the congenital rubella syndrome.

Prophylaxis

Current prophylactic recommendations for rubella include vaccination of all children with live attenuated vaccine either alone or in combination with measles and mumps vaccine, at the age of 15 months. A second dose at 11 to 12 years of age is recommended. Rubella vaccine, however, should not be administered to pregnant women or women who are planning for pregnancy.

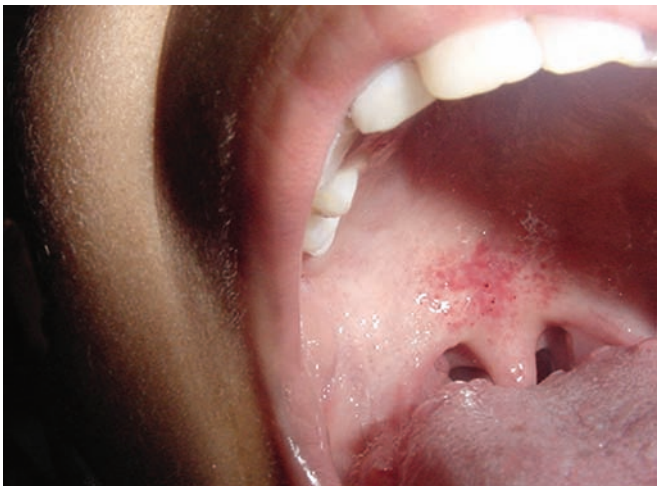

Fig. 6.5 Close-up of palatal rash

CONGENITAL RUBELLA (Fig. 6.6)

Congenital rubella occurs following maternal rubella infection during the first 20 weeks of pregnancy. At least 15–20% of offspring of women who contracts this disorder during the 1st trimester of pregnancy are afflicted with one or more serious congenital malformations. The infection is primarily due to underutilization of rubella vaccine. The earlier in pregnancy that the maternal rubella occurs, the greater the risk to the fetus. Affected infants are born at term but have low birth weight. Besides the classic triad of congenital cataract, deafness and congenital malformations of the heart, systemic symptoms like growth retardation, thrombocytopenic purpura, hyperbilirubinemia, hepatosplenomegaly, pneumonia, cardiac defects, eye disorders, deafness, osseous defects, and meningoencephalitis. The prominent cutaneous lesions

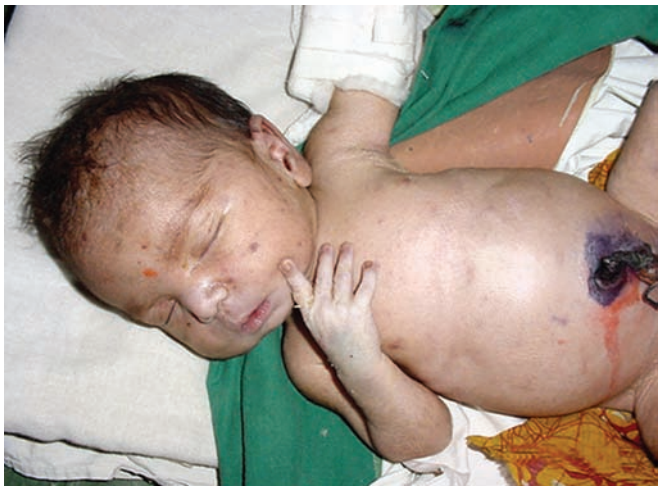

Fig. 6.6 Rash of congenital rubella in a newborn

of congenital rubella are the thrombocytopenic purpura and the blueberry muffin lesions; these are bluish red infiltrated plaques usually noted at birth. They may be few to numerous and generally appear on the head, neck, trunk or extremities. They are usually round and vary from a dark blue to purplish red color. The lesions disappear by 3 to 6 weeks. Other cutaneous manifestations include a generalized maculopapular rash, reticulate erythema over face and extremities, hyperpigmentation of the navel, forehead, eczema, and recurrent urticaria.

The mortality rate is 20–30% within the 1st year of life. Treatment consists of supportive measures and recognition of potential disabilities.

Prophylaxis

The live attenuated vaccine is recommended in all children from 1 year of age to puberty.

VARICELLA (CHICKENPOX) (Figs 6.7 to 6.9)

It is a highly contagious disease of childhood and at times adulthood caused by a DNA virus, the varicella-zoster virus. Transmission is by droplet infection and rarely from skin contact with varicella or herpes zoster patients in immunocompromized individuals. Approximately half of the cases occur before the 5th year of life and 80–90% cases occur before adolescence. The incubation period of the disease is 15–20 days and the disease begins with fever, malaise and development of an exanthem. The exanthem is characterized by a teardrop vesicle on an erythematous base which develops by 24–48 hours of appearance of fever. The eruption usually starts on the trunk and have a centripetal distribution

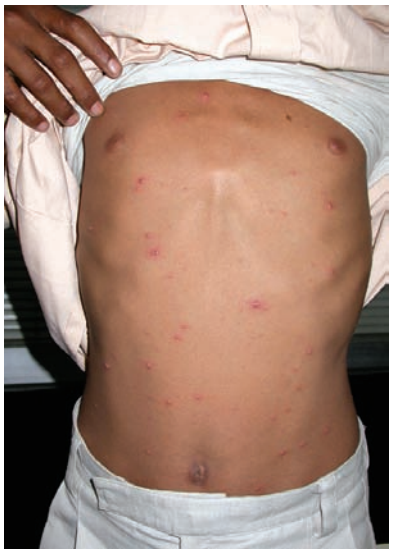

Fig. 6.7 Polymorphic eruptions of varicella

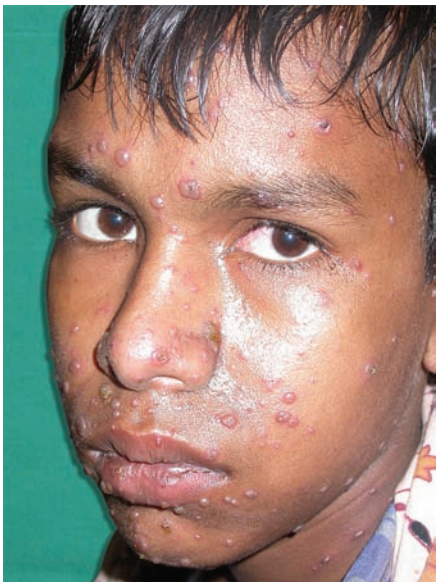

Fig. 6.7A Varicella lesions, polymorphous

and the involvement of mucous membrane is characteristic. The vesicles are plymorphic in nature, i.e. present in the form of macules, papules and vesicles, all in different stages of evolution at the same time. The vesicles have an unbilicated appearance and appear in crops at the height of temperature. The diagnosis is quite clear cut from its clinical appearance. However, when only a few vesicles have appeared, one may do a Tzanck smear examination and look for multinucleated giant cells for confirmation of diagnosis. Patients are believed to be contagious for 1–2 days before and for approximately 5 days after the onset of rash.

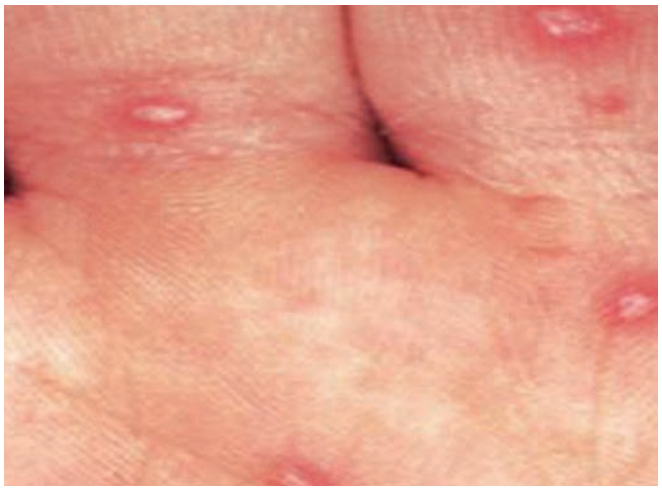

Fig. 6.8 Chickenpox rash over palm

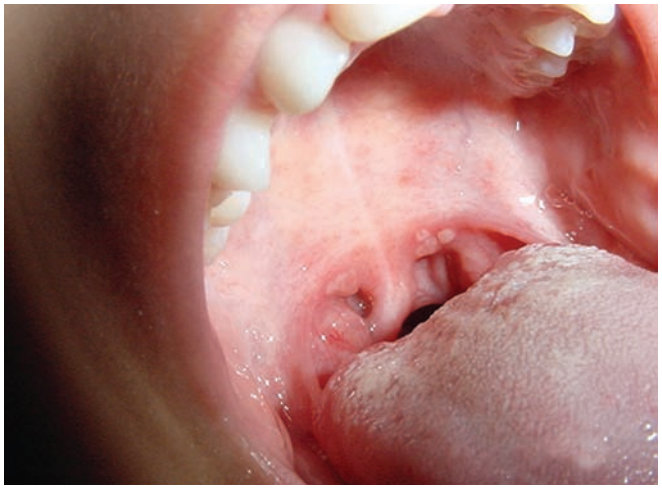

Fig. 6.9 Palatal rash of chickenpox

BREAK THROUGH VARICELLA (Figs 6.9A and B)

Breakthrough chicken-pox is an infection with wild type of varicella zoster virus occurring in vaccinated individual 42 days or more after receiving the vaccine. The clinical presentation is milder and atypical. Patients are usually afebrile or with low grade fever. Cutaneous lesions are chiefly maculopapular with fewer than 50 lesions and usually do not progress to vesiculation and crust formation as seen in unvaccinated varicella. Disease course is shorter and risk of complications is much less. Sometimes the cases may be misdiagnosed as insect bite reaction. The affected children are less contagious compared to unimmunized children. However, around 25–30% of persons with breakthrough

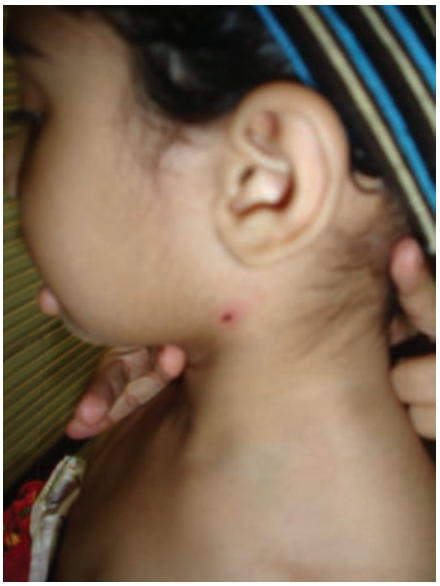

Fig. 6.9A Break through varicella

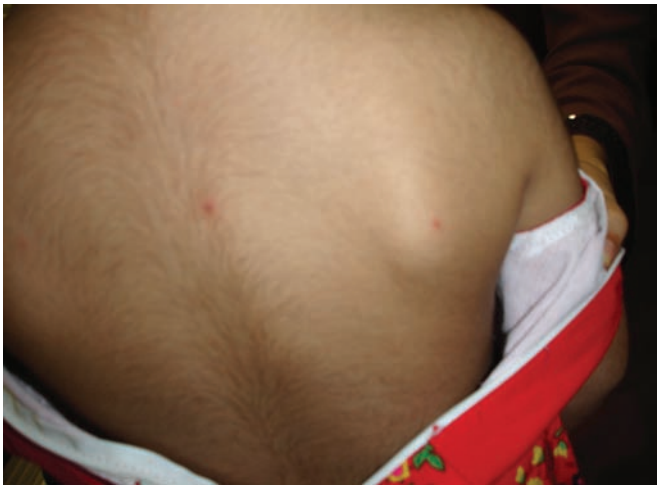

Fig. 6.9B Same girl, lesions on back

varicella may present with features typical of varicella in unvaccinated people and this is usually seen in persons immunized with single dose of varicella vaccine.

Some of the proposed risk factors for vaccine failure are vaccination at younger ages, longer time since vaccination (≥ 5 years), history of asthma or eczema and autoimmune conditions; though not well supported.

Atypical presentation of breakthrough varicella poses a diagnostic challenge to the clinicians. Laboratory tests are gaining importance for confirming this disease and managing cases and contacts. Detection of viral DNA by PCR from skin lesion and varicella IgM tests during acute or convalescent

phase are preferred methods for diagnostic confirmation. Treatment is directed towards symptomatic relief and acyclovir is indicated only in cases of severe disease and in varicella complications. Children with suspected breakthrough varicella should be isolated until 24 hours have elapsed since the appearance of any new lesions. The diagnosis of this entity is of particular importance in schools, daycares, hospitals, or other settings that depend on vaccine-derived immunity to protect against transmission of the infection.

Management

Acyclovir orally at a dose of 20 mg/kg/dose for children 2–12 years of age (up to 500 mg per dose) and 4 g/day for adults for 5–7 days, if started within 24–48 hours, gives good results. This is also useful in immunocompromised children. For immunologically depressed patients exposed to varicella, gamma-globulin prophylaxis (1.3 mL/kg) or zoster immune globulin (ZIG) may be used to alter the subsequent course of clinical disease. Only when there is definite evidence of secondary infection, an antibiotic should be used. Regular bathing with soap and water, intake of high protein diet, e.g. egg, chicken, mutton, soybean, pulses, etc. are important. When the vesicles start healing, there may be a sense of itching which may require oral antihistamine. Topical application of soothing agent like calamine may help relieving the local discomfort. Adequate rest at home for at least 10–14 days is a must. Various myths and misconcepts about the disease are to be dealt with firmly.

DENGUE FEVER (Figs 6.10 to 6.15)

It is a viral disease, the virus belonging to the family flaviviridae and has four serologically distinct types viz., DEN 1, DEN 2, DEN 3 and DEN 4. Dengue virus is transmitted by mosquitoes of the genus aedes, such or *Aedes aegyptii* and *A. Albopictus*. It is the most common cause of arboviral disease in the world with an estimated annual occurrence of 100 million cases of dengue fever and 250,000 cases of dengue hemorrhagic fever and a mortality rate of 25,000 per year. The disease has been reported in more than 100 countries with 2.5 billion people living in the area where dengue is epidemic. Most cases of dengue hemorrhagic fever are reported from Asia where it is a leading cause of hospitalization and death in children. Classical dengue fever is characterized by sudden onset of very severe headache, retro-orbinal pain, fatigue associated with severe arthralgia and myalgia. The fever usually lasts for 5–7 days after which a rash appears. The rash is usually of maculopapular nature, confluent with sparing of normal islands of circular coin shaped skin (very characteristic). The rash subsides by 3–7 days with scaling and mild pruritus. The patients may have additional hemorrhagic manifestation, e.g. petechiae, purpura, a positive capillary fragility test, etc. Gum bleeding, menorrhagia, epistaxis, bleeding per anus are only occasionally seen.

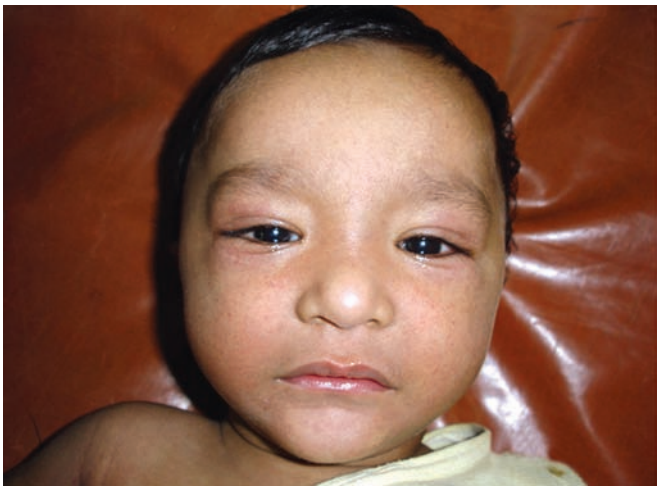

Fig. 6.10 Flushed cheek, swollen eyelids and maculopapular rash of dengue

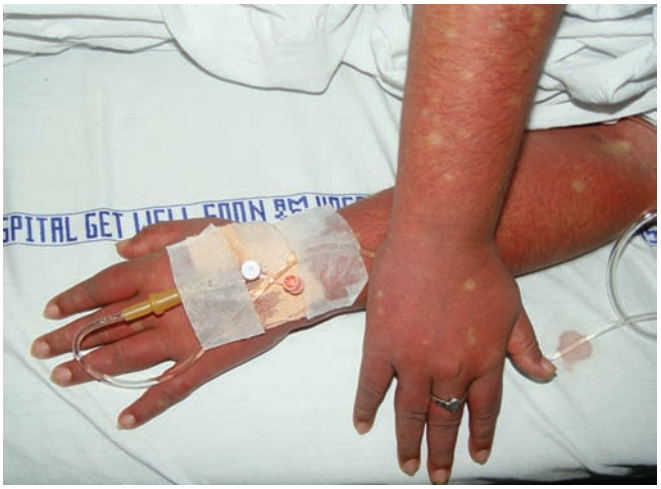

Fig. 6.11 Maculopapular rash of dengue over forearm and palm

Diagnosis

Laboratory investigation includes leukopenia, thrombocytopenia and mild to moderate elevation of hepatic transaminase levels. Primary infections are characterized by an increase in dengue specific IgM antibodies 4–5 days after the onset of fever and by the increase in IgG antibodies after 7–10 days; IgM antibodies are detectable for 3–6 months, while IgG antibodies are detactable throughout life. In secondary infections, the level or IgM antibodies are lower than in

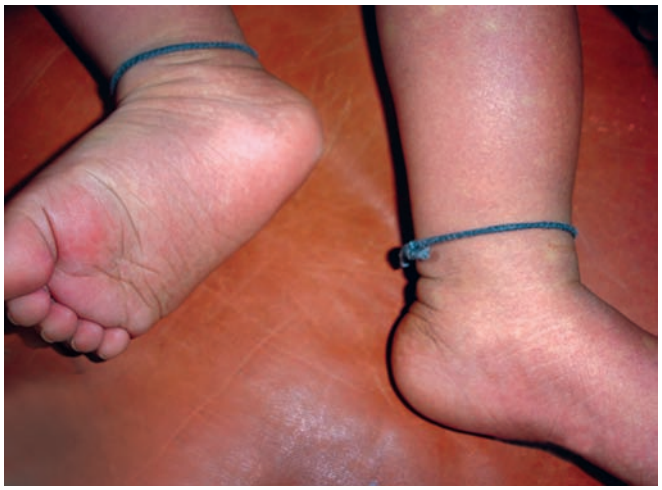

Fig. 6.12 Dengue rash over legs and soles, note spared island of normal skin

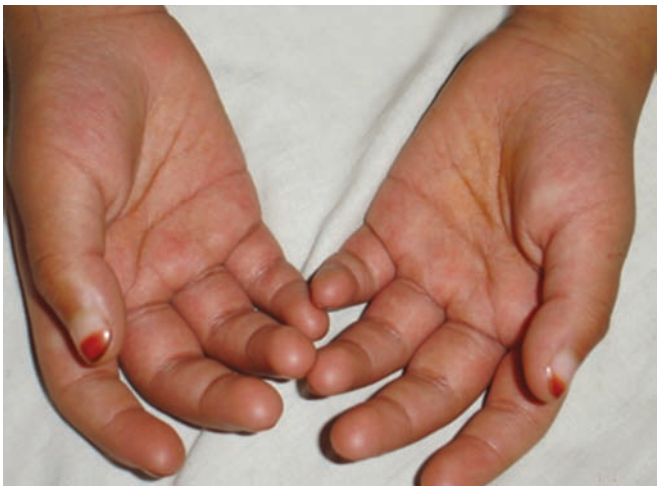

Fig. 6.14 Erythematous swollen palms in dengue

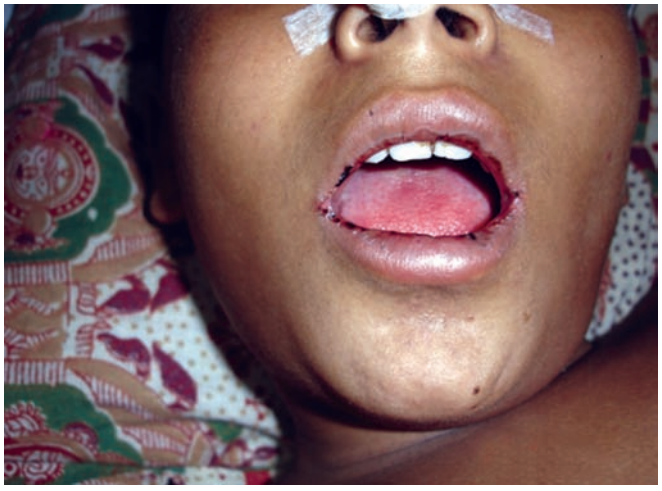

Fig. 6.13 Hemorrhagic rash of dengue over lips

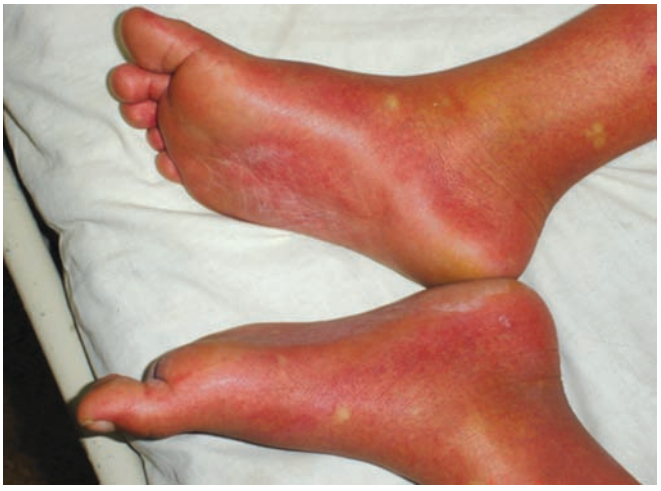

Fig. 6.15 Erythematous swollen legs and soles in dengue, note island of normal skin

primary infections and the antibodies are sometimes absent. However, levels of IgG antibodies rise rapidly in secondary infections, even during the acute phase of the disease.

Management

Treatment is basically symptomatic and supportive. For fever, paracetamol is prescribed, bed rest and fluid replacement are very important. Patients with platelet count of one lack per cubic millimeter are to be admitted to a hospital and treated with platelet concentrate and/or fluid replacement. If there is bleeding or evidence of intra-vascular coagulation, fresh blood or fresh frozen plasma should be administered. It is very important to go for preventive treatment for travellers in areas where dengue is endemic. Application of insect repellents, protective clothing and use of insecticides and very important.

GIANOTTI-CROSTI SYNDROME (Figs 6.15A to 6.15E)

It is also known as papular acrodermatitis. This disease is seen in childhood. It is a distinctive, self-limiting dermatosis of child hood. The disease is characterized by the abrupt onset of nonpruritic lichenoid papules on the face, buttocks, extremities generally lasting about 20 days, with at times mild constitutional symptoms and acute, hepatitis.

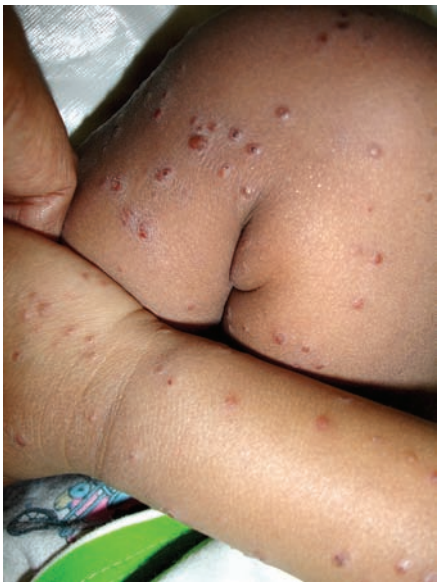

Fig. 6.15A Lichenoid papules over acral areas in a 3-year-old boy with Gianotti-Crosti syndrome

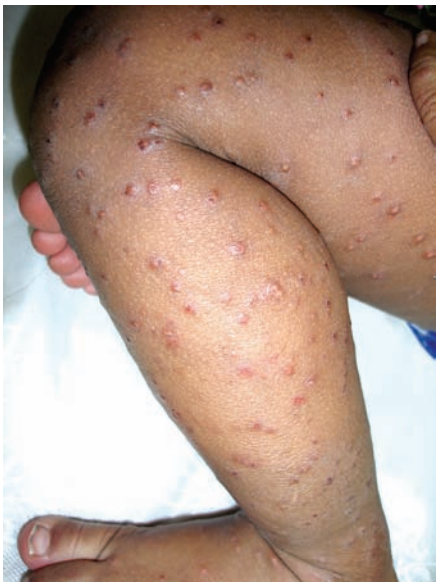

Fig. 6.15C Close-up of lesions

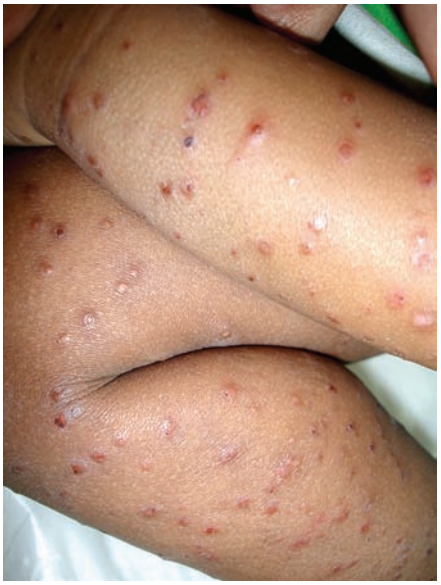

Fig. 6.15B Same child with lesions over legs

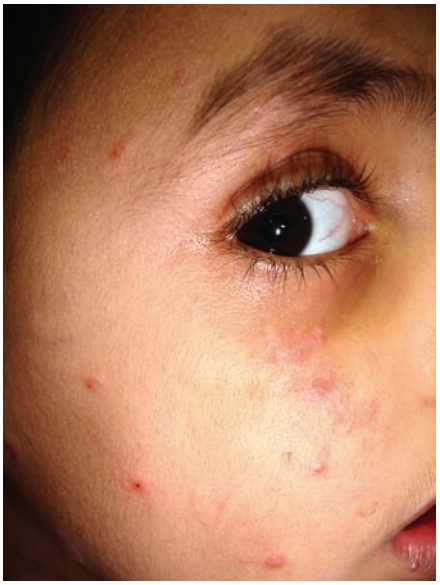

Fig. 6.15D 4-year-old girl with GCS over face

Etiology

The disease begins abruptly, and the eruption is often preceded by an upper respiratory tract infection, generalized lymphadenopathy, hepatomegaly and rarely splenomegaly. Evidence of hepatitis manifested by hepatomegaly, elevated serum enzyme levels, virus-like particles in liver and lymph node specimens, and detection of elevated serum levels of hepatitis B surface antigen suggests viral etiology in some patients. Since the disorder subsequently has also been associated with infection with Epstein-Barr virus, parainfluenza virus, coxsackie virus A16, respiratory syncytial virus, poliovirus vaccine, and group A β-hemolytic streptococci, it may actually represent a host response to a variety of infectious agents.

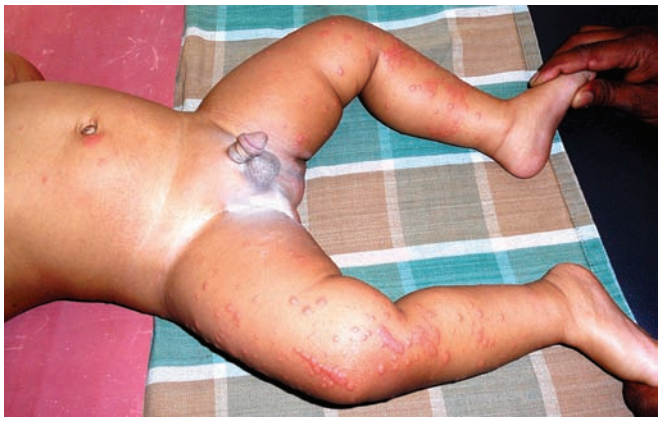

Fig. 6.15E Lichenoid papules of GCS over thighs and legs

Children between 3 months and 15 years of age are usually affected with this disease, although adults have also been afflicted by this disorder. The eruption consists of monomorphous, flat-topped 1–10 mm, flash colored, pale pink or coppery red appears on the face, buttocks extremities, palms soles and occasionally the upper aspect of the back.

Treatment

The diagnosis of Gianotti-Crosti syndrome is dependent on the characteristic clinical findings and histopathologic examination of cutaneous lesions. Since, this syndrome is benign and self-limiting, treatment with other than symptomatic measurers is unnecessary. It should be noted, however, that corticosteroid creams may have an adverse effect on the cutaneous eruption.

STAPHYLOCOCCAL SCALDED SKIN SYNDROME (Figs 6.16 and 6.17)

Staphylococcal scalded skin syndrome (SSSS) also known as Ritter's disease or pemphigus neonatorum is caused by an epidermolytic toxin producing strains od staphylococci belonging to phase group II. The disorder usually affects children younger than 5 years of age and begins as malaise, fever, irritability, a generalized macular erythema and a fine, stippled, sandpaper or nutmeg like appearance that progresses to a tender scarletiniform phase over 1 to 2 days. The erythema and tenderness spread from the intertriginous, periorificial areas and trunk to the entire body. The lesions then exfoliate with exudation and crusting around the mouth and sometimes the perorbital area. Large fragments of crusts often become separated leaving radial fissures surrounding that give the disorder its characteristic and diagnostic appearance. Within 2–3 days the upper layer of the epidermis

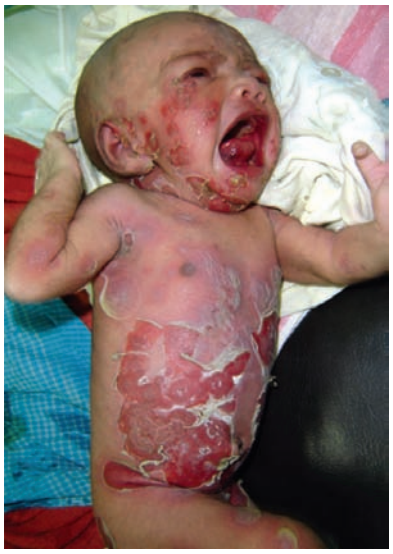

Fig. 6.16 Rash of Staphylococcal scalded skin syndrome over trunk and face

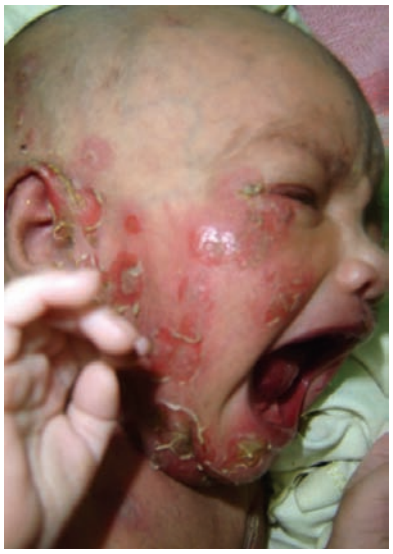

Fig. 6.17 Rash of SSSS over face

becomes wrinkled and can be easily peeled off like wet tissue paper. Shortly, thereafter the patient develops flaccid bullae and eventual exfoliation of the skin (the desquamative phase). If there is no secondary infection, the entire skin heals without scaling within 14 days of the onset of the process.

Prognosis

Staphylococcal scalded skin syndrome has a mortality slightly less than 4% in children, with most fatalities occurring in newborns.

Treatment

Treatment is aimed at eradication of staphylococci from the focus of infection, thus terminating the production of toxin. Topical antibiotics are ineffective. A penicillinase resistant antistaphylococcal agent viz., cloxacillin (12.5–25 mg/kg/day), combination of cloxacillin and clavulenic acid is given for 7–10 days. Parenteral antibiotics is given to those who are severely ill or have extensive skin diseases.

KAWASAKI DISEASE (Figs 6.17A to 6.17O)

It is an acute multisystem vasculitis primarily affecting infants and young children. It is a leading cause of acquired heart disease in children. Eighty percent of the patients are below the age of 5 years. However, in Indian scenario Kawasaki disease is seen in relatively older children.

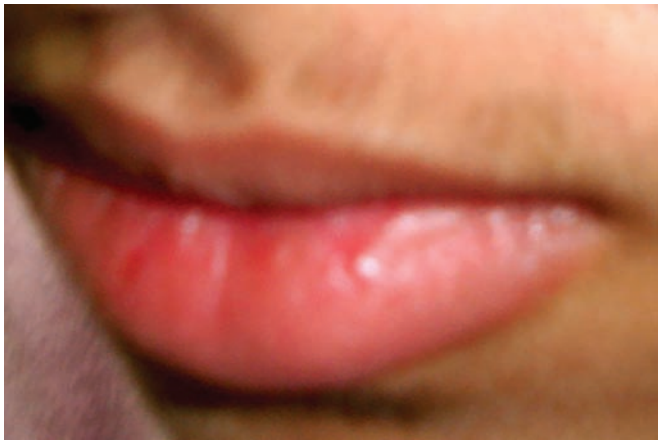

Fig. 6.17A Kawasaki disease, note red lips

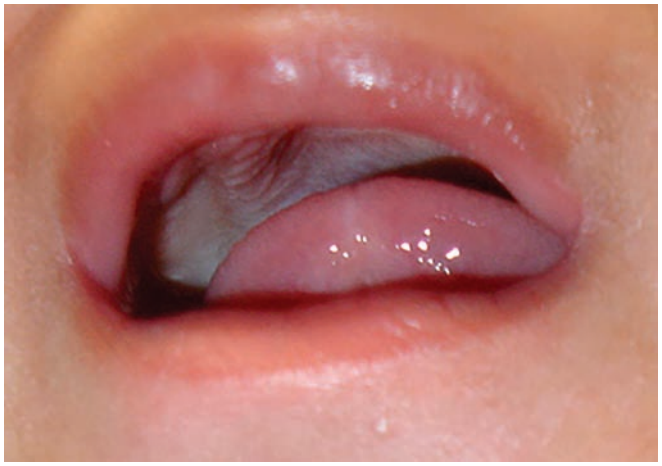

Fig. 6.17B Kawasaki disease, erythematous lips and tongue

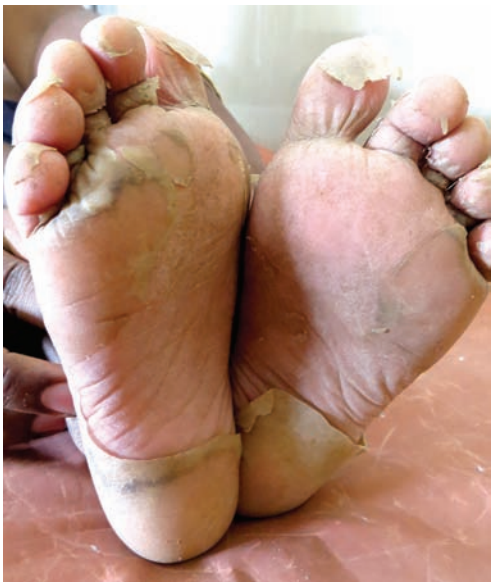

Fig. 6.17C Kawasaki disease, plantar exfoliation

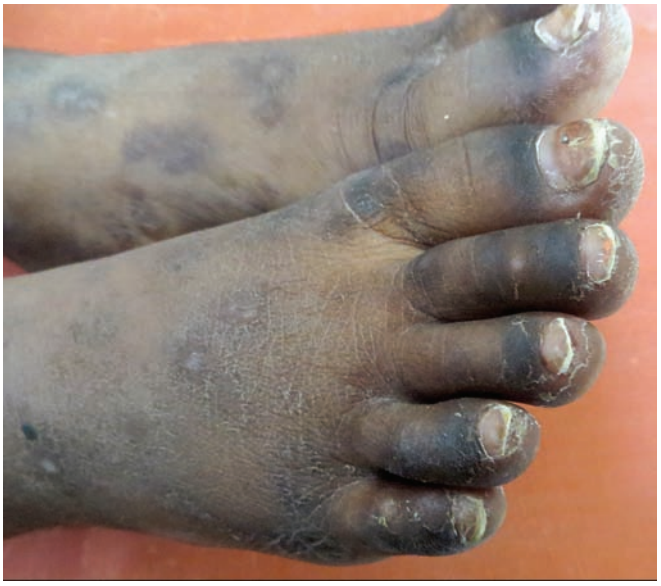

Fig. 6.17D KD, lesions over dorsum of feet

Etiopathogenesis

It is a condition resulting from immune activation. The first step is the activation of the T helper cells and polyclonal B cell activation. The second step is the release of multiple pro inflammatory cytokines. The third step is the immune complex mediated injury to the vessel walls. The fourth step is characterized by the development of circulating antibodies that are cytotoxic to cardiac myosin and endothelial cells.

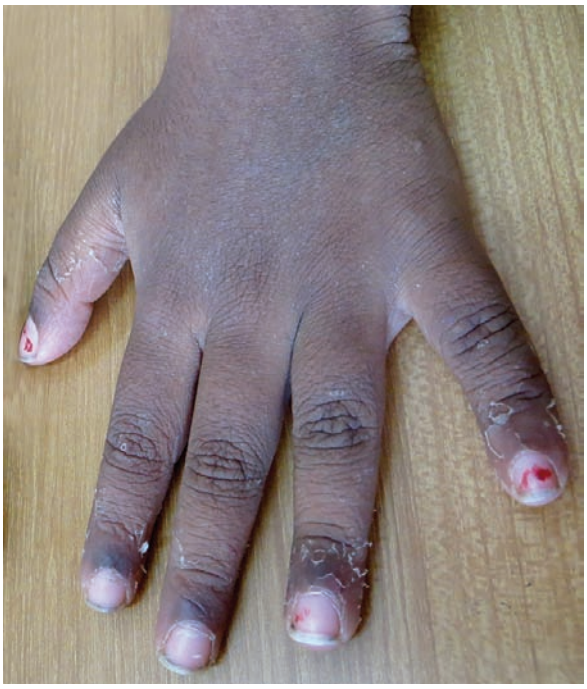

Fig. 6.17E KD, note finger-tip exfoliation

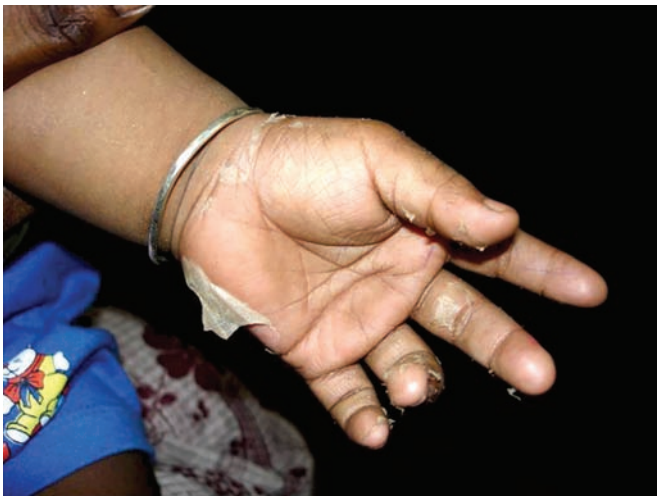

Fig. 6.17F Finger-tip exfoliation

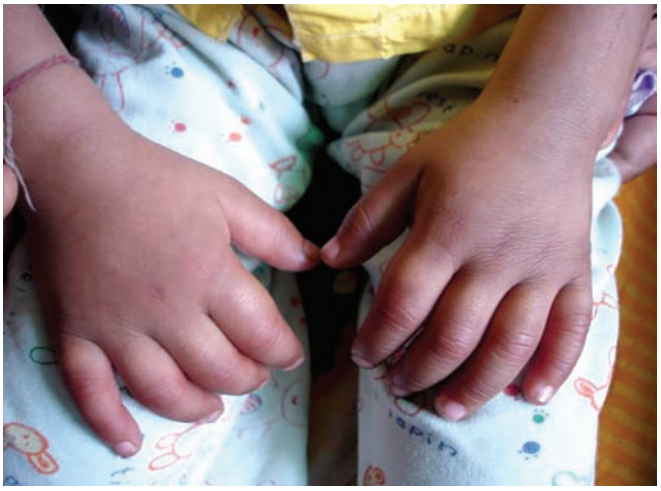

Fig. 6.17G Edema of hands

It is also proposed that super antigens may be responsible as the etiology of Kawasaki as manifested by the acute manifestations of the condition. An alternative hypothesis is that a conventional antigen driven response with respiratory tract as the portal of entry leads to Kawasaki disease.

Clinical Features

Cutaneous Manifestations

It is a triphasic illness with the acute phase lasting for about 7–14 days, subacute phase of 25 days and a convalescent phase of nearly 70 days.

The patient presents with a high fever and appears toxic. About 90% of the patients present with an exanthem in the first few days involving the trunk and proximal extremities. The morphology varies from macular, popular, scarlatiniform, morbilliform, urticarial and targetoid lesions. One of the earliest manifestations is the presence of perineal eruption that starts with an erythema and desquamates in about 48 hours.

Edema and erythema of the hands and feet with fusiform swelling of the fingers which resolves with desquamation in about 2–3 weeks.

Mucosal involvement occurs in the form of conjunctival congestion which may sometimes also be associated with anterior uveitis. The lips become cherry red, fissured and cracked. The tongue has been described as 'strawberry tongue', with the hypertrophied papillae and hyperemia.

Systemic Associations

1. Cardiovascular abnormalities including pericardial effusion, myocarditis, congestive cardiac failure, coronary artery ectasia.
2. Arthralgia and arthritis
3. Urethritis with sterile pyuria
4. Aseptic meningitis
5. Diarrhea, abdominal pain
6. Sensorineural hearing loss
7. Hepatic dysfunction

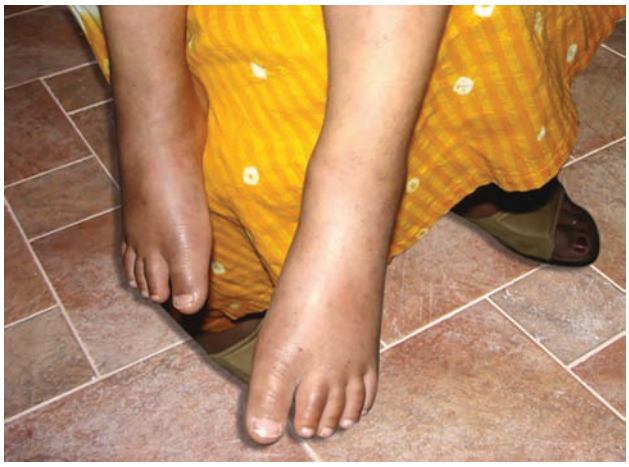

Fig. 6.17H Edema feet

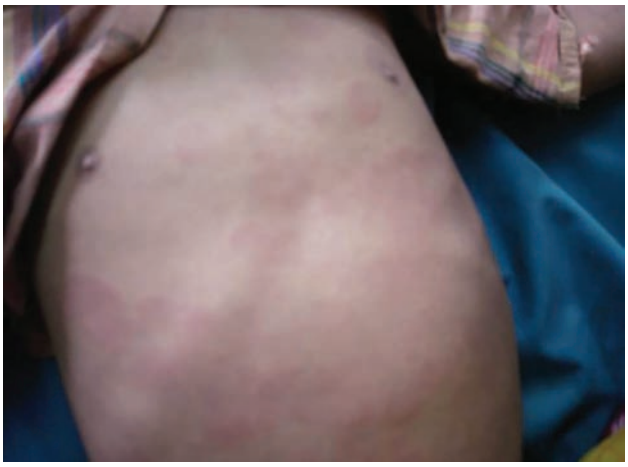

Fig. 6.17K Rash-any form but never vesico-bullous

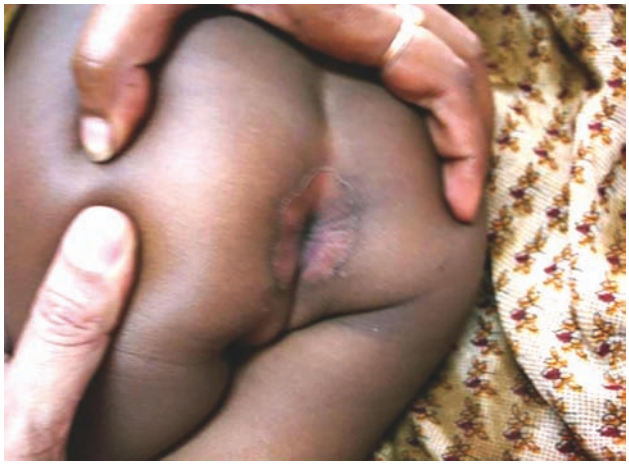

Fig. 6.17I Perianal excoriation

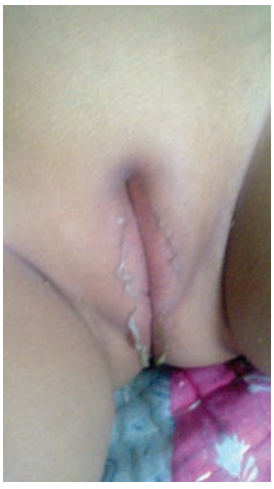

Fig. 6.17J Vulvovaginal exfoliation

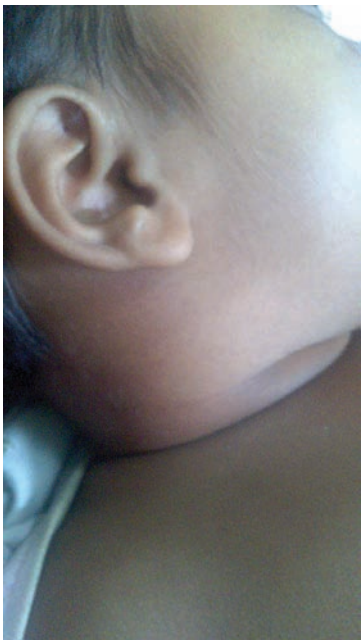

Fig. 6.17L Unilateral cervical lymphadenopathy

Diagnostic Criteria for Kawasaki Syndrome

Fever of 5 days or more with at least four of the followings:

1. Bilateral painless bulbar nonexudative conjunctival injection.
2. Injected or fissured lips or fissured pharynx or strawberry tongue.
3. Erythema of palms and soles or edema of hands and feet or periunual desquamation.
4. Polymorphous exanthema.
5. Acute non suppurative cervical lymphadenopathy.

"There are two things that are more difficult than making an after-dinner speech: climbing a wall which is leaning toward you and kissing a girl who is leaning away from you."—Winston Churchill

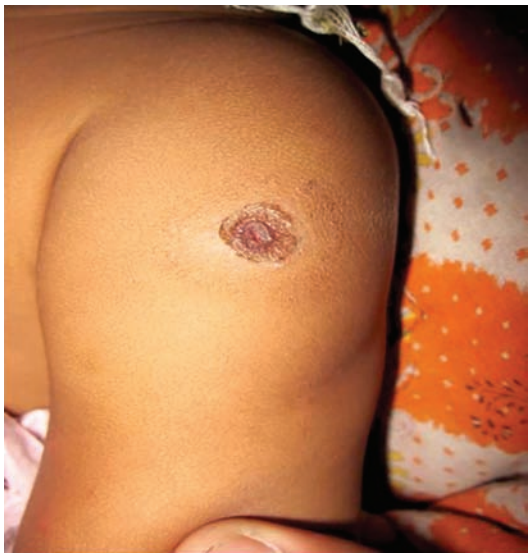

Fig. 6.17M BCG reactivation

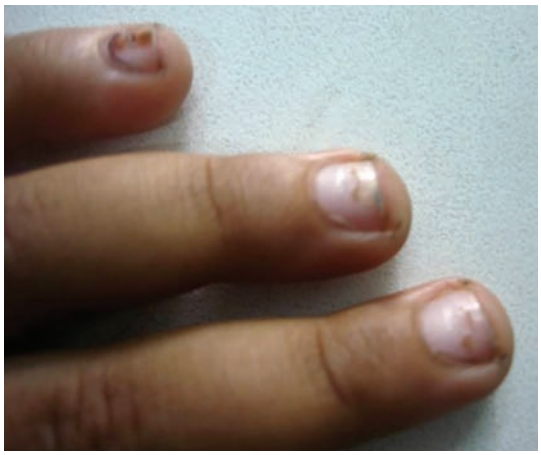

Fig. 6.17N Beau's lines due to KD episode

Laboratory Diagnosis

1. Transaminitis
2. Thrombocytosis
3. Sterile pyuria
4. Elevation of acute phase reactants
5. Electrocardiographic changes

Differential Diagnosis

1. Staphylococcal scalde skin syndrome
2. Stevens-Johnson syndrome
3. Erythema multiforme
4. Scarlet fever
5. Toxic shock syndrome
6. Viral exanthema.

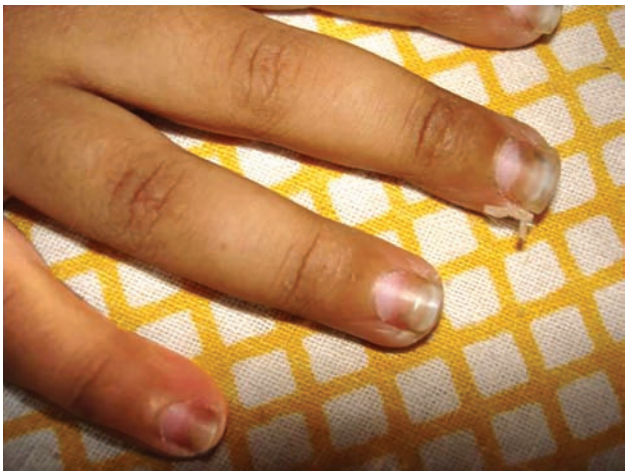

Fig. 6.17O Orange-brown chromonychia in KD

Treatment

The combined use of IVIG and aspirin has been the basis for treatment. The efficacy of IVIG in prevention of coronary artery has been dose dependent, however, the optimal dose has not yet been established. Although reports state administration IVIG, 2g/kg over 10–12 hours as a single dose has more benefit.

Approximately 85% of patients treated within the first 10 days of the disease will show resolution. If fever persists after 2–3 doses of IVIG, intravenous methylprednisolone in pulse doses for 3 days may be considered.

Other modalities include plasmapheresis, biologicals and cyclophosphamide.

TOXIC SHOCK SYNDROME (Fig. 6.18)

This severe disorder is an acute febrile illness with multisystem involvement characterized by myalgia, vomiting, diarrhea, pharyngitis, high fever, mucous membrane and conjunctival hyperemia, hypotension, scarlitiniform rash, and in severe cases a shock. Similar cases were previously described as Staphylococcal scarlet fever as early as 1978. Although it is more common in adolescent females and young women, it can also affect males and children. It is mediated by a blood-borne toxin produced by *S. aureus* at a focal site of infection. These include a phage group I *S. aureus* (toxic shock syndrome toxin 1 or TSS-1) in most patients and other toxins like enterotoxin A through C, epidermal toxin and some other toxins. A similar syndrome has been described following infection with toxin producing strains of Streptococci. Most cases are related to tampoon use during menstruation. However, they can also result from surgical wound infections, infections, infections following sinusitis, nasal packing, ear piercing, deep and superficial abscesses, infected burns, herpes zoster cellulitis,

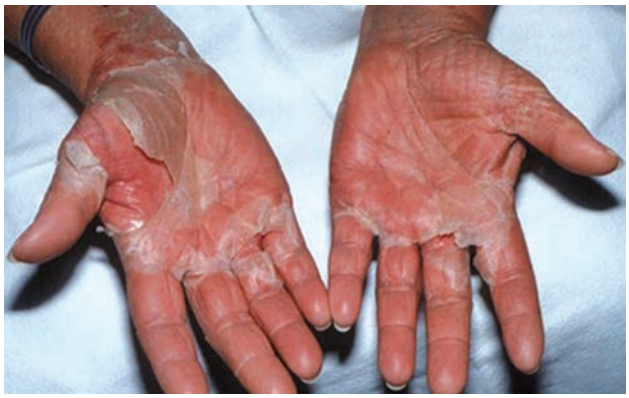

Fig. 6.18 Maculopapular rash of toxic shock syndrome over palms, note exfoliation by sheets of scales

adenitis, bursitis, empyema, osteomyelitis, septic abortion, etc. The scarlitiniform rash typically desquamates, nails are shed and telogen effluvium may occur. Flaccid blisters with subepidermal fluid are seen in some infants with toxic shock syndrome.

Treatment

The treatment should be aggressive with early institution of antistaphylococcal antibiotics. In severe cases fluid replacement is essential. Vasopressors are used to maintain normal blood pressure. Other appropriate measures are to be taken like respiratory assistance, or dialysis should be undertaken when necessary.

CHIKUNGUNYA FEVER (Figs 6.19 to 6.19D)

Chikungunya fever is a re-emerging acute viral infection characterized by fever, arthritis, myalgia, conjunctivitis and mucocutaneous manifestation. It was documented in an outbreak at Tanzania in 1952 and India in 1964. It is usually self limiting but rarely fatal.

Etiology

It is caused by an arbovirus transmitted by the bite of Aedes mosquito. It is also transmitted vertically if mother gets the infection few days prior to delivery.

Clinical Features

Chikungunya fever is seen in all age groups from newborn to adults. It affects both sexes equally. There is high grade fever associated with arthralgia, myalgia, lymphadenopathy, skin eruptions, conjunctivitis, photophobia, meningeal syndrome and acute encephalopathy. Cutaneous features are seen in 40–50% of cases. Clinically manifests as generalized

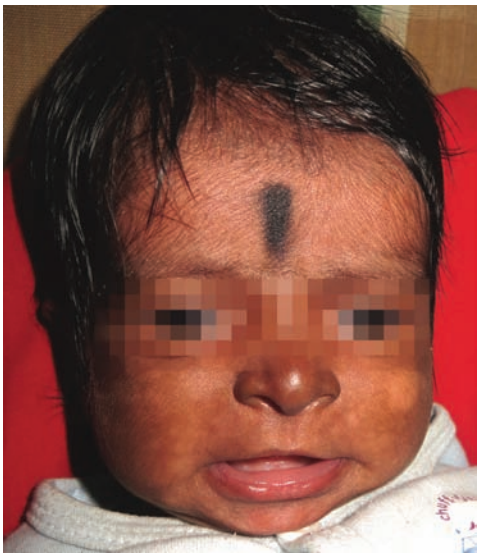

Fig. 6.19 Classical rash of chikungunya fever

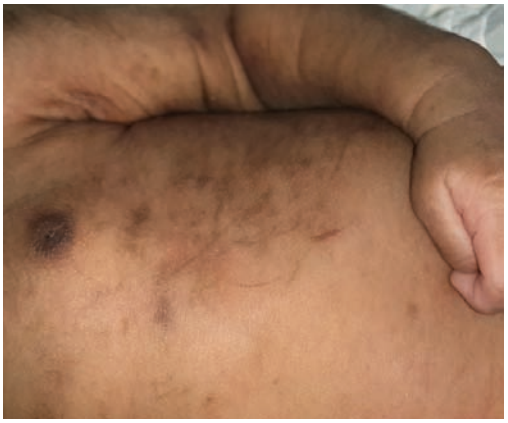

Fig. 6.19A Neonatal chikungunya hyperpigmentation over trunk

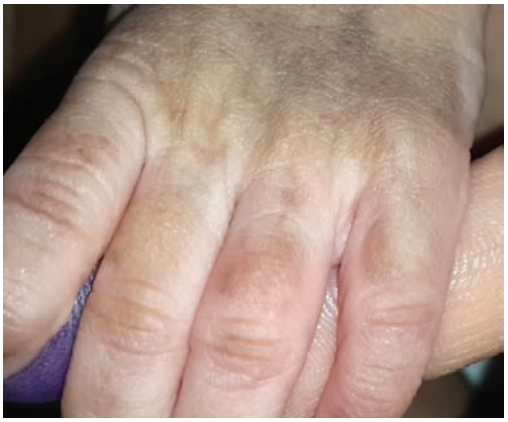

Fig. 6.19B Same baby, note hyperpigmentation over dorsum of hand

Fig. 6.19C Neonatal Chikungunya, note characteristic hyperpigmentation over nose, philtrum and lower lip

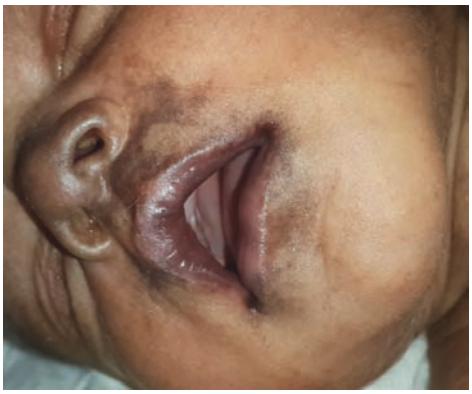

Fig. 6.19D Same baby, close-up

maculopapular rash, hyperpigmentation, xerosis, desquamation of palms, generalized articaria lesions, transient nasal erythema, vesiculobullous lesions, vasculitis and erythema multiforme like lesions, aphthous ulcers, and oral mucosal pigmentation. Skin rash commonly affects extremities, trunk, neck, earlobes and face.

The cause of hyperpigmentation is not known. It is mainly attributed to post inflammatory hyperpigmentation. Different morphological patterns of hyperpigmentation seen are centrofacial, freckle like, blotchy, flagellate, palmar pigmentation or diffuse pigmentation on face, nose, pinna, trunk and extremities. Neonates affected by maternal transmission can present with only hyperpigmentation. Nasal hyperpigmentation is very striking clue to diagnose chikungunya in neonates which is not seen in any other viral infections. This pigmentation persists for months even after remission.

Investigations

Diagnosis of chikungunya rash is mainly clinical. Serological tests include fourfold increase in IgG levels and IgM antibodies specific to chikungunya. Viral culture confirms the diagnosis.

Treatment

The treatment of cutaneous lesions is mainly symptomatic. Bland emollients and calamine lotion can be given. Antihistamines are given for pruritus. Hyperpigmentation persists for some time. Counseling of parents about the course is required.

RICKETTSIAL DISEASES (Figs 6.20 to 6.24)

Rickettsiae comprise a group of microorganisms that phylogenetically occupy a position between bacteria and viruses. They are obligate intracellular gram-negative coccobacillary forms that multiply within eukaryotic cells. Rickettsiae do not stain well with Gram stain, but they take on a characteristic red color when stained by the Giemsa stain. Rickettsial illnesses, caused by organisms within the genus of rickettsiae can be divided into the following 3 biogroups:

1. Spotted fever biogroup (15 rickettsioses)
2. Typhus group
3. Scrub typhus biogroup (Tsutsugamushi disease).

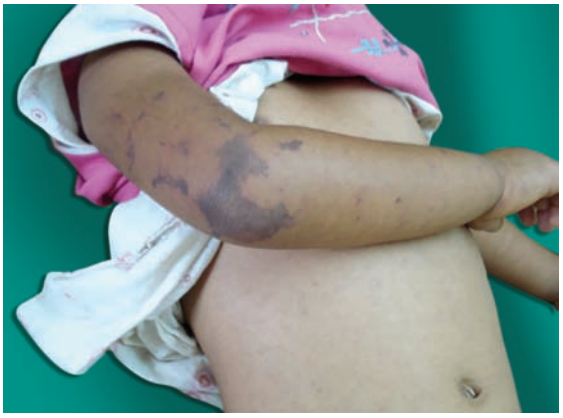

Fig. 6.20 Hemorrhagic lesions of Rickettsial disease

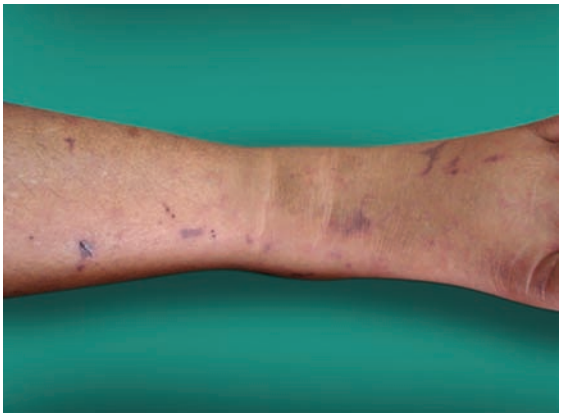

Fig. 6.21 Classical lesions of Rickettsial disease

"Oaths are but words, and words are but wind."—Samuel Butler

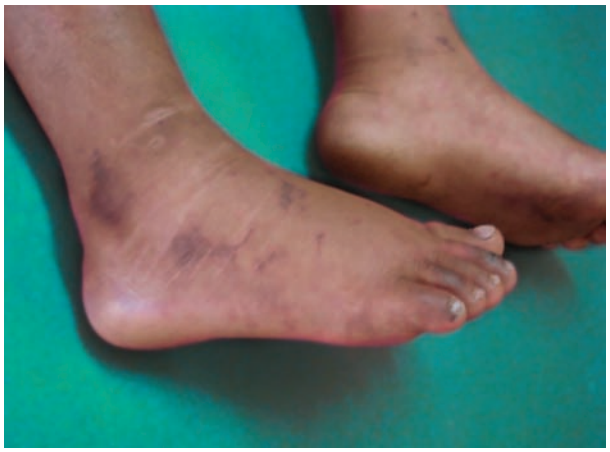

Fig. 6.22 Same boy, close-up

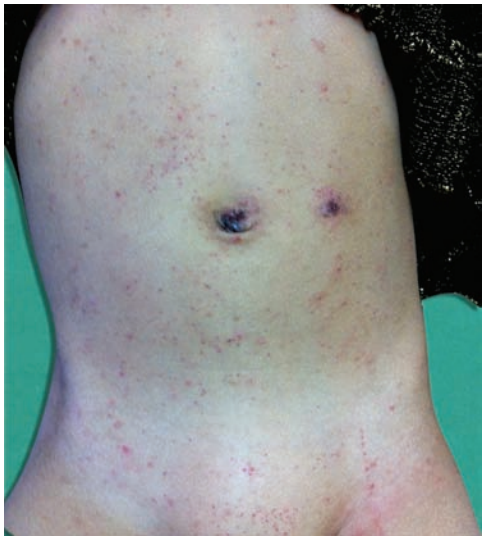

Fig. 6.23 Rickettsial pox lesions

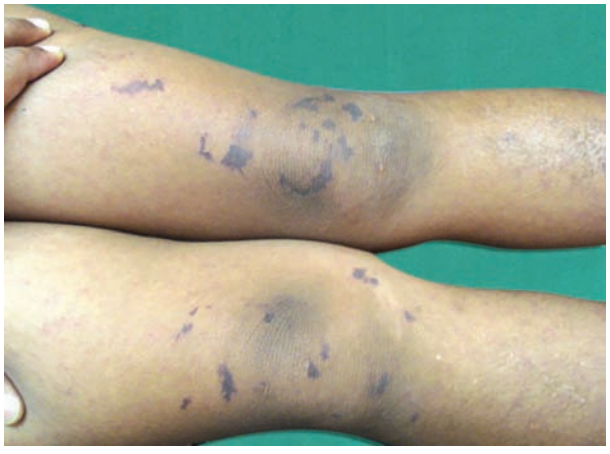

Fig. 6.24 Rickettsial disease, lesions over knee

Etiopathogenesis

The major pathophysiologic effect of rickettsial infection is increased vascular permeability which can result in edema, hypovolemia and hypotension. Although endothelial cells of the microcirculation of all organs are affected the critical organs are the lung and brain which can cause life threatening infection. A fatal outcome results if there is pulmonary edema, acute respiratory distress syndrome and aseptic meningitis.

Clinical Features

Typically begins with a prodrome of fever, headache, nausea, myalgia, vomiting abdominal pain. A cutaneous rash develops on the 3-6th day of the disease. Cough, lethargy and confusion may be early features of involvement of the brain. As clinical course progresses hypotension, acute renal failure, respiratory failure and coma may develop.

The typical cutaneous feature is the presence of an eschar consisting of a central area of dermal and epidermal necrosis (0.5–2 cm) surrounded by a zone of erythema that appears during 4–10 days. The rash begins at the wrists and ankles in case of spotted fever and axillae in typhus fever. The examnthem involves the entire body with relative sparing of the face. Palms and soles are generally involved with a maculopapular rash. Petechiae and purpure may develop in cases of severe endothelial injury. Cutaneous necrosis can also lead to the necrosis of digit, ear lobes and nose tips.

Differential Diagnosis

1. Viral exanthema
2. Drug rash
3. Kawasaki disease
4. Measles
5. Dengue fever.

Laboratory Diagnosis

Serologic testing using specific methods (e.g. immunofluorescence antibody test, indirect immunoperoxidase test, enzyme immunoassay) are superior to the Weil-Felix reaction.

Treatment

Specific Therapy

Adequate antibiotic therapy initiated early in the first week of illness is highly effective and is associated with the best outcome. Fever usually subsides within 24–72 hours after starting antibiotic therapy. If fever fails to subside with the use of a suitable antibiotic, the diagnosis of rickettsial disease should be reconsidered. Treatment may be terminated 2–3 days after the patient is afebrile and at least 10 days of therapy has been given.

Doxycycline is the drug of choice for all rickettsial infections; it is preferred over other tetracyclines for treatment of rickettsial infections and, at such low dose and short duration, is rarely associated with staining of teeth in children younger than 8 years.

The first line drug in cases of scrub typhus is azithromycin.

Supportive Therapy

Thrombocytopenia, hypoalbuminemia, hypotension, and coagulation defects require supportive management. Hyponatremia is best managed with maintenance fluids or even modest fluid restriction.

HAND-FOOT AND MOUTH DISEASE (Figs 6.25 to 6.33)

Hand-foot and mouth disease (HFMD) is a distinctive viral infection caused by enterovirus, member of Picornaviridae. It was first reported in New Zealand in 1957. HFMD is most commonly associated with infections due to coxsackie A16 or enterovirus 71, which are single stranded, uncapsulated RNA viruses. Other etiological agents are coxsackie virus A4-A7, A9, A10, B1-B3 and B5. HFMD affects children most commonly between 1 and 10 years of age. It rarely occurs in adults. It is seen in summer and autumn months. It is highly contagious to other family members. The route of transmission is fecal-oral route or through contact with skin lesions or oral secretions. After a short incubation period of 3–6 days the virus spreads to regional lymphnodes within 24 hours and later disseminate to oral cavity and skin.

Mild fever and constitutional symptoms may precede the skin eruptions. It is characterized by sudden onset of groups of papulovesicules or vesicles on an erythematous base. These vesicles are oval to elliptical and are painful. They occur on specific areas like hand, feet, perioral region, elbow and knee joints, forearms, legs and gluteal region. It affects oral mucosa and rarely genitalia. It heals without scarring. Most of the cases improve spontaneously within 7–10 days. Complications are rare and include cardiac dysfunction, fulminant pulmonary edema, myocarditis, meningitis, encephalitis, acute flaccid paralysis.

Differential diagnoses to be considered are varicella, herpes simplex, impetigo, pompholyx, papular urticaria, scabies and herpangina. Mortality is rare and complications are more seen with enterovirus 71. HFMD is a clinical diagnosis and requires no investigations. Confirmation can be done by culture or by detection of neutralizing antibodies in serum. Management of HFMD is symptomatic. Topical anesthetics can be used for oral mucosa.

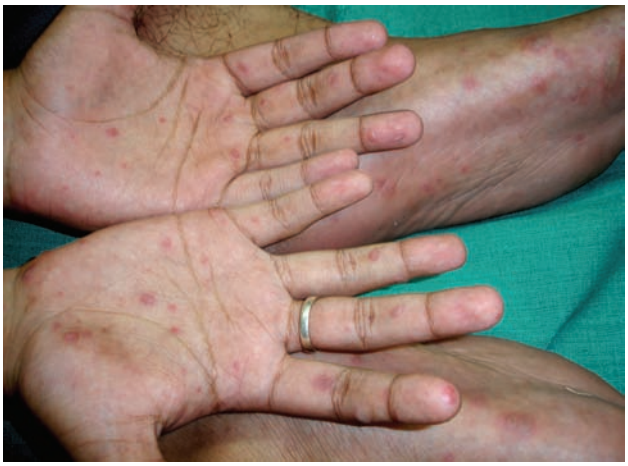

Fig. 6.26 Same boy with palmo-plantar lesions

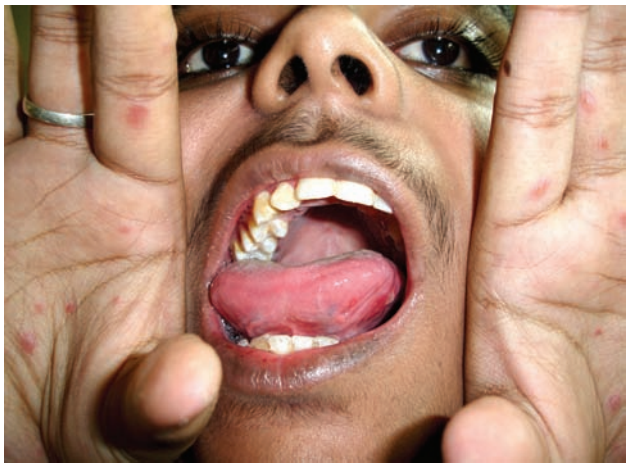

Fig. 6.25 Hand Foot and mouth disease in an adolescent boy

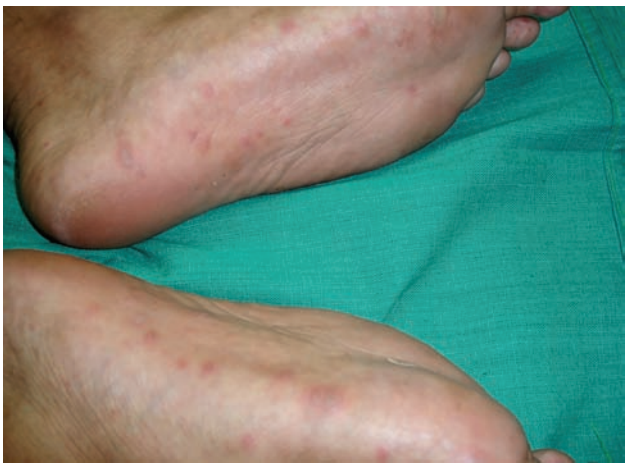

Fig. 6.27 HFMD, close-up of plantar lesions

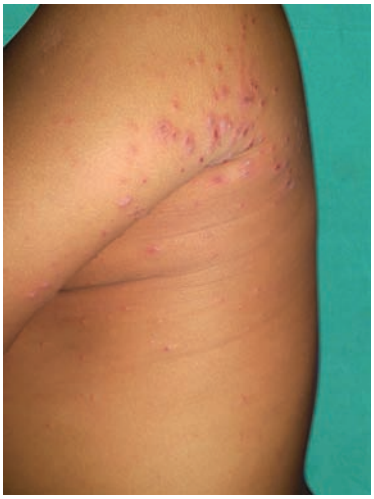

Fig. 6.28 Grouped vesicles around axillary fold in HFMD

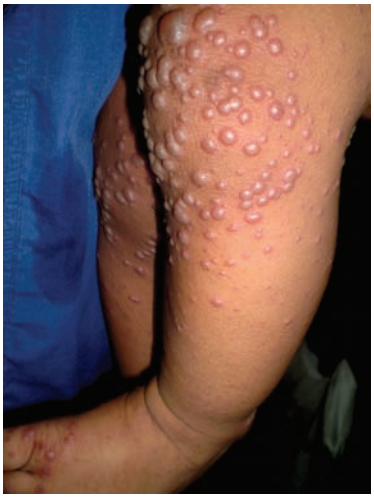

Fig. 6.29 Clustering of lesions of HFMD around knee

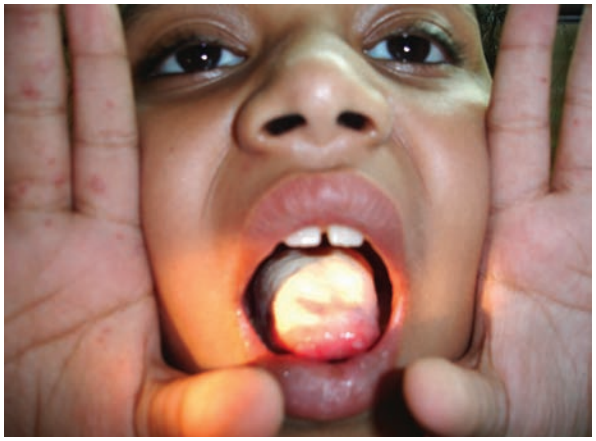

Fig. 6.30 Oral mucosal lesions in HFMD

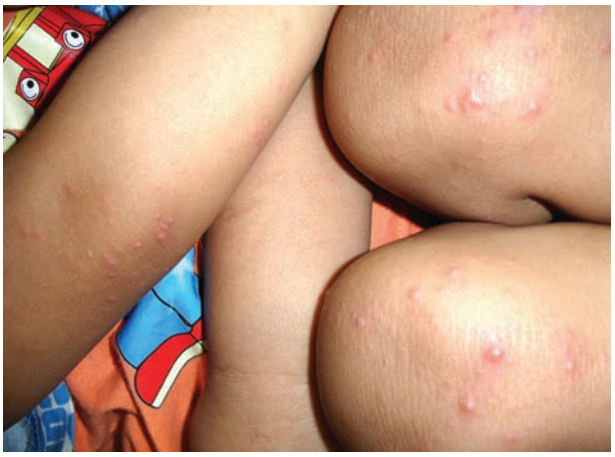

Fig. 6.31 Lesions over elbow and knee in HFMD

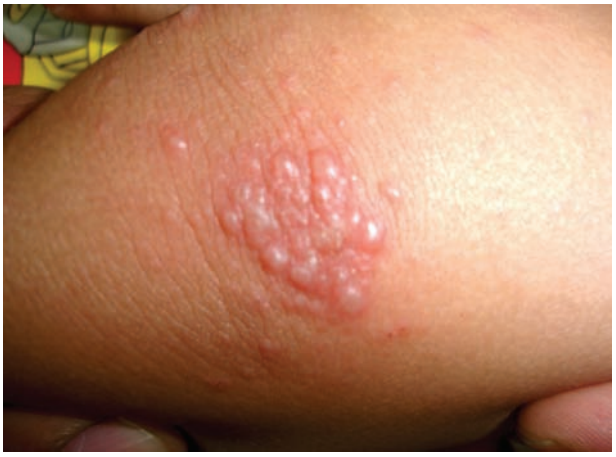

Fig. 6.32 Grouped vesicles in HFMD

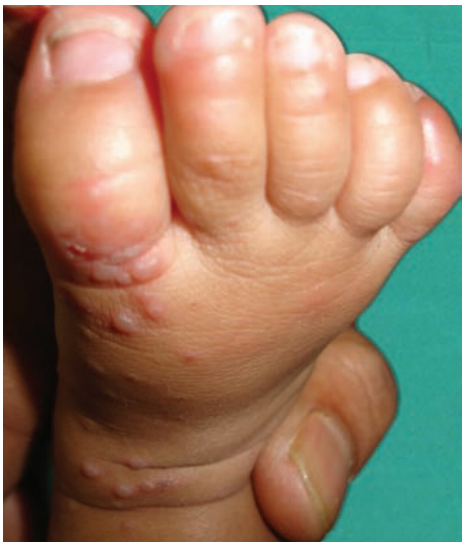

Fig. 6.33 Lesions over foot in an infant with HFMD

"You only live once, but if you do it right, once is enough."—Mae West

7

Eczema and Dermatitis

NAPKIN DERMATITIS (Figs 7.1 to 7.2A)

The term 'napkin dermatitis' implies an inflammatory eruption of the napkin area. Hydration of skin, friction between skin and the fabric of the napkin, urine and its degradation product, proteolytic and lipolytic enzymes and *Candida albicans* level in the feces are supposed to play an etiologic role. The onset is from 3rd to the 12th week and the peak prevalence is seen between the 7th and 12th month. Both sexes and all races appear to be equally affected. It is manifested as confluent erythema on the convex surfaces in closest contact with the napkin, i.e. the buttocks, the genitalia, the lower abdomen and pubic area and the upper thighs. Where the reaction is acute, peeling of skin in sheets may occur. Post-inflammatory hypopigmentation may be a striking feature. In both sexes, involvement of the genitalia may lead to dysuria.

JACQUET'S DERMATITIS (Fig. 7.2B)

Jacquet's dermatitis is a severe erosive form of irritant contact napkin dermatitis. This clinical entity was first recognized by Jacquet in 1905. It tends to affect more in older children wearing napkin or with infrequent diaper change. The frequency of its occurrence recently has decreased due to use of good modern diapers. Persistent occlusion, maceration, friction and prolonged contact with urine and feces contribute to the development of Jacquet's dermatitis. It persists for long time, if the child has incontinence. They are also called as 'ammonia ulcers'. Clinically presents as papuloerosive and nodular lesions, superficial erosions or punched out ulcers with raised erythematous border. Mucosae are spared. The most common sites affected are penis, labia, concave skin of perianal region. Jacquet's dermatitis is difficult to differentiate from perianal pseudoverrucous papules and nodules, and granuloma gluteale infantum. Management includes preventive measures, regular cleansing, frequent change of diapers, and application of barrier creams like zinc oxide or white petroleum jelly. Mild topical steroids can be applied. Secondary infections should be treated.

Management

Napkin dermatitis is self-limiting in most of the cases as the children outgrow this problem after successful potty training. The mother or the caregiver should be advised regarding increasing the frequency of napkin changes and proper cleansing of the skin with either with a soft baby soap or a nonsoap nondetergent cleanser. The skin should be cleaned with lukewarm water without rubbing. The nappies should be cleaned with a mild detergent and antiseptics should be preferably avoided. Various barrier creams containing zinc oxide, titanium dioxide, white soft paraffin, water repellent dimethicone, etc. are used in the West. However, in our country, these types of creams do not appear to be useful because of our hot and humid climate. Application of an emollient helps in majority of the cases. In cases which do not respond to improved hygiene and application of emollient, application of a mild topical steroid, e.g. clobetasone or hydrocortisone (1%) cream along with an anticandidal agent, e.g. clotrimazole, miconazole or ketoconazole once or twice/day for 7–14 days helps. This is to be followed by application of emollient. Antibacterials are to be used only in cases of secondary infection. Application of baby powder is better avoided as the starch content of it can enhance growth of *Candida albicans*.

IRRITANT DERMATITIS (Figs 7.3 and 7.3A)

It develops as a result of direct irritant potential of the irritant in infants and newborns. The dermatitis develops as a result of nonimmunologic mechanisms. Mild irritants, when kept

"With Malice toward none, with charity for all, with firmness in the right, as God gives us to see the right, let us strive on to finish the work we are in, to bind up the nation's wounds."— Abraham Lincoln

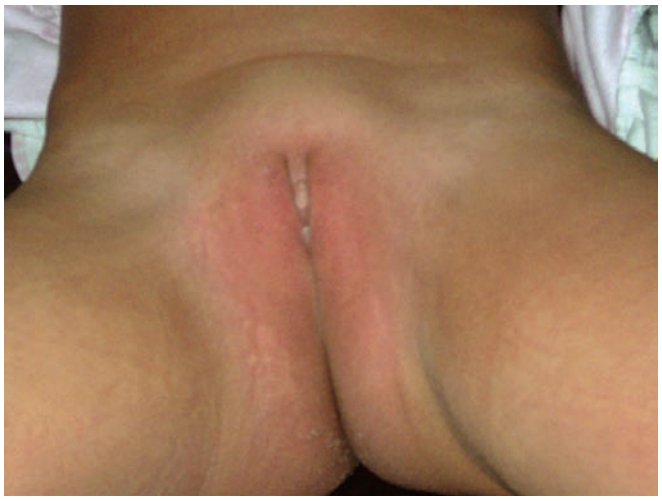

Fig. 7.1 Erythema and chapping over buttock in napkin dermatitis

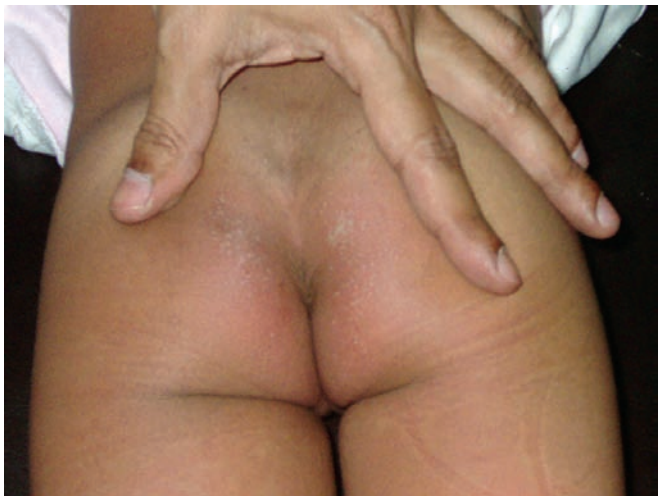

Fig. 7.2 Same child (close-up)

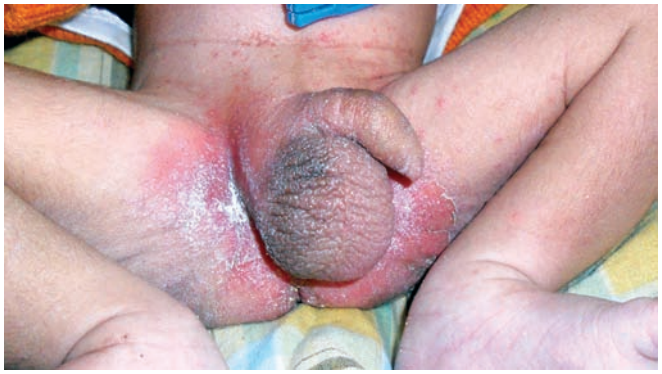

Fig. 7.2A Candidal diaper dermatitis

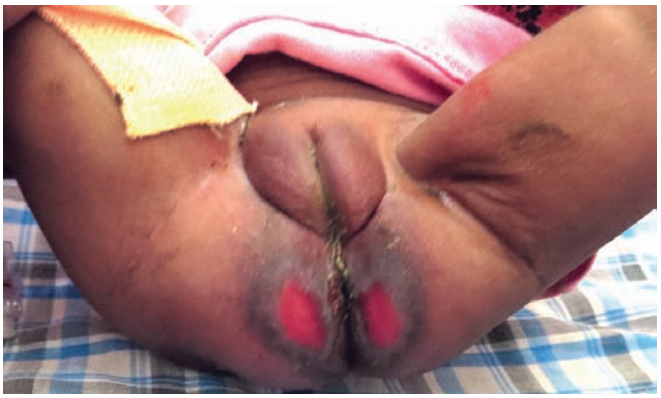

Fig. 7.2B Jacquet's dermatitis

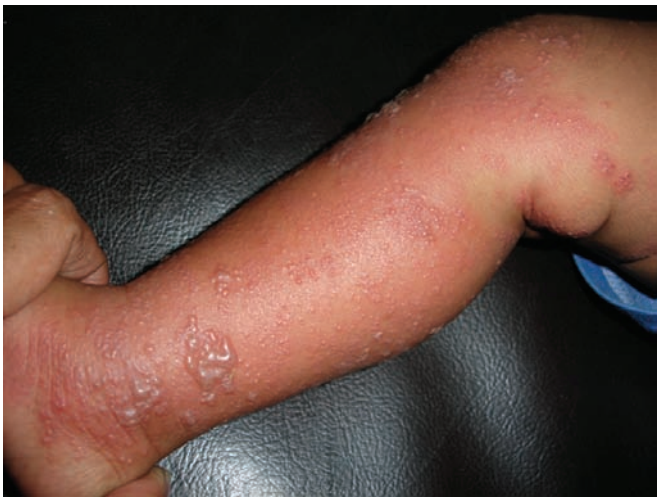

Fig. 7.3 Acute irritant dermatitis in a 3-year-old girl

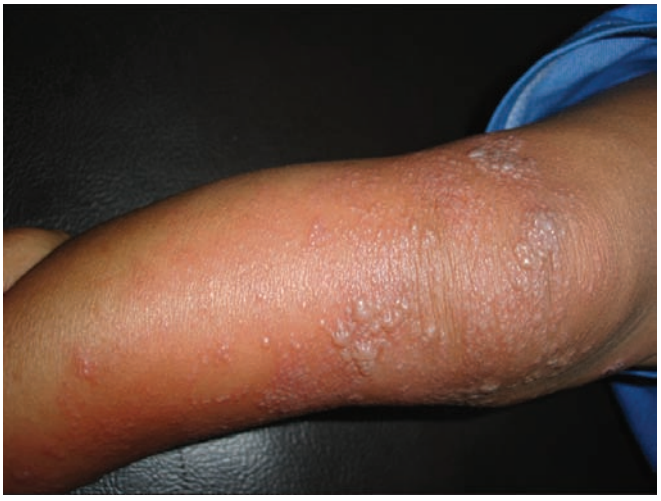

Fig. 7.3A Irritant dermatitis, close-up

"A man may die, nations may rise and fall, but an idea lives on."—John F Kennedy

in contact with skin in sufficient concentration and over a significant period, can produce chronic irritant dermatitis. This is known as cumulative dermatitis. Various physical and chemical factors, e.g. friction, low humidity, heat, cold, solvents, soaps and detergents. Babies with atopic diathesis are more prone to develop this type of dermatitis. It manifests as localized patches of dry, slightly inflamed or chapped skin.

Treatment

Treatment of acute irritant dermatitis comprises of cleaning the area with water and mild soap or neutralizing solution. Frequent wet compresses with application of a bland emollient or mild corticosteroid is helpful. All incriminating physical and chemical factors are to be removed. Barrier creams may be useful.

LIPLICKER'S DERMATITIS (Figs 7.3B to 7.3D)

It is mostly seen in preschool children and children of early school-going age. The lips and adjacent skin frequently become dry and, as a result of a licking habit, inflamed and irritated and scaly. In addition, saliva frequently becomes trapped between the thumb and mouth of thumbsuckers, and a similar reaction is commonly seen in toddlers. These are more commonly seen in atopic children.

Treatment

Occlusive pastes such as zinc oxide ointment, moisturizing creams, and low-to-medium potency topical corticosteroid creams or ointments are helpful in the management of this disorder. Counseling of the children regarding avoidance of liplicking or thumb-sucking is important.

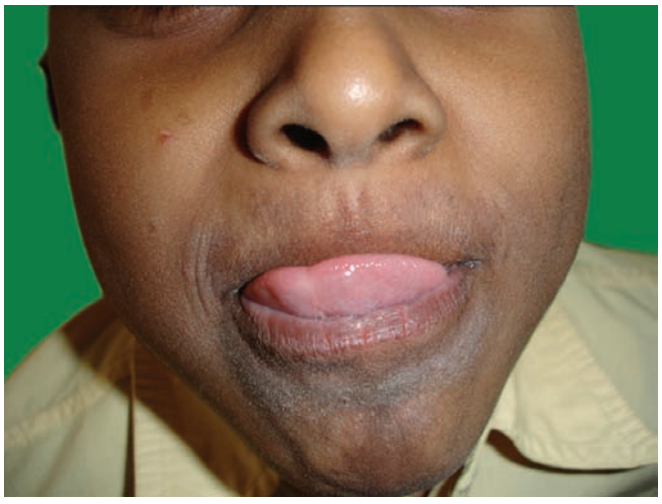

Fig. 7.3B Liplicker's dermatitis

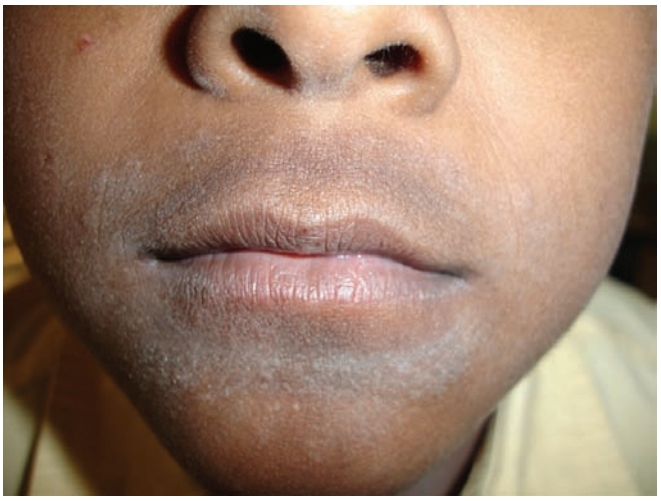

Fig. 7.3C Liplicker's dermatitis, close-up

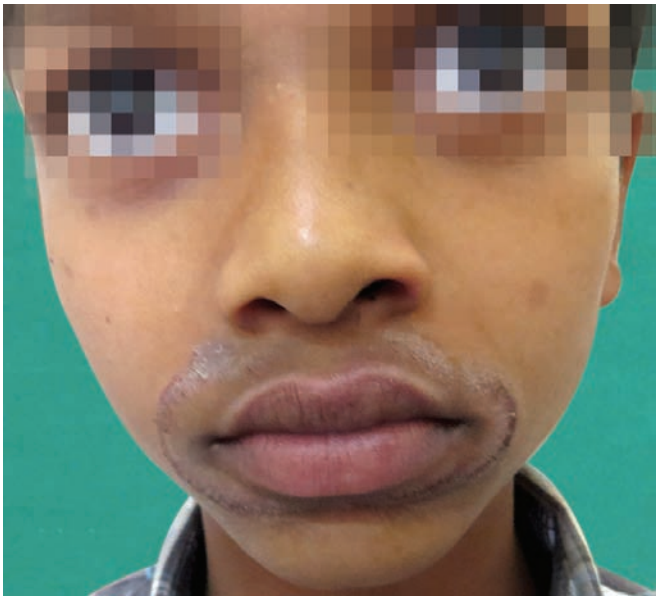

Fig. 7.3D Liplicker's dermatitis

CRADLE CAP (Fig. 7.4 to 7.4B)

This term is used when there is adherent scaling of the scalp. This type of scaling is common on the vertex during the first week of life and is believed to represent vernix. However, such scaling may appear in early infancy in babies whose scalp was clear at birth. In acquired type of cradle cap, eyebrows, forehead, temples retroauricular area and folds of the neck may also be affected.

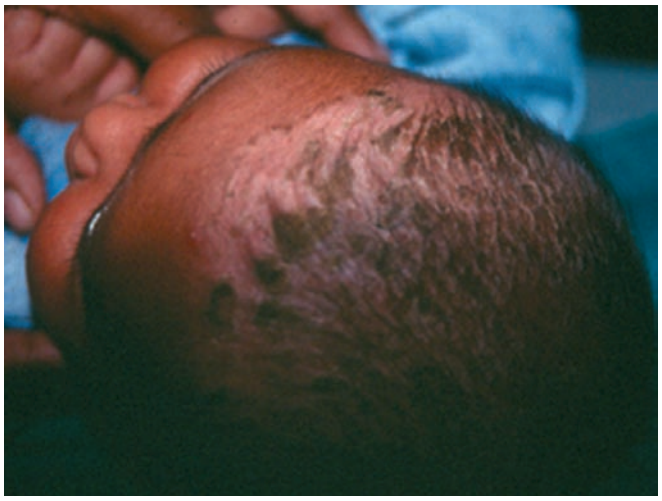

Fig. 7.4 Cradle-cap (subsiding)

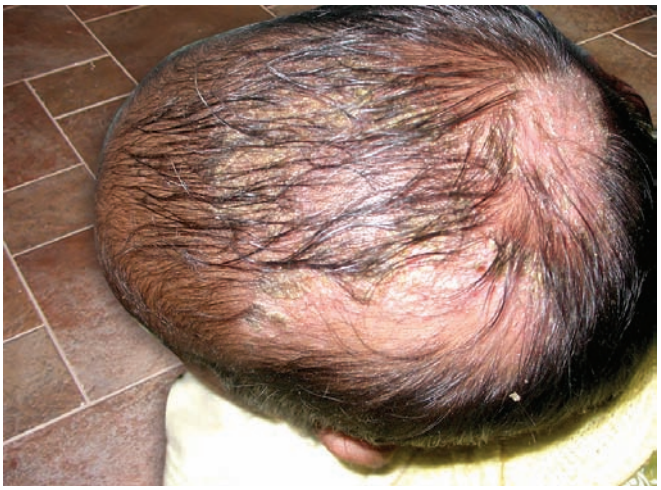

Fig. 7.4B Cradle cap involving entire scalp

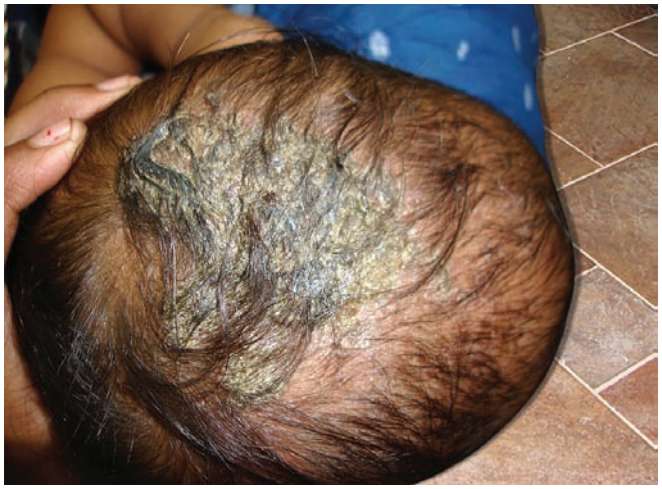

Fig. 7.4A Cradle cap (localized)

Treatment

The scalp should be soaked in lukewarm coconut or olive oil for 10–20 minutes. Then shampooing of the scalp should be done using ketoconazole or ketoconazole and zinc pyrithione. Applications of oil and shampooing should be done 2–3 times/week. After each bath, clotrimazole lotion can be applied over the scalp and massaged lightly. In cases where cradle cap extends to the forehead, a mild topical steroid, e.g. clobetasone or hydrocortisone cream, either alone or with miconazole can be applied once/day for 2–3 weeks. Application of steroid creams or lotions over the scalp is better avoided.

INFANTILE SEBORRHEIC DERMATITIS (Figs 7.5 to 7.7)

The term infantile seborrheic dermatitis is used to describe an eruption having a predilection for the scalp and the proximal flexures and a favorable prognosis compared with atopic dermatitis. However, the term is used by clinicians to describe a clinical presentation that may reflect a variety of different skin disorders and that may, therefore, have a number of different causes.

There is considerable debate about the relationship between seborrheic dermatitis and atopic dermatitis. Some authors propose that infantile seborrheic dermatitis is merely a characteristic pattern of atopic dermatitis and not a separate entity on the basis of the observation that apparently typical infantile seborrheic dermatitis not infrequently transforms into equally typical atopic dermatitis. No specific etiologic agent has been identified, although nutritional factors and the fungus *Malassezia furfur* are thought to play a role. The eruption first appears between the 2nd week and the 6th month of life but most commonly between the third and eight weeks. It usually starts on the napkin area but may also appear first on the face, scalp or trunk. It spreads rapidly to involve the scalp particularly the vertex and frontal areas, face, neck, napkin area and axillae. On the face, the forehead, eyebrows, eyelids and nasolabial folds are the worst affected.

The rash comprises of well-defined areas of erythema and scaling with fine vesicles. The scales are adherent, yellow-brown in color, large and greasy in the scalp but smaller, whiter and drier in other areas. The infant usually is well and only rarely itchy which is in contrast to atopic dermatitis.

"Any fool can tell the truth, but it requires a man of some sense to know how to lie well."—Samuel Butler

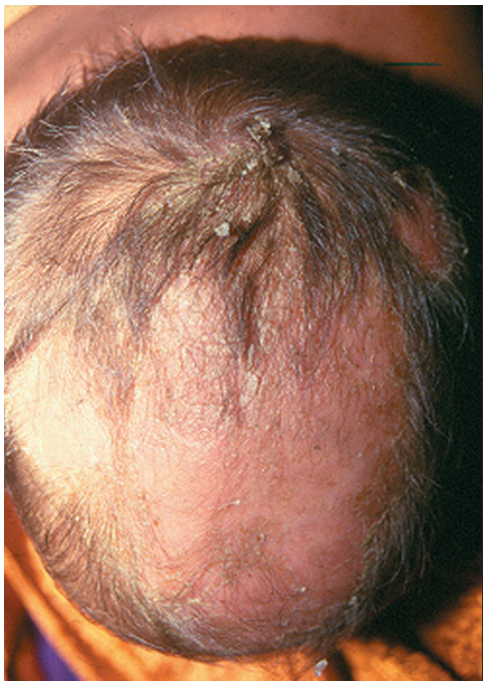

Fig. 7.5 Diffuse scaling and crust formation over the scalp in infantile seborrheic dermatitis

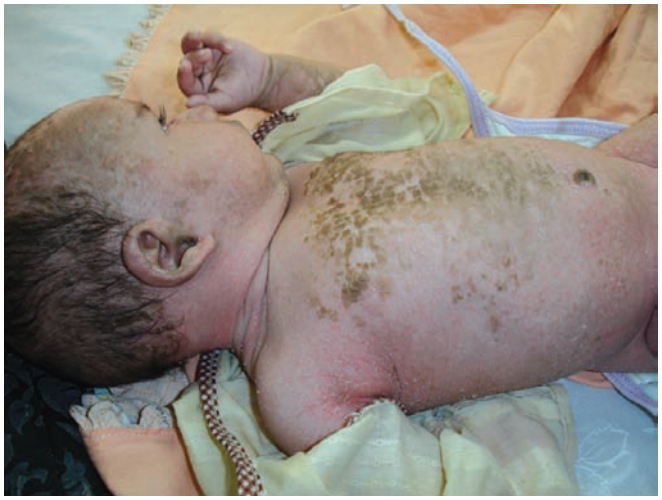

Fig. 7.6 Scales and crust of ISD

Differential Diagnosis

There is considerable diagnostic overlap with cradle cap, intertrigo, disseminated primary irritant napkin dermatitis, atopic dermatitis, infantile psoriasis, multiple carboxylase deficiency and primary immunodeficiencies. Differentiation from atopic dermatitis is desirable because of the more favorable prognosis of infantile seborrheic dermatitis.

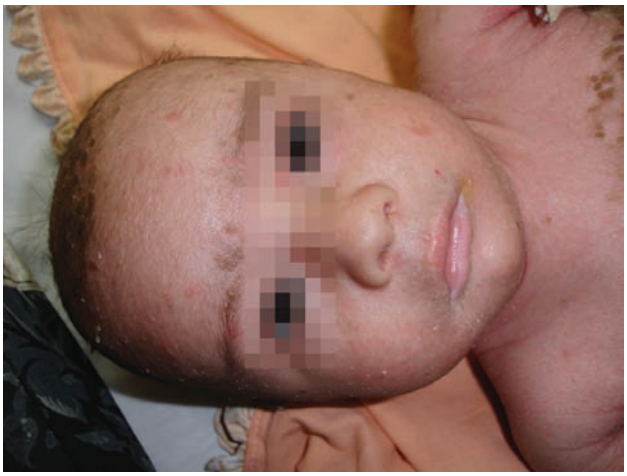

Fig. 7.7 Involvement of face, eyebrows and eyelids in ISD

Axillae are not affected in atopic dermatitis, whereas flexors forearms and shins which are affected in atopic dermatitis, are not involved in infantile seborrheic dermatitis.

Treatment

Cleansing and applications over the scalp are more or less same as in cases of cradle cap. In milder cases, a mild topical steroid or steroid-antifungal cream should be applied over forehead, retroauricular folds, eyebrows, earlobes, groin, etc. once/day for 2–3 weeks. Application of body oil and soap should be as in cases of normal babies. For severe cases, where pruritus is often present, either promethazine (in early infancy) or cetirizine (in infants above 6 months of age) may be given. In recalcitrant severe cases, one may resort to short course of oral corticosteroids. However, application of topical corticosteroid cream or lotion over extensive area of the body is not recommended. Oral antistaphylococcal antibiotics may be given in cases where secondary infection is suspected.

PAPULAR URTICARIA (PU) (Figs 7.8 to 7.9C)

Injection of foreign protein by biting insects into skin of the most sensitive subjects may cause an immediate IgE-mediated reaction which starts as an extremely itchy urticarial weal at the site of the bite. This is succeeded by a firm pruritic papule, which persists for several days. The weal and papule may show a central hemorrhagic punctum and the papule may be surmounted by a tiny vesicle. Lesions are grouped in clusters and develop in crops at irregular intervals. Bullous reactions are common on the lower legs. Irritation is an almost constant symptom and rubbing and scratching may increase the inflammatory changes and induce eczematization.

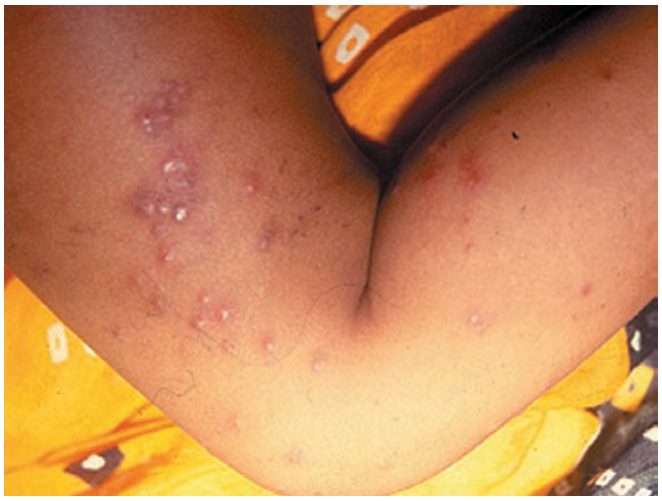

Fig. 7.8 Papular urticaria over thigh and leg (common sites)

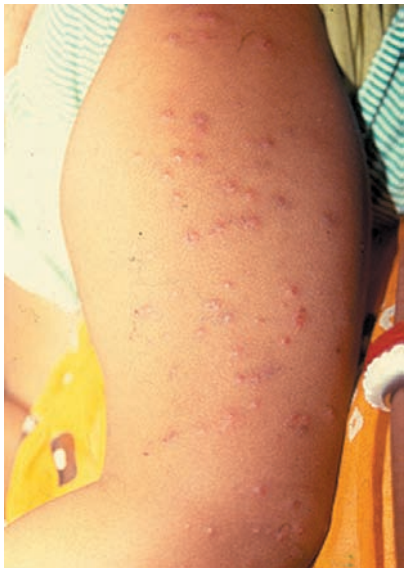

Fig. 7.9 Same child (close-up)

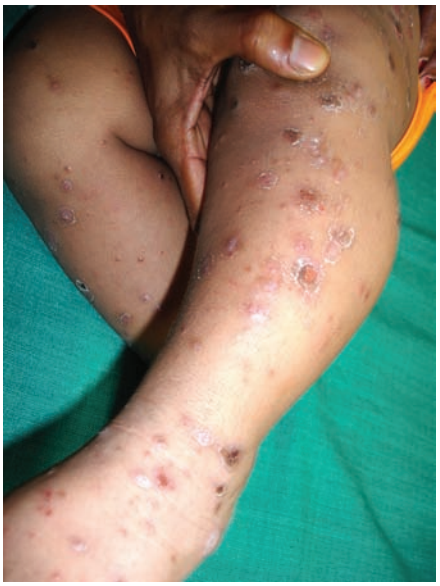

Fig. 7.9A Papular urticaria—severe

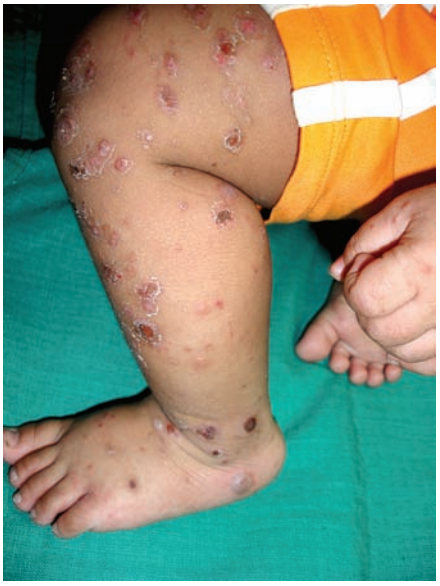

Fig. 7.9B Same patient with PU

Complication

Secondary infection is a common complication and may manifest as impetigo, folliculitis, cellulitis and lymphangitis.

Treatment

Full sleeve clothes give protection from insect bite and help to prevent development of new papules to an extent. Use of mosquito repellents, mosquito nets, spraying of beddings and their exposure to sunlight are advocated. For skin lesions topical application of a mild steroid, e.g. clobetasone, hydrocortisone for infants and young children and fluticasone or mometasone for older children can be given for initial 3–5 days to accelerate resolution of papular urticaria lesions. If lesions are infected, a combination of fluticasone and mupirocin can be used. The author prefers to give lacto-calamine on both the legs to prevent direct contact of smaller insects like ants, etc. on the childrens' skin. Use of continuous long-term cetirizine (for 6 months to 1 year) helps to prevent recurrences in most of the children.

"Appear weak when you are strong, and strong when you are weak."—Sun Tzu

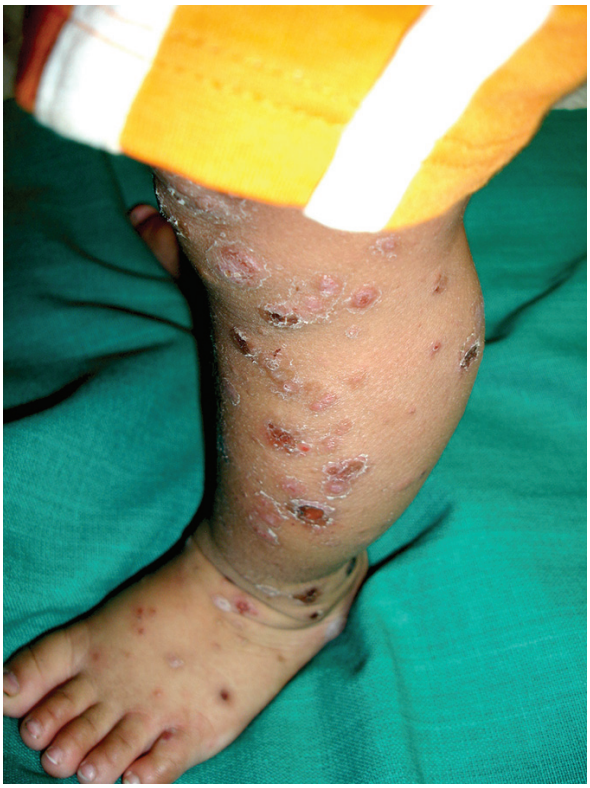

Fig. 7.9C Close-up of PU

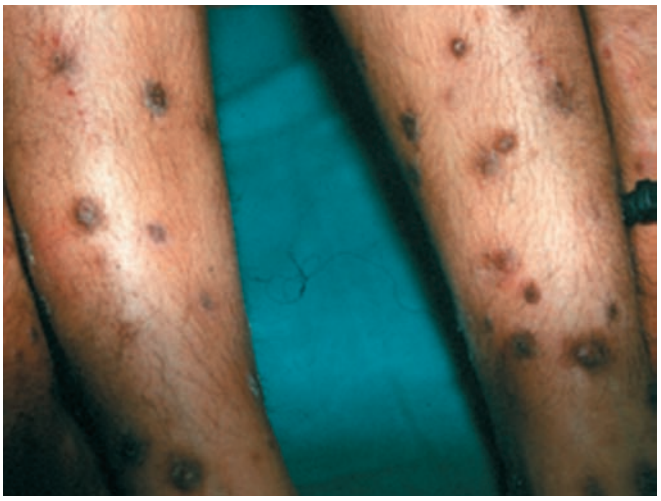

Fig. 7.10 Hyperpigmented, indurated, excoriated papules and plaques of nodular prurigo over extremities

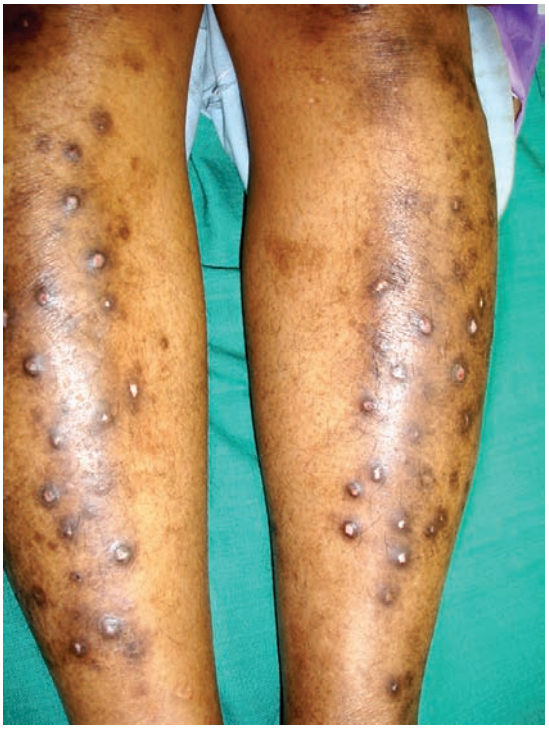

Fig. 7.10A Excoriated papules with hyperpigmentations in prurigo

NODULAR PRURIGO (Figs 7.10 to 7.10C)

This is characterized by chronic intensely itchy nodules which can occur at any age between 20–60 years. In children, it is more common in atopics. The individual lesion is a hard globular nodule 1–3 cm in diameter, with a raised warty surface. The lesions are usually pigmented, grouped, numerous and symmetrical, initially on the distal parts of the limbs and are worse on the extensor surfaces. The trunk, face and even the palms can be affected. Crust and scale may cover recently excoriated lesions. The patient is troubled by crises of pruritus of intense severity. The nodules may remain pruritic indefinitely although some may regress spontaneously to leave scars. The disease runs very protracted course.

Treatment

Symptomatic relief of pruritus is very important and sedating antihistamines at night is required for long-term control of the disease. Topical corticosteroids are better applied on early erythematous lesions to control inflammation for 2–3 weeks. Intralesional triamcinolone acetonide helps to reduce nodularity of chronic lesions. It may be combined with cryosurgery. Topical capsaicin, UVA radiation and oral thalidomide are other treatment modalities. Associated xerosis is controlled by application of emollients.

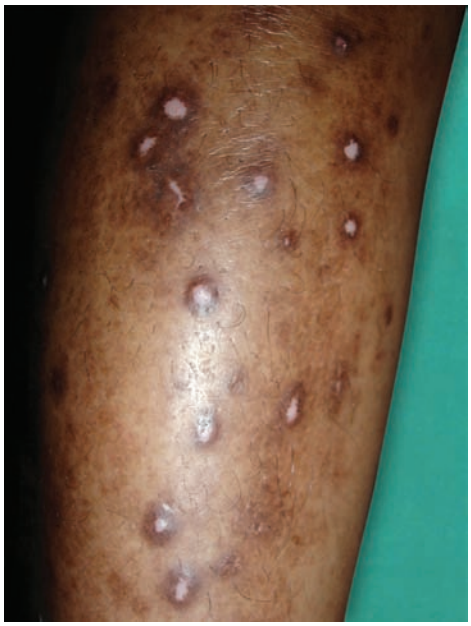

Fig. 7.10B Intensely pruritic lesions of prurigo

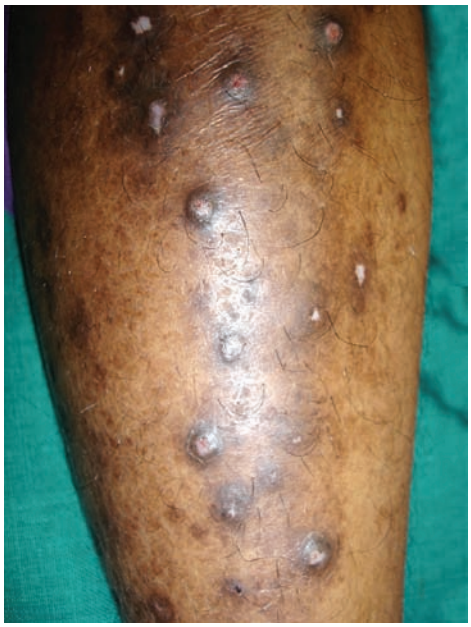

Fig. 7.10C Close-up of prurigo

ATOPIC DERMATITIS (Figs 7.11 to 7.30D)

Atopic dermatitis (AD) is a chronic, inflammatory skin condition characterized by itchy papular (vesicles in infants)

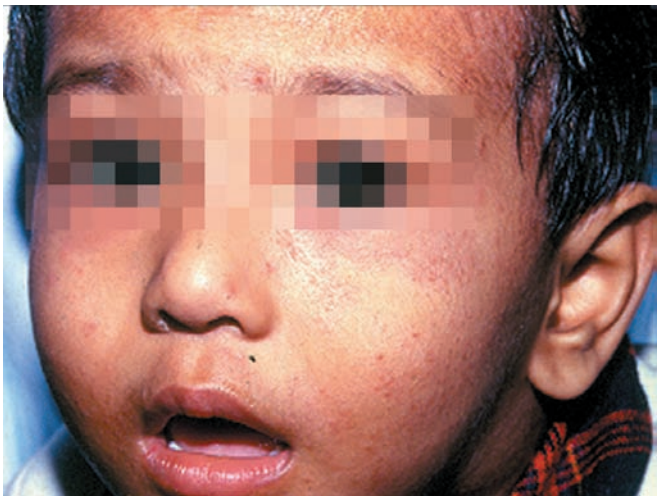

Fig. 7.11 Xerosis over the face

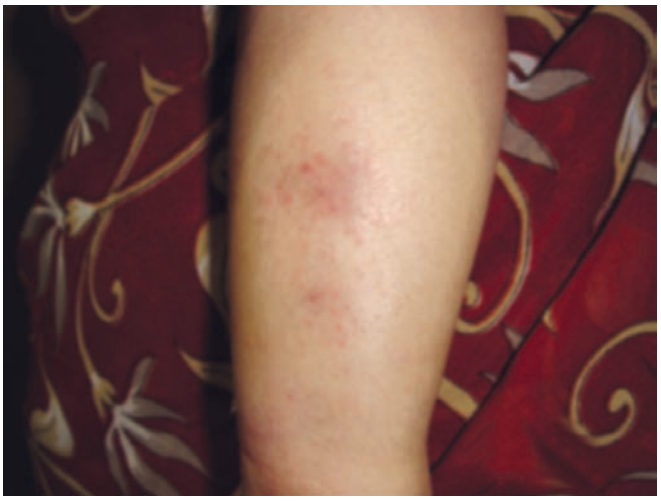

Fig. 7.12 Nummular eczema over leg

rash in a flexural distribution, which becomes excoriated and lichenified with time.

Clinical Features

This itchy chronic and fluctuating condition usually starts between 2 to 6 months and has a slight male predilection. The symptoms are:

- Itching
- Macular erythema, papules/papulovesicles
- Eczematous areas with crusting
- Lichenification and excoriation
- Xerosis (Figures 7.14 to 7.16)
- Secondary infection.

"The one serious conviction that a man should have is that nothing is to be taken too seriously."—Samuel Butler

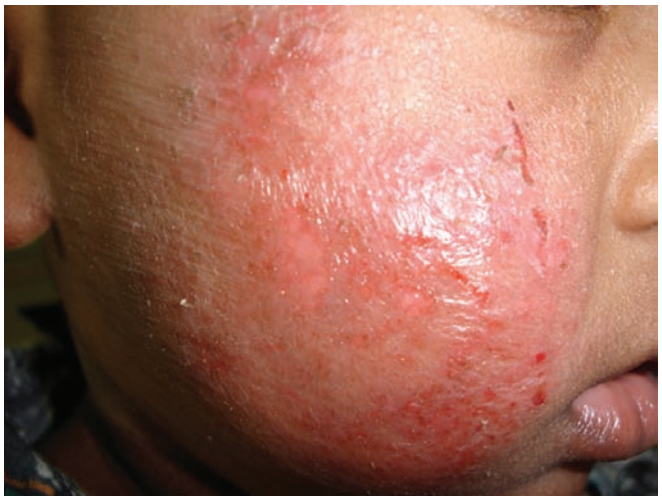

Fig. 7.12A Acute eczema in AD

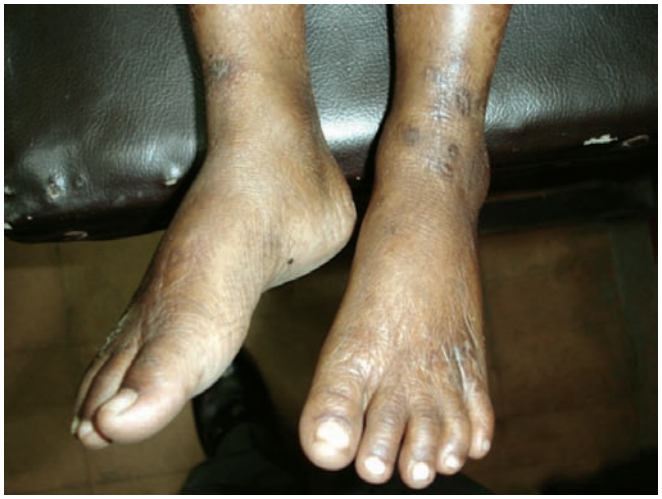

Fig. 7.13 Subacute eczema over both the legs

INFANTILE PHASE (Figs 7.31 to 7.31B)

Most frequently starts on face with relative sparing of napkin area. When the child begins to crawl, the exposed surfaces become involved with erythema, and intensely itchy papules (discrete/confluent) which may become exudative and crusted as a result of rubbing. The disease runs a chronic course varying with teething, respiratory infections, emotional upsets and climatic changes.

CHILDHOOD PHASE (Figs 7.32 to 7.32C)

From 1.5–2 years, areas commonly involved are elbow and knee flexures, sides of the neck, wrists and ankles. Sides of neck may show striking reticulate pigmentation (Fig. 7.29). The erythematous and edematous papules tend to lichenify. However in some patients, even after prolonged rubbing, lichenification does not occur and are difficult to treat.

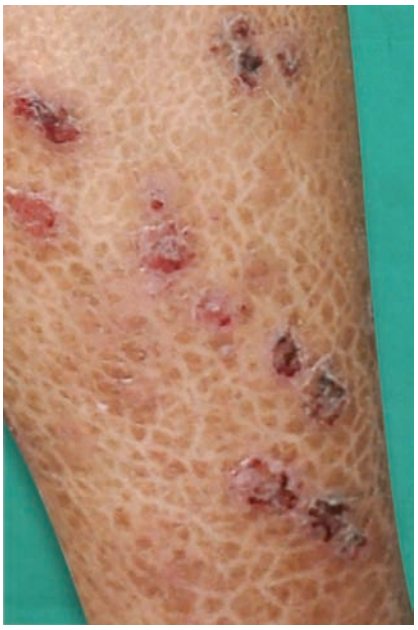

Fig. 7.13A Subacute eczema

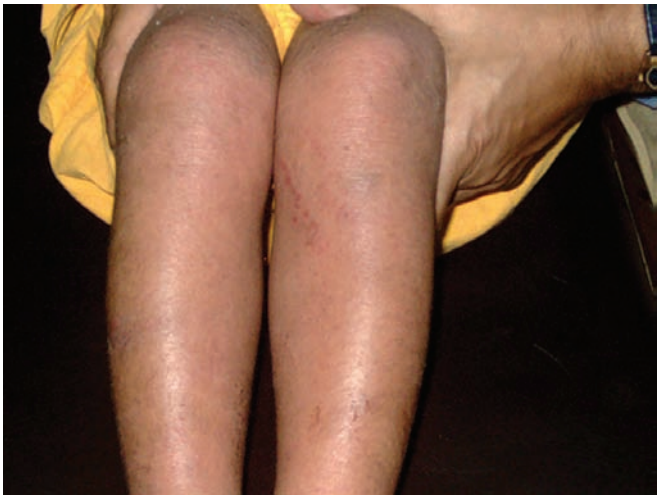

Fig. 7.14 Severe xerosis in a case of atopic dermatitis

Infected Lesions of AD

Commonly seen over body folds where *S. aureus* colonization is high (7.33 to 7.33 B).

ADULT PHASE (Fig. 7.34)

Picture similar to that in childhood with lichenification of the flexures and hands.

Atopic Hand Eczema

Patchy vesicular and lichenified hand eczema with coarsening and pitting of nails is also seen in AD children.

Associated Disorders

- Asthma and allergic rhinitis occur in 30 to 50 percent of cases of AD and their onset is later than that of eczema.
- Xerosis is a common problem in AD patients.
- Sometimes infantile seborrheic dermatitis may turn to typical AD.
- There is greater risk of developing contact dermatitis than non-atopics.
- Moist or fissured eczema around the mouth is common in children with AD.
- Drug reactions of the anaphylactic type are more common in atopic persons.
- Food allergy is frequent in patients of AD.
- Statistically significant association has been found between alopecia areata and atopy.
- Urticaria with allergic basis more common in atopics.

PITYRIASIS ALBA (Figs 7.15 to 7.15B)

This is a type of non-specific dermatitis, of unknown origin which characteristically produces erythematous scaly patches which subside to leave areas of hypopigmentation. Peak age of onset is between 3 and 16 years with equal prevalence in both sexes. The individual lesion is a rounded, oval or irregular plaque which is red, pink or skin colored and has fine lamellar or branny scaling. Initially, erythema is conspicuous but by the time the physician sees the patient, there is fine scaling and hypopigmentation which induces the patient to seek advice. There are usually several patches which range from 0.5 to 2 cm in diameter. In children, the lesions are often confined to the face, and are most common around the mouth, chin and cheeks. The course is variable. Most cases persist for some months and some may still show leukoderma for a year or more after all scaling subside. Recurrent crops of new lesions may develop at intervals. The average duration of the facial lesions in children is a year or more. The conspicuous leukoderma may lead to a misdiagnosis of vitiligo. In older children and adults, the lesions on the trunk, during the early erythematous phase may be mistaken for psoriasis, but the distribution, the sparing of scalp, elbows and knees, and the lack of psoriatic scale should exclude the diagnosis.

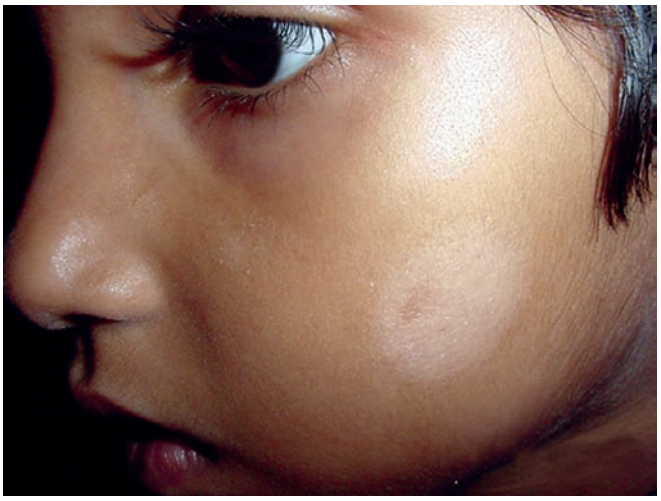

Fig. 7.15 Hypopigmented and scaly patch of Pityriasis alba over cheek

Fig. 7.15A Pityriasis alba over face

KERATOSIS PILARIS (Figs 7.16 and 7.16A)

It is a common autosomal dominant disorder comprising keratinous plugs in the follicular orifices with varying degrees of perifollicular erythema. In its isolated form, it appears in childhood and reaches its peak in adolescence. Small gray-white plugs of keratin obstruct the mouths of the follicles entrapping the body hair. The sites of predilection are the extensor surfaces of the upper arms, thighs and the buttocks. Uneven involvement of a given area is usual with some follicles completely spared, while adjacent ones one grossly

Fig. 7.15B Same patient, different view

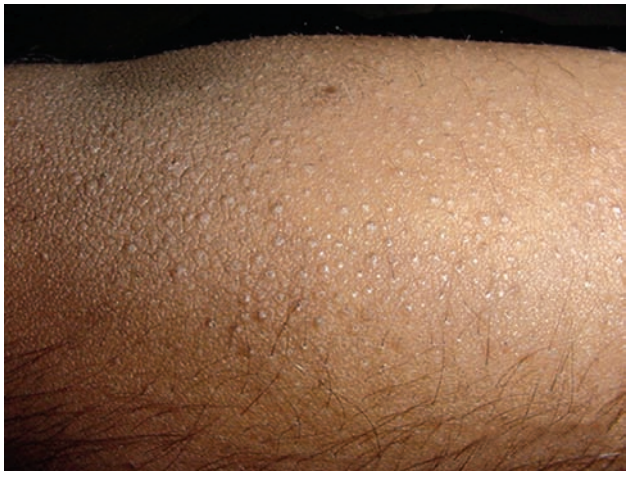

Fig. 7.16 Follicular keratotic papules of keratosis pilaris

plugged. Perifollicular erythema is often present. When redness is marked, the term keratosis rubra pilaris is used. Often the lesions improve during summer.

DENNIE-MORGAN FOLDS (Figs 7.17 and 7.17A)

Dennie-Morgan infraorbital fold has been included in most descriptions of atopic eczema. This sign is thought to be present when there is a definite double fold or if one or more creases, outlining skinfolds and starting at the inner canthus,

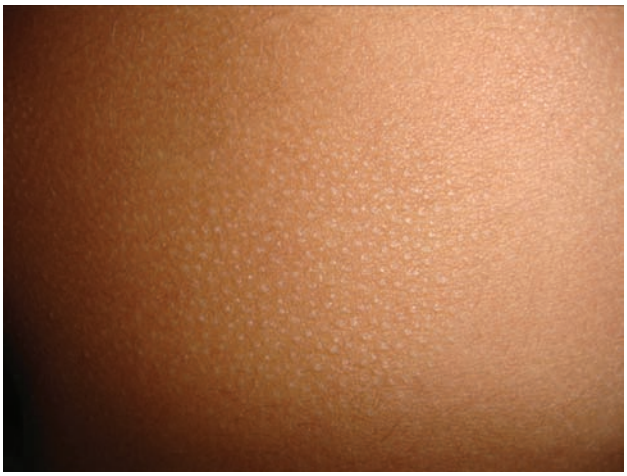

Fig. 7.16A Keratosis pilaris

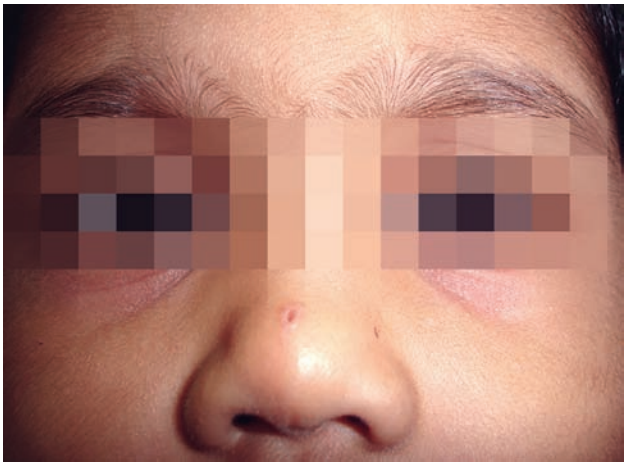

Fig. 7.17 Dennie-Morgan infraorbital folds in a child with atopic dermatitis

extend laterally at least beyond an imaginary perpendicular line though the pupil. The percentage of atopic eczema patients exhibiting infraorbital folds was found to be 50- 60 percent in most studies.

GEOGRAPHIC TONGUE (BENIGN MIGRATORY GLOSSITIS) (Figs 7.18A and 7.18B)

Geographical tongue may be asymptomatic or may cause a sore tongue. Patients of any age may be affected. Clinically, it is characterized by map-like red areas with increased thickness of intervening filliform papillae. Alternatively, there are rounded, sometimes scalloped, reddish areas with a white margin. Patterns may change from day-to-day and even

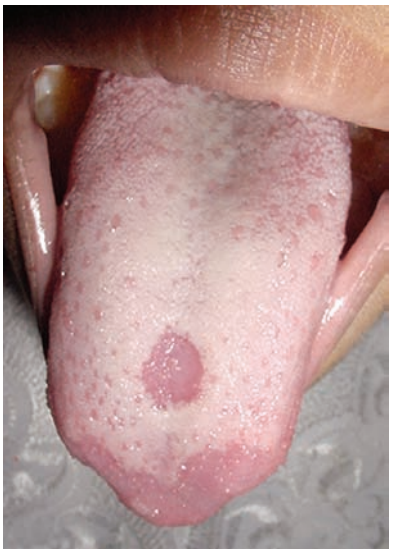

Fig. 7.18A A Geographic tongue

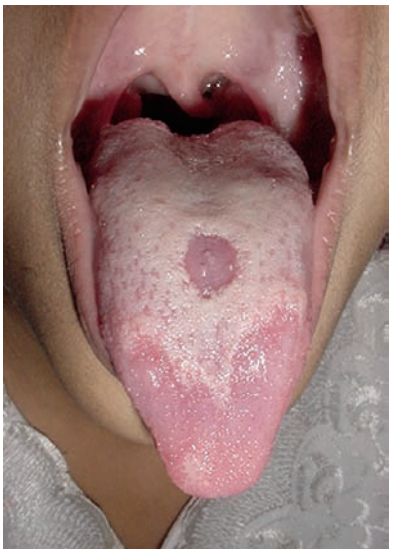

Fig. 7.18B Close-up of geographic tongue

within a few hours. Rarely, labial or palatal mucosa may be affected. There are no complications and the only differential diagnoses are from psoriasis and larva migrans. Clinical examination usually suffices to differentiate the condition from lichen planus, candidiasis or deficiency glossitis.

JUVENILE PLANTAR DERMATITIS (Figs 7.19 and 7.20)

This condition is characterized by dry, fissured dermatitis of the plantar surface of the forefoot. It occurs almost exclusively

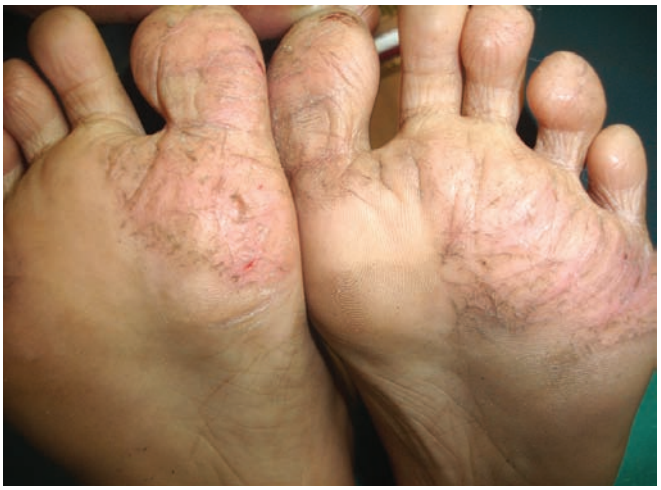

Fig. 7.19 Bilateral symmetrical lesions of JPD

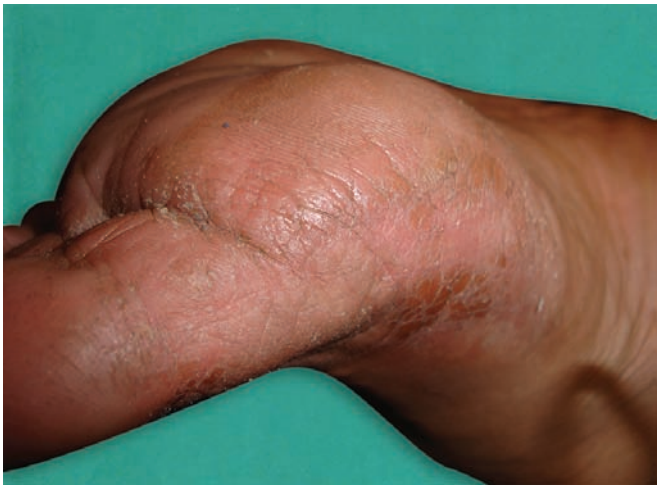

Fig. 7.20 Classical lesion of JPD in a young boy

in children aged 3–14 years. It is thought that changes in the composition of children's socks and shoes in the last 10 years or so may be responsible for the emergence of this disease. Atopy is thought to have an association with this condition. Many children with this condition have an increased personal or family history of atopy. There is a slight preponderance of male patients. The presenting features are redness and pain on the plantar surface of the forefoot, which assumes a glazed and cracked appearance. The condition is most severe on the ball of the foot and toe pads and tends to spare the nonweight-bearing instep. The toe clefts are normal and this helps to distinguish the condition from *Tinea pedis*. The lesions are strikingly symmetrical. Juvenile plantar dermatoses is a clinical diagnosis although skin scrapings to exclude fungus and patch tests to exclude footwear allergy may be advisable, if the diagnosis is doubtful.

POMPHOLYX (Figs 7.21 and 7.21A)

Pompholyx is a form of eczema of the palms and soles, in which edema fluid accumulates to form visible vesicle or bullae. Onset before 10 years is unusual. It is characterized by the sudden onset of crops of clear vesicles, which appear deeply seated and sago like. There is no erythema, but a sensation of heat and prickling of the palms may precede the attacks. Vesicles may become confluent and present as large bullae, especially on the feet. Itching may be severe, preceding the eruption of vesicles. The attack subsides spontaneously, and resolution with desquamation occurs in 2–3 weeks in most cases, but recurrent attacks may cause a wave-like continuation of symptoms with lesions occurring symmetrically on the palms and soles. It may be confused with contact dermatitis where the lesions are usually unilateral and asymmetrical. Dermatophytosis which presents as localized and asymmetrical area of scaling and vesiculation of the palm or sole can be confirmed by scrapings for fungus.

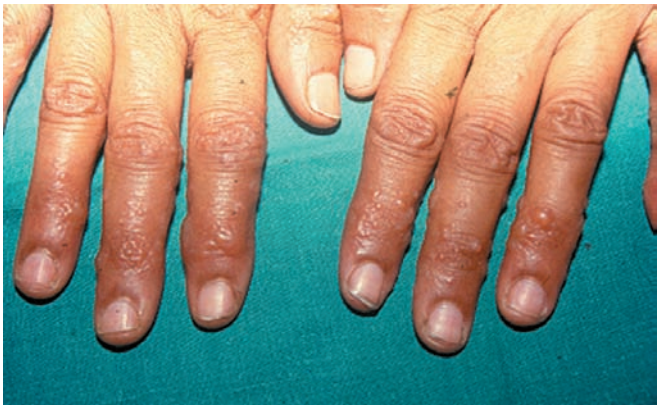

Fig. 7.21 Pompholyx lesions over fingers

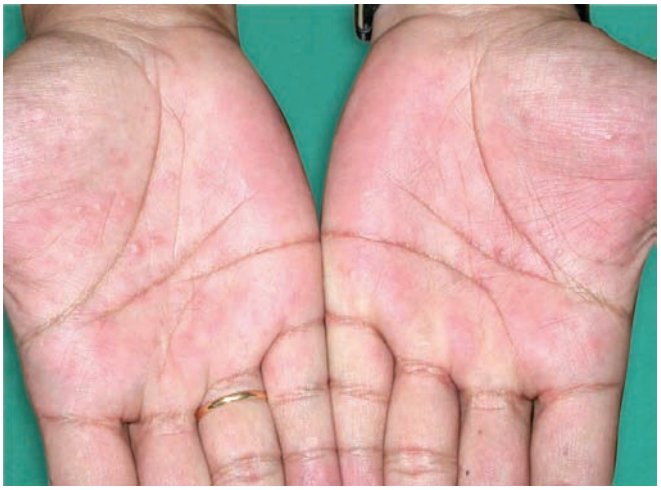

Fig. 7.21A Pompholyx lesions over palms

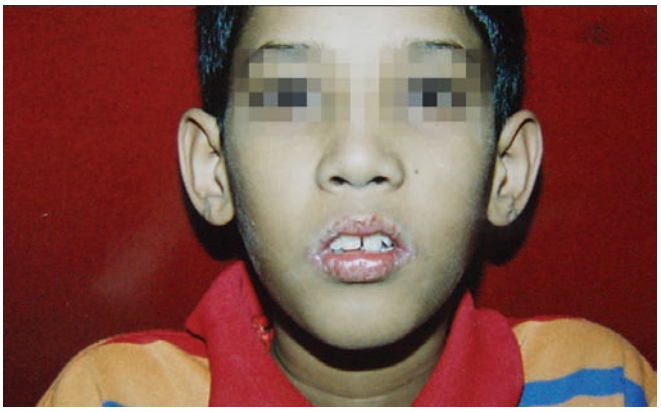

Fig. 7.22 Atopic cheilitis

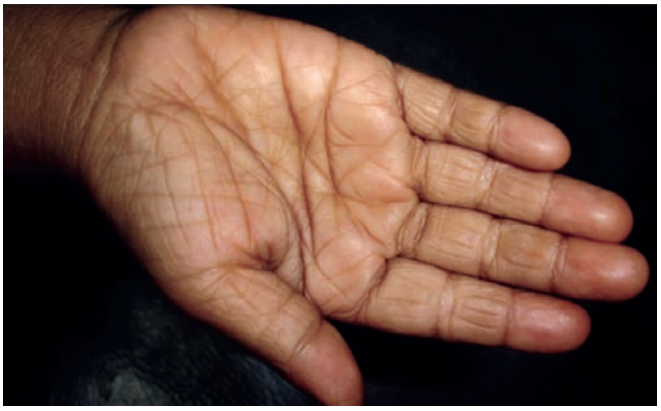

Fig. 7.23 Hyperlinear palms in atopics

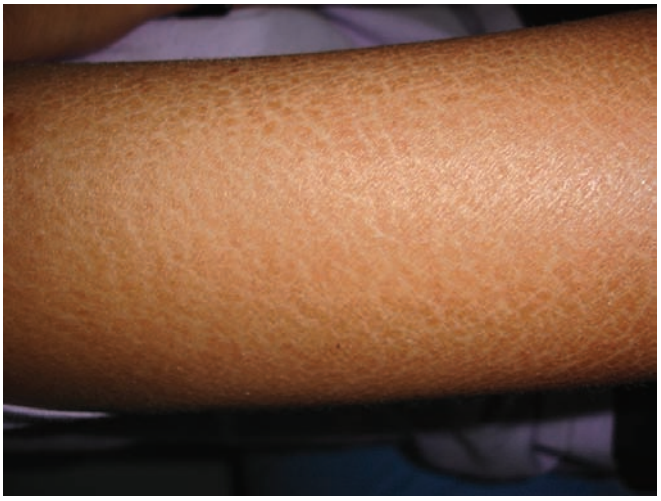

Fig. 7.24 Fine fixed scales of ichthyosis vulgaris

"No power on earth can stop an idea whose time has come."—Victor Hugo

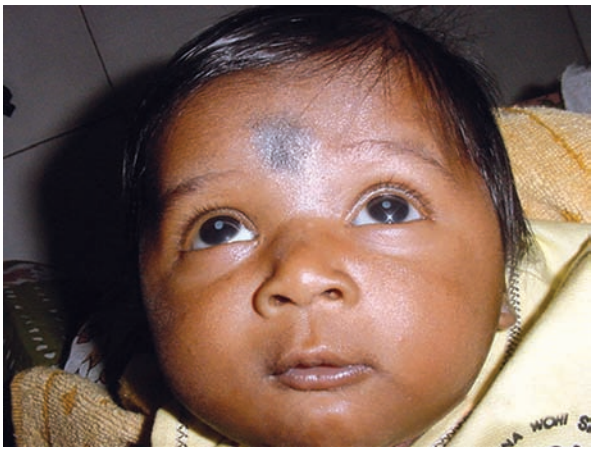

Fig. 7.25 Atopic cataract

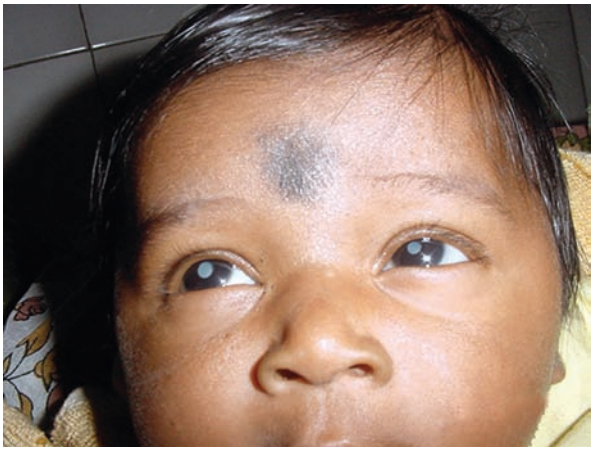

Fig. 7.26 Close-up of atopic cataract

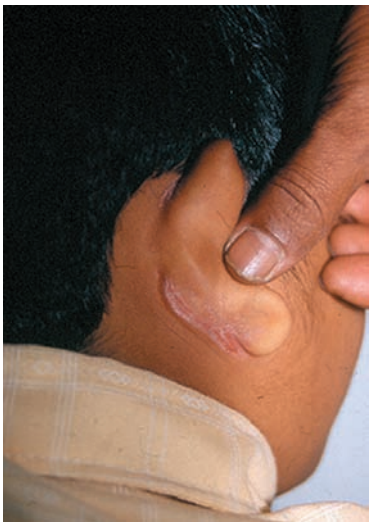

Fig. 7.27 Retroauricular fissuring in AD

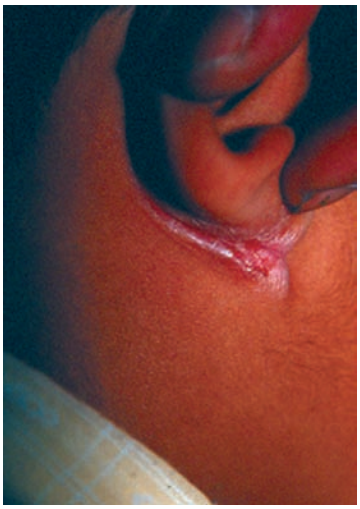

Fig. 7.28 Same boy having infra-auricular fissuring at a later date

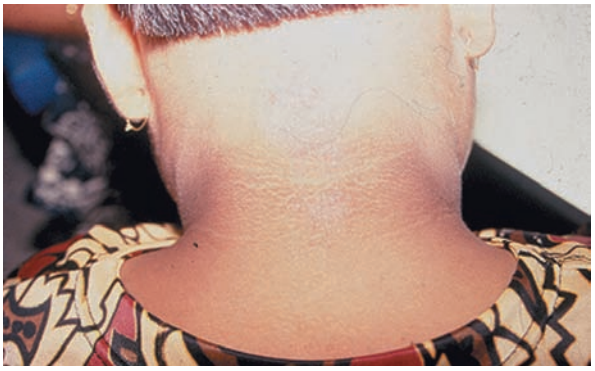

Fig. 7.29 Fine reticulate pigmentation over neck in a girl with AD (atopic dirty neck)

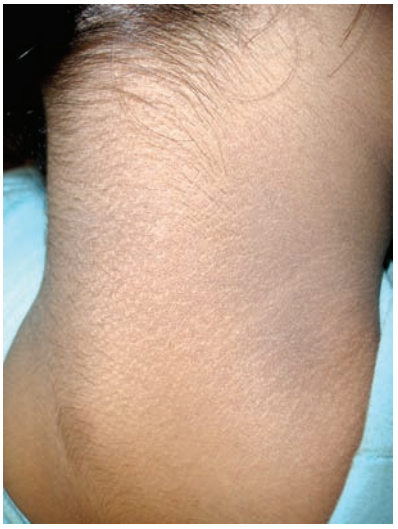

Fig. 7.29A 'Dirty neck' of atopic child

"Comedy is acting out optimism."—Robin Williams

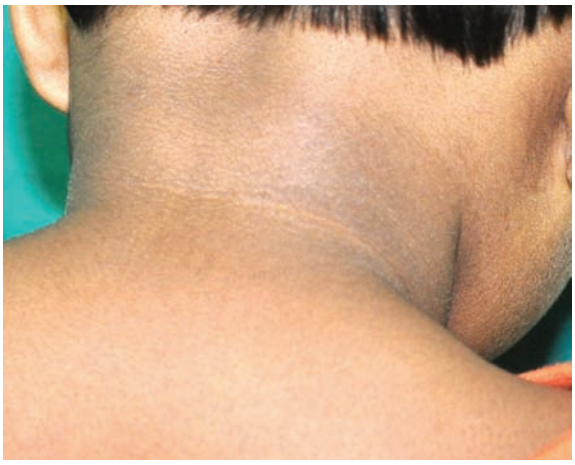

Fig. 7.29B Atopic 'dirty neck' or melanosis of neck

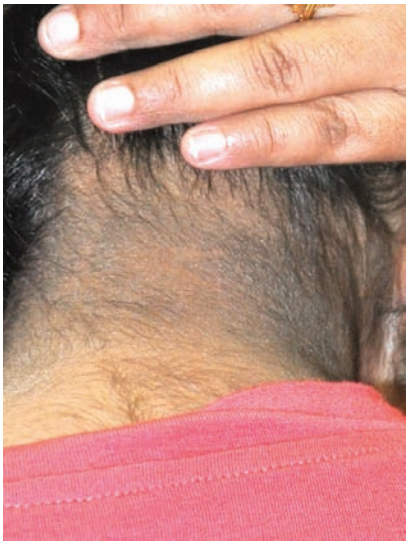

Fig. 7.29C Hyperpigmentation of neck in atopic dermatitis

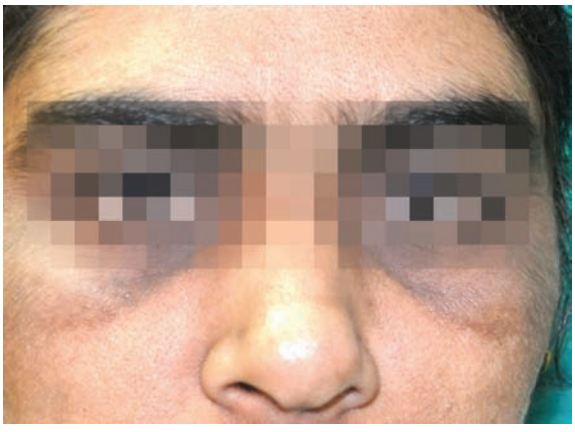

Fig. 7.29D Periorbital melanosis in atopic child

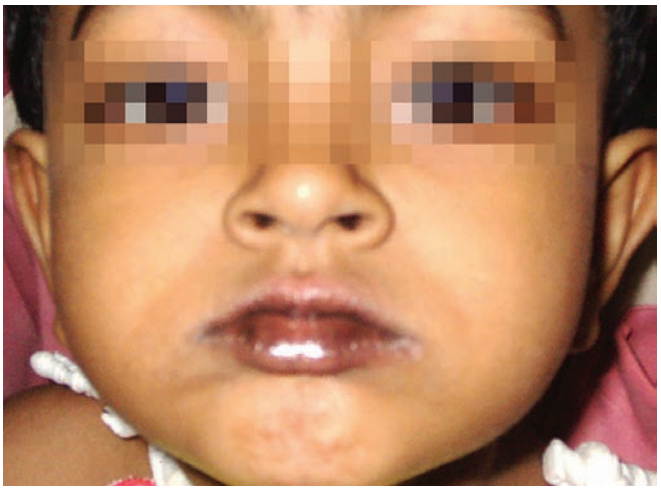

Fig. 7.29E Atopic cheilitis

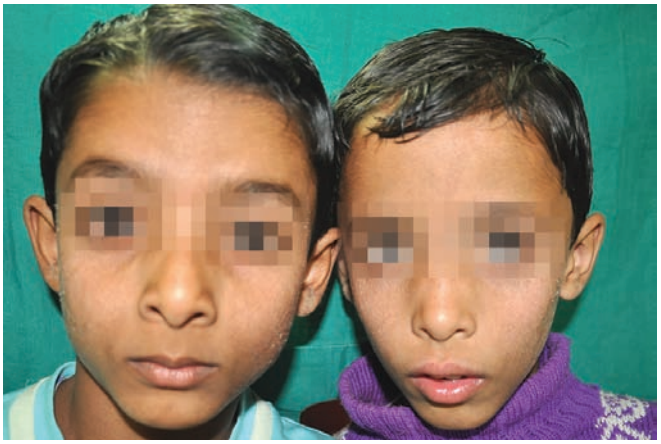

Fig. 7.29F Atopic dermatitis twins

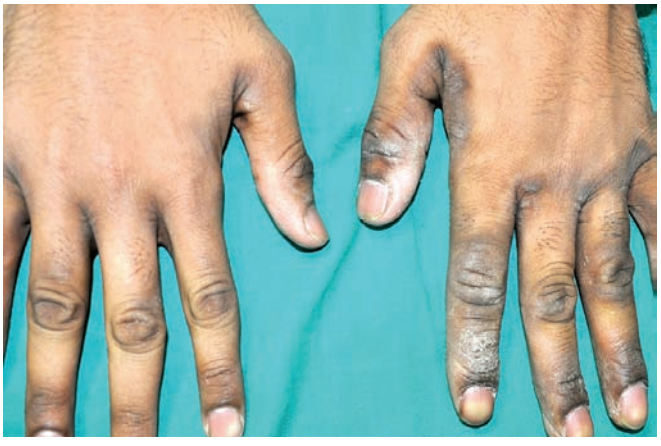

Fig. 7.29G Knuckle pigmentation

"The price of greatness is responsibility."—Winston Churchill

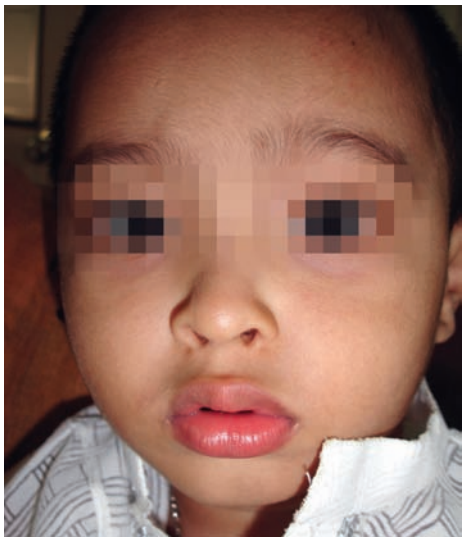

Fig. 7.30 Atopic cheilitis

Fig. 7.30A Atopic cheilitis (close-up)

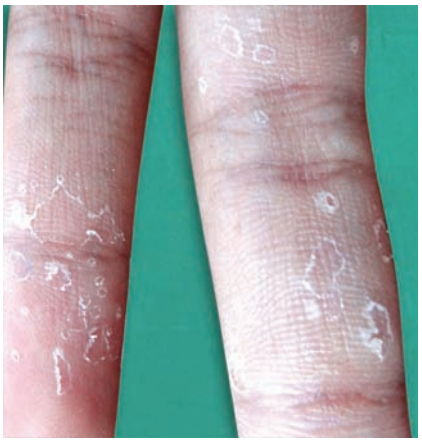

Fig. 7.30B Keratolysis exfoliativa (KE)

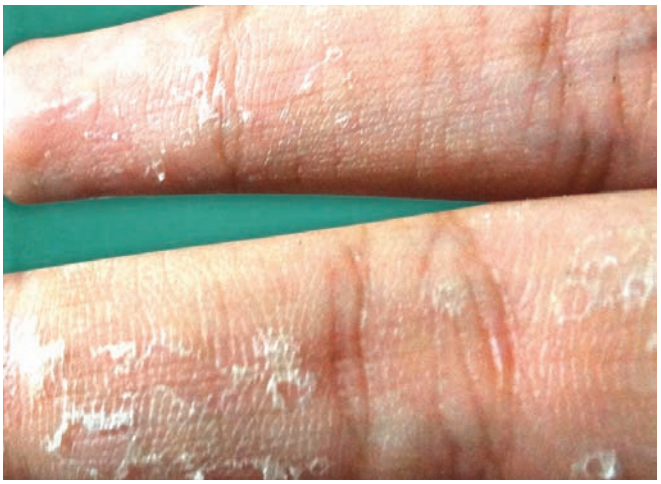

Fig. 7.30C KE over fingers

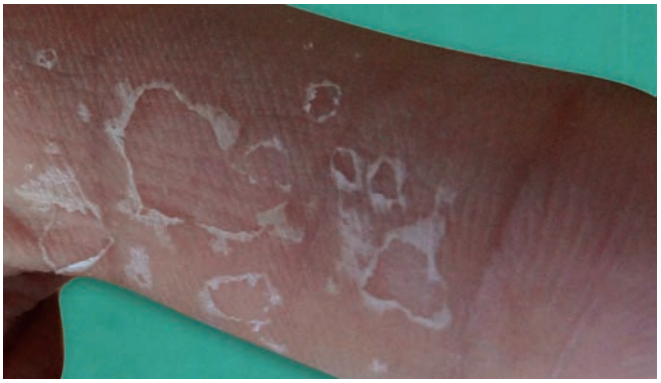

Fig. 7.30D Keratolysis exfoliativa, close-up view

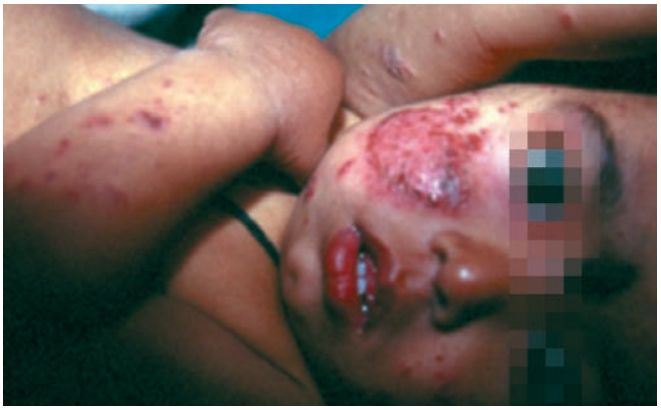

Fig. 7.31 Acute eczematous lesions of AD over face and extensors in an infant. Note the gesture of scratching suggesting the degree of pruritus

"Fear Not. What is not real, never was and never will be. What is real, always was and cannot be destroyed."—Bhagavad Gita

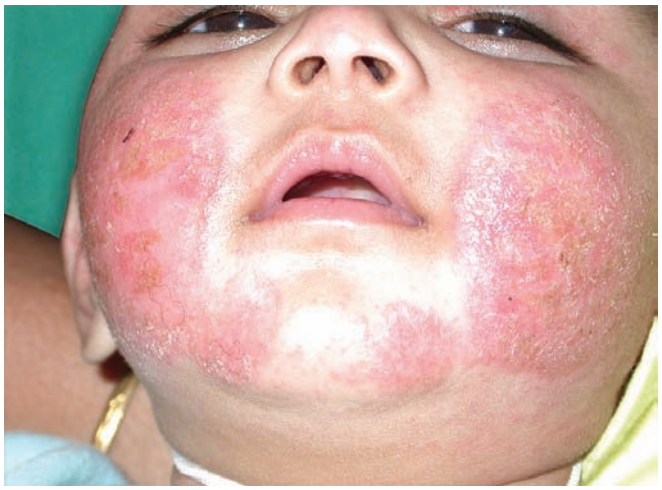

Fig. 7.31A Acute lesions of AD over face

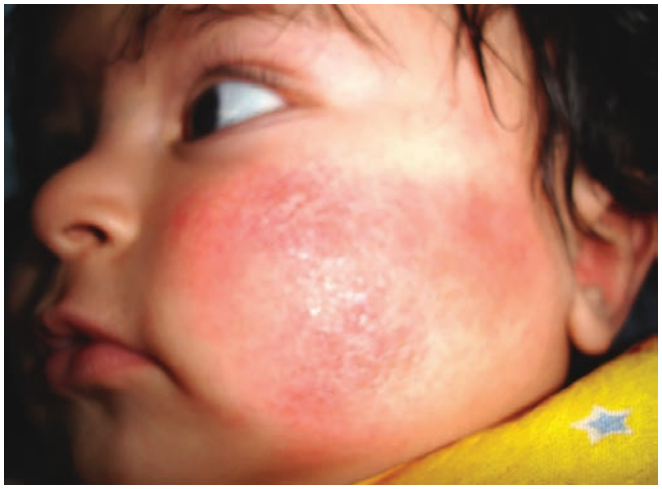

Fig. 7.31B Classical lesions of AD over face

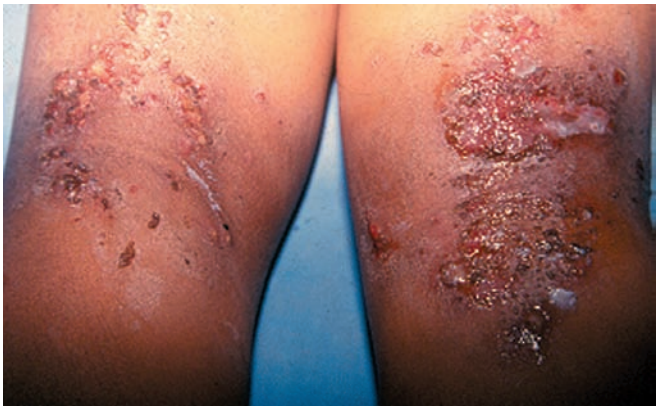

Fig. 7.32 Childhood AD with localization of the lesions over popliteal fossae.Note gross secondary infection over the lesions

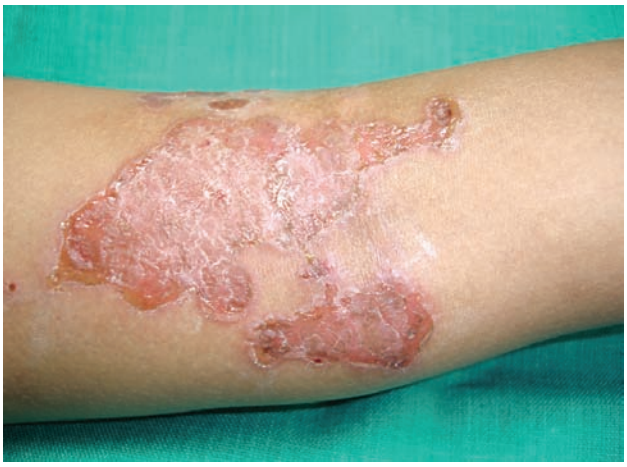

Fig. 7.32A Subacute eczema of AD

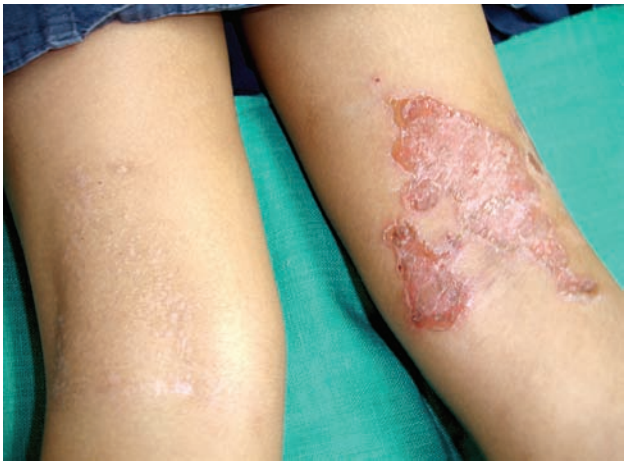

Fig. 7.32B Subacute eczema of AD over popliteal fossae

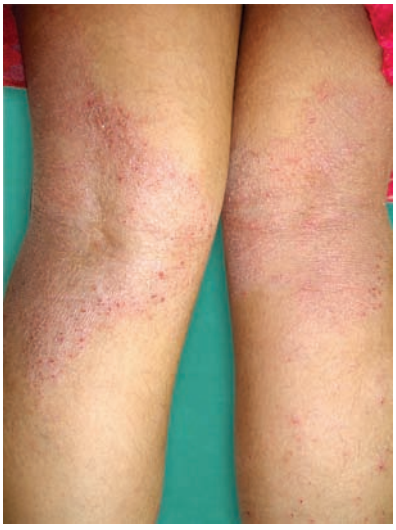

Fig. 7.32C Flexural eczema of childhood AD

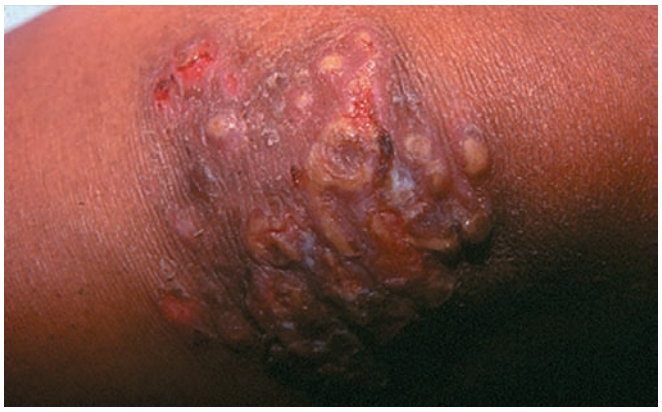

Fig. 7.33 Secondary infection of AD lesion (close-up)

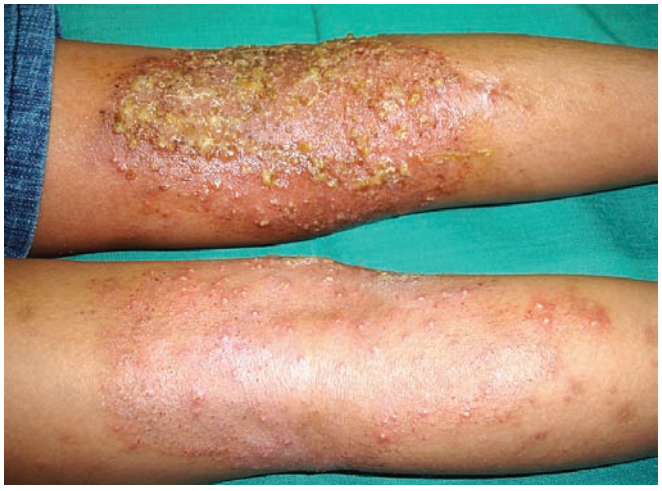

Fig. 7.33A Seconday infection in flexural eczema

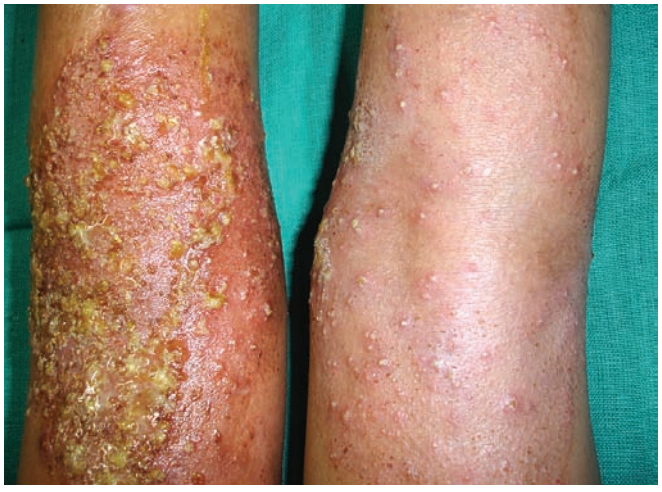

Fig. 7.33B Gross secondary infection of eczema in AD

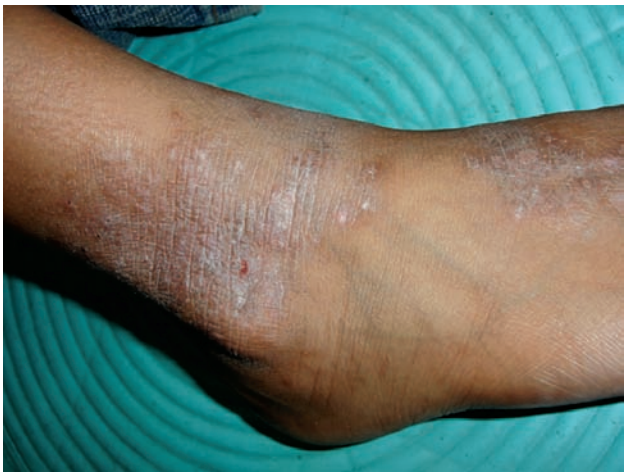

Fig. 7.34 Chronic lichenified eczema of atopic dermatitis

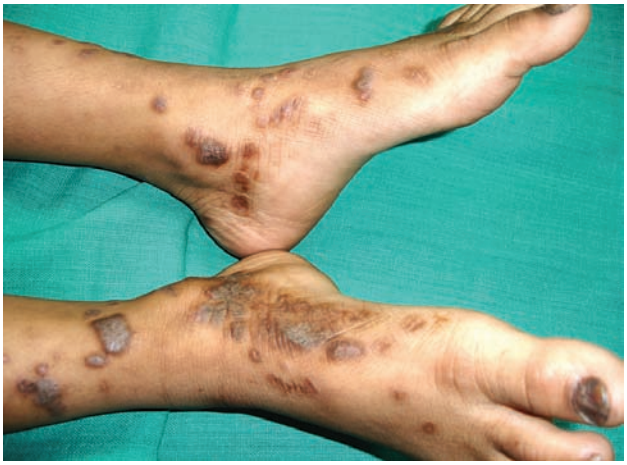

Fig. 7.34A Chronic lichenified eczema of AD

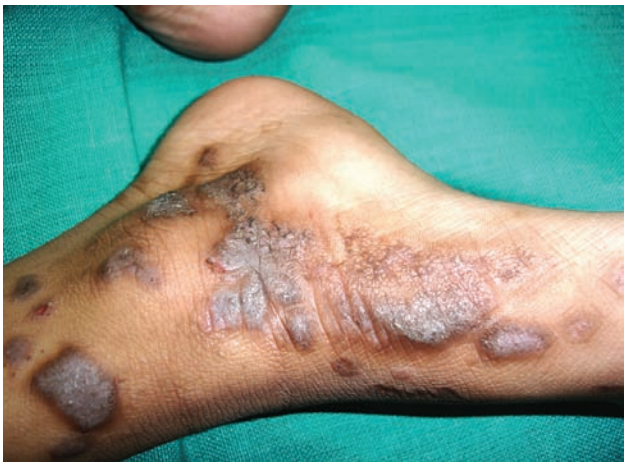

Fig. 7.34B Close-up

"Take care of your thoughts when you are alone, and take care of your words when you are with people."—Unknown

SEVERE ATOPIC DERMATITIS (Figs 7.35A to 7.35E)

In the west, a good number of children suffer from severe atopic dermatitis (AD). In India, however, the severity of the disease is much less in majority of the children suffering from AD. The various probable reasons put forth are, a different kind of season and environment in our country, practice of prolonged breastfeeding, different dietary habits of mothers during pregnancy and lactation, different dietary habits of the children and finally different genetic make-up of our population.

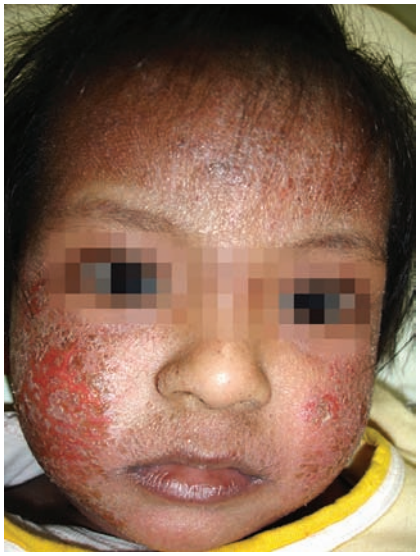

Fig. 7.35A Severe AD, note facial lesions

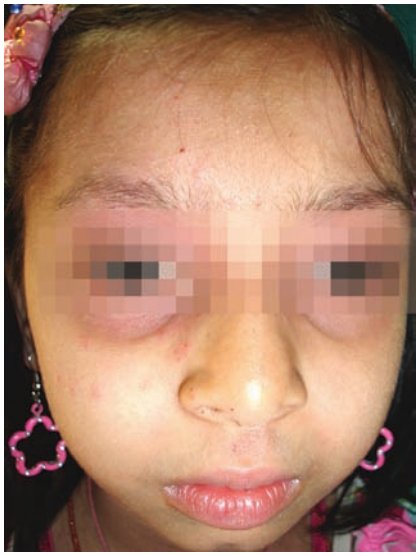

Fig. 7.35B Severe AD, note periorbital lesions

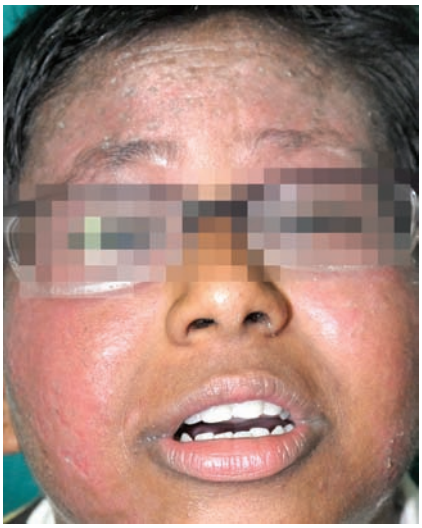

Fig. 7.35C Severe AD with excruciating pruritus

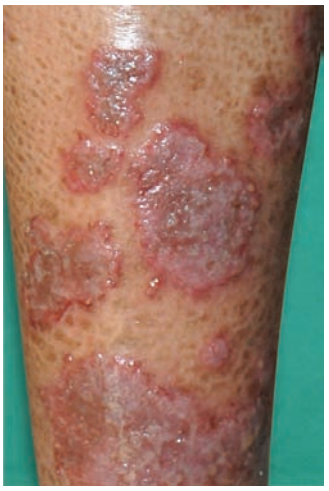

Fig. 7.35D Severe AD, note acute oozy lesions

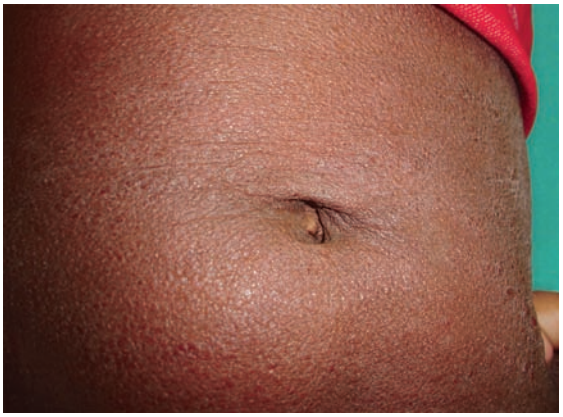

Fig. 7.35E Severe and extensive AD

"Time discovers truth."—Lucius Annaeus Seneca

POSTERIOR THIGH DERMATITIS (Figs 7.35F to H)

A recently encountered entity seen in school-going children, Toilet seat and car leather cover causing allergic sensitization and thereby produce dermatitis over back of the thighs in girls and boys both.

Treatment

Management of AD has several facets. The treatment is basically aimed at effective control of the disease and provides improved quality of life (QOL) to the children with AD. Counseling of the parents goes a long way in the control of the disease.

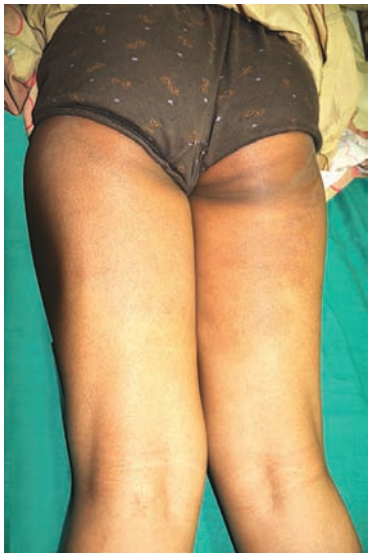

Fig. 7.35F Posterior thigh dermatitis

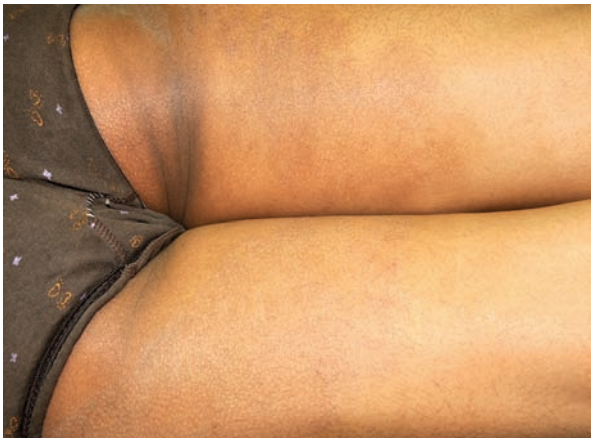

Fig. 7.35G Close-up

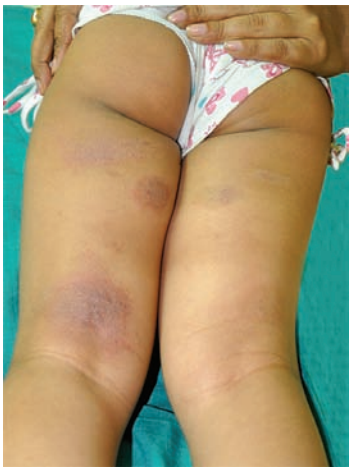

Fig. 7.35H Posterior thigh dermatitis in a preschool girl

Cleaning of the skin is very important and in this regard regular bathing has no alternative. Either a soft moisturising soap or a synthetic nonsoap nondetergent cleanser should be used. There is no role of antiseptic bathing and it should better be avoided. Maintaining proper temperature and humidity of the bedroom, not touching plants, avoiding pets, avoiding dusty atmosphere and contact with wool, wearing cotton clothing, avoiding constant touching of the skin by metals, e.g. rings, bengal or amulet makes life more comfortable for the children.

Application of topical steroid and emollient within 3 minutes of bathing is helpful. Topical steroids should be applied over the eczematous patches and emollient over the dry patches of skin. The strength and mode of application of topical steroid depends upon the severity, site and age of the patients. In infants, a less potent steroid is chosen as well as over the sites like eyelids, face, axillae and groins. Clobetasone and hydrocortisone are very mild steroids. Fluticasone is a moderately potent steroid approved by US FDA in infants over 3 months of age. It can be safely applied once a day for 2–3 weeks, then on alternate days for 2–3 weeks and then the frequency of application can be furthers tapered. In case of infected lesions or lesions over finger or toe web-spaces, anterior nares, perianal areas, retroauricular folds, where *Staph. aureus* counts are usually high, a combination of fluticasone with mupirocin is recommended. Mometasone is another moderately potent topical steroid used in children.

Recently, topical tacrolimus (FK-506) has been used in two different strengths (0.03%) and (0.1%) ointment to treat AD. However, as of now, it is considered to be a supplement not substitute of topical glucocorticoids.

Oral medications are given when lesions are extensive. H_1-receptor antihistamines are basically used for their sedative effects. Promethazine or trimeprazine given one hour before bedtime from 3 months onwards can be useful. However, they can cause drowsiness and lack of concentration in the

next morning. They can be used for 10-14 days as prolonged use can cause tachyphylaxis. Hydroxyzine, clemastine, chlorpheniranine can be used for children as a long-term antihistamine in children above 1 year of age. The author has been using it for this purpose in infants above 6 months age safely for the last one decade.

Oral antistaphycococcal antibiotics like cloxacillin, amoxicillin and cloxacillin combination or erythromycin are used when there is exudation and pustule formation. In patients with recurrent flares of AD associated with infection, long-term antibiotic treatment and measures to reduce staphylococcal colonization of nose and perineum should be taken by using mupirocin cream.

In sever cases of AD, hospitalization, changes in the diet and environment may be helpful. 'Wet-wrap technique' quite popular in the West, does not appear to be helpful in our topical hot and humid climate. To cut-down morbidity, short courses of oral corticosteroids are used. Oral cyclosporin is quite promising but a costly alternative. Fortunately in India, we usually come across a milder form of AD as compared to that in the West. Educating the parents about the disease and their counseling forms an integral part of management.

Atopic Dermatitis Like Eczemas

Some of the conditions which mimic AD and need to be identified are as follows:

Wiskott-Aldrich Syndrome

It is a X-linked recessive syndrome characterized by triad of chronic eczematous dermatitis resembling atopic dermatitis, recurrent infections and thrombocytopenia with small platelets. There is increased susceptibility to bacterial (pyoderma or otitis media) as well as viral and fungal Infections. Thrombocytopenia manifests as petechiae, epistaxis, bloody diarrhea and or hematemesis. There are elevated levels of IgA and IgE but normal levels of IgM and IgG. Death ensues from infection, bleeding, or lymphoma.

Hyperimmunoglobulinemia E Syndrome (HIES)

It is a primary immune deficiency syndrome. Autosomal-dominant form is most common, also called Job's syndrome. It is characterized by triad of eczema, recurrent skin and lung infections and high serum IgE. The disease begins within the first month of life. Initial lesions are folliculocentric papulopustular eruption involving the face, scalp, neck, axillae and diaper area. Cutaneous staphylococcal infections are common. The child later develops skeletal and dental abnormalities. Eczematous rash of HIES shares many clinical features with atopic dermatitis but they do not have allergic rhinitis, asthma or other cutaneous signs of atopy unlike individuals with atopic dermatitis.

Severe Combined Immunodeficiency

This is a disorder with deficient cell-mediated and humoral immunity. It presents with failure to thrive in early infancy, diarrhea and recurrent infections. Initial cutaneous eruptions may be seborrheic-like dermatitis or morbilliform eruptions. Severe eczematous dermatitis and erythroderma may develop with alopecia. Persistent mucocutaneous candidiasis is often present.

Phenylketonuria (PKU)

This is an autosomal recessive disorder of amino acid metabolism characterized by mental retardation, diffuse hypopigmentation, seizures, dermatitis, and photosensitivity. Early infantile eczema, indistinguishable from atopic dermatitis, may be one of the first signs of PKU. Edematous scleroderma of the extremities sparing the hands and feet, is also characteristic.

There are still some more which have been discussed separately, e.g. biotinidase deficiency, infantile seborrheic dermatitis, infectious seborrheic dermatitis, etc.

INFECTIOUS ECZEMATOID DERMATITIS (Figs 7.36 and 7.37A)

Treatment

It develops following secondary eczematization from a primary pyogenic infection. The purulent material discharged causes eczematization of the normal looking skin around. Eczematous lesions on the skin over the pinna in case of otitis externa and eczmatization around pyoderma lesions are classical examples.

Oral antistaphylococcal antibiotics, e.g. cloxacillin, combination of amoxicillin and clavulanic acid or erythromycin for 7–10 days form the mainstay of treatment. It is to be supplemented with application of a moderately potent steroid, e.g. fluticasone, mometasone, for 7–14 days. After oral antibiotic is stopped, one may use a combination of fluticasone and mupirocin for 7 days followed by fluticasone/mometasone only for another 7 days. Associated pruritus is treated with oral antihistamines. Cleaning of the local skin with lukewarm water and soap is to be done. Cleaning of the skin with antiseptics is not required, rather better avoided. In resistant cases (which is very rare), pus is to be sent for culture and sensitivity (C/S) testing and antibiotic is to be chosen according to the C/S report.

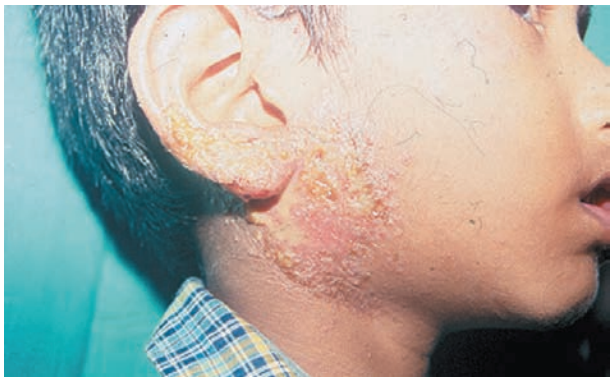

Fig. 7.36 Infectious eczematoid dermatitis (IED)

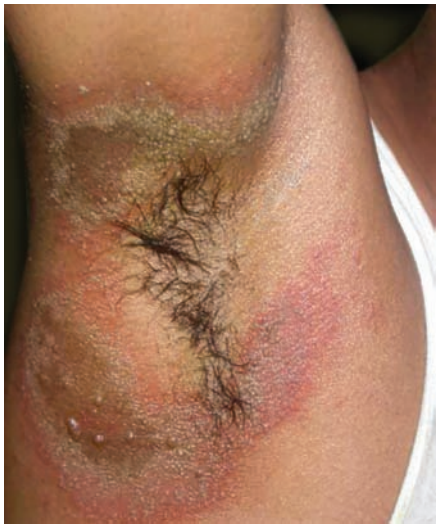

Fig. 7.37 Infectious eczematoid dermatitis over axilla, note pustular lesions and eczematization

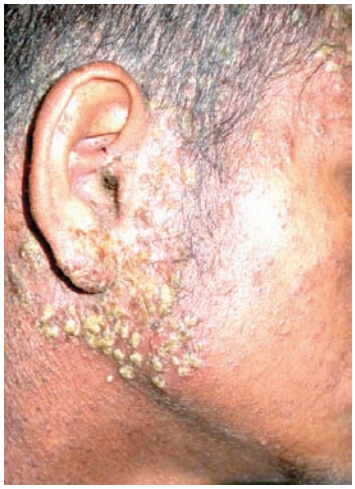

Fig. 7.37A IED—around ear lesions

MILIARIAL ECZEMA (Figs 7.38 to 7.40)

This entity has not been described in the standard text and literature published from the west. This is mostly seen in tropical climate like in India. During summer months due to increased sweating infants and children often develop extensive miliaria. This is more common in hospital admitted babies who mostly remain in bed. The miliaria on getting ruptured, undergo eczematization. The lesions are usually distributed over trunk. However, face and extremities may also be affected. With the involvement of face, it may closely simulate atopic dermatitis.

Treatment

The eczematized areas are to be treated with topical corticosteroids or steroid-antibiotic combinations. However, rest of the treatment of miliaria remains the same.

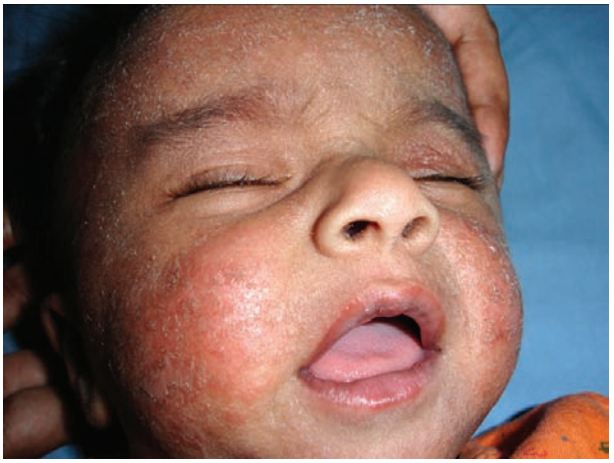

Fig. 7.38 Miliarial eczema over face in a 3-month-old baby

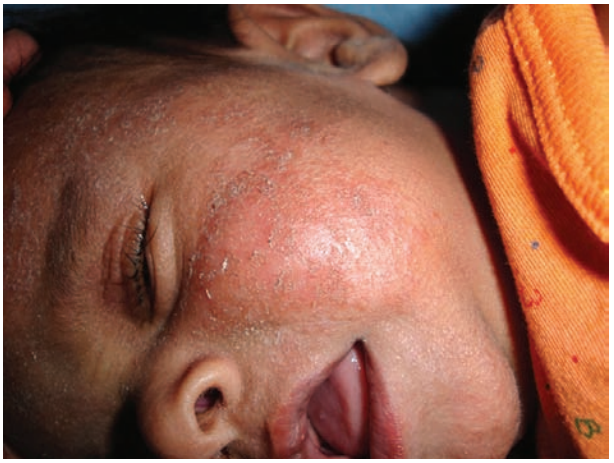

Fig. 7.39 Same baby, note erythema and scaling

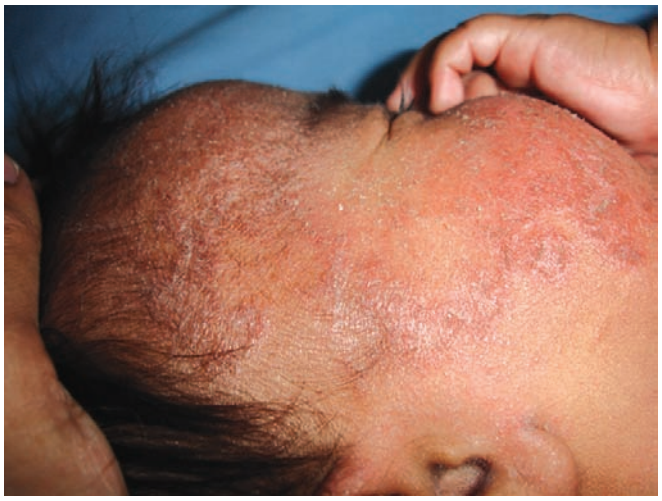

Fig. 7.40 Miliarial eczema, note clear demarcation of eczema and scaling at the margin

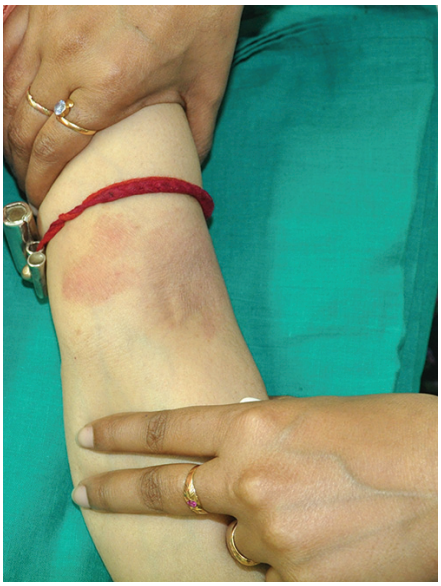

Fig. 7.41 Contact dermatitis to amulates

ALLERGIC CONTACT DERMATITIS (Figs 7.41 to 7.44)

The occurrence of allergic contact dermatitis (ACD) increases with age; prevalence rates of 13.3–24.5% have been reported, but the highest sensitization rate has been found in children aged 0–3 years. Unlike ICD, ACD develops in predisposed subjects and involves an immunological mechanism that requires an initial sensitization phase followed by the elicitation phase that causes the skin lesions. The sensitization phase begins when the hapten penetrates the skin, where it is first biochemically transformed by epidermal enzymatic processes and then conjugated with a carrier protein to become immunogenic. The antigen is thus captured by antigen presenting cells (APCs), particularly Langerhans cells, processed, bound to class II MHC molecules, and exposed on the cell surface. At this point, under the influx of the numerous cytokines produced by keratinocytes and APCs, the Langerhans cells migrate towards the locoregional lymph nodes where specific effector and memory T-lymphocytes are selected and clonally proliferated before leaving the lymph node, entering the bloodstream and reaching the skin.

The legs and feet, hands and face are the sites most frequently affected by pediatric ACD, which is mainly caused by metals, footwear, topical medications and cosmetics.

Cosmetics are the main causes of ACD in early infancy because mothers are using herbal or other products containing active ingredients. Irritant forms are more frequent than allergic forms, and are due to the application of topical agents that are too aggressive. Even so-called "natural" products such as propolis or tea tree oil can cause ACD.

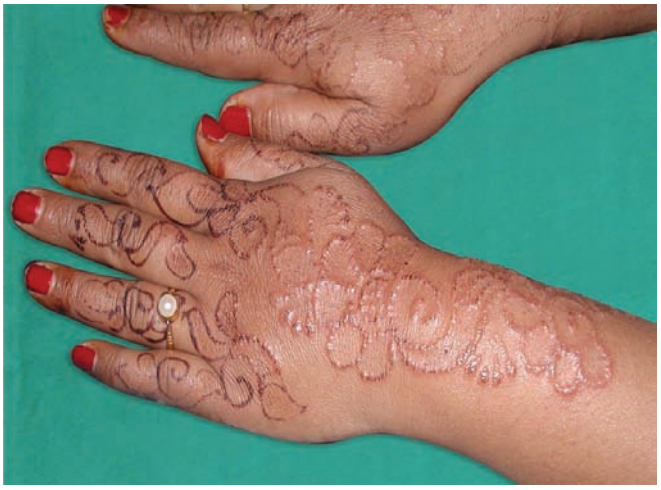

Fig. 7.42 CD to decorative tattoo

Contact with metals increases exponentially during school age and adolescence. Those responsible for the highest incidence of ACD during childhood are nickel, chrome and cobalt, which can also induce co-sensitization to other metals. Nickel sulphate is contained in multiple products including artificial jewellery, buttons of clothes, watch and even in chocolates.

Girls are also frequently sensitized to the perfumes contained in numerous products (often including those that are claimed to be "fragrance-free") in the form of essential oils or perfumed preservatives such as benzyl alcohol. As chrome

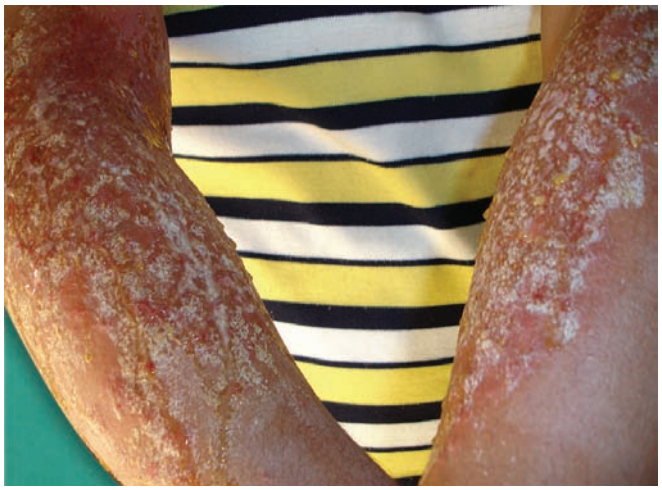

Fig. 7.43 CD to *Henna*

(potassium dichromate) is one of the ingredients used in the tanning of leather, wearing leather shoes is the main cause of sensitization, particularly in the summer when shoes may be worn without socks. In adolescence, the substances used in hair dyes (such as p-phenylenediamine) can cause ACD of the scalp, face and eyelids. Once the hapten to which a child has been sensitized has been identified, it is possible to treat the ongoing lesions, but it is also essential to avoid any future contact with the causative substance. This is easy in some cases, but may be difficult in the case of ubiquitous haptens (e.g. nickel), or impossible, if the hapten is unknown.

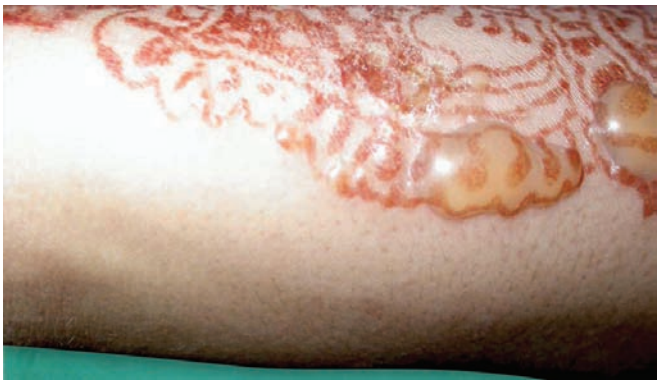

Fig. 7.44 Acute irritant dermatitis

"There is nothing either good or bad, but thinking makes it so."—William Shakespeare

8

Papulosquamous Disorders

INFANTILE AND CHILDHOOD PSORIASIS (Figs 8.1 to 8.9A)

Psoriasis is quite common in children. Besides the common forms, several forms are peculiar to children. Interdigital tinea is uncommon in children and a toe-cleft intertrigo may be psoriatic. Other flexural forms also occur. The disease may mimic chronic blepharitis or perleche, usually unilaterally with a small plaque of psoriasis on one eyelid extending to the lid margin or on the cheek at the angle of the mouth. Psoriasis on face is more common in children. The disease at first appears on the scalp where it may present as pityriasis amiantacea. An indolent pustular acrodermatitis sometimes of only one digit usually eventually proves to be psoriatic. More extensive chronic lesions of the hands and feet may occur with persistent dryness, hyperkeratosis and fissuring. Guttate psoriasis is also common in children. It presents as sudden appearance of showers of 2–3 mm scaly papules, mostly on the trunk. These lesions often develop as a result of upper respiratory streptococcal infection. Pitting of the finger nails may be the only manifestation for months or even years. Follicular psoriasis occurs on the extensor prominences of elbows and knees. Psoriasis can rarely affect infants also.

Various types of psoriasis seen in childhood are as follows:

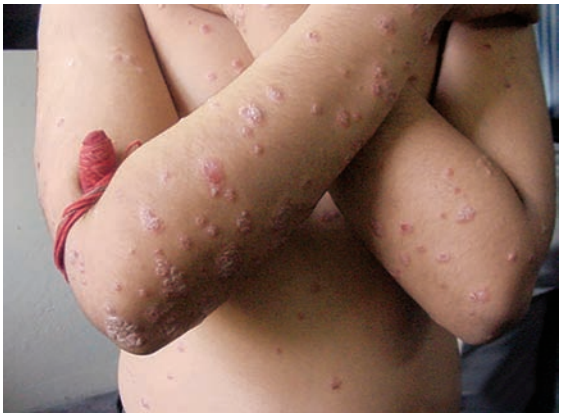

Fig. 8.1 Psoriasis vulgaris in a child

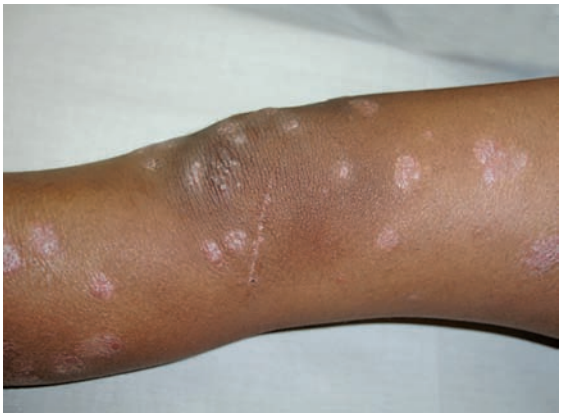

Fig. 8.2 Close-up of lesions of psoriasis vulgaris, note Koebner's phenomenon

Guttate Psoriasis (Figs 8.9B and C)

It is also known as eruptive psoriasis and is derived from the Latin gutta meaning a drop. This type of psoriasis is common generally in children and adolescents. It is characterized by an eruption of small salmon pink colored scaly plaques and papules ranging in size from 0.5 to 1.5 cm. This form has strong association with HLA-Cw6 and is generally occurs 2–3 weeks after an upper respiratory infection (URI) with *group A beta-hemolytic streptococci*. Laboratory parameters may show a raised ASO titer, increased anti DNase B or streptozyme activity. However, in spite of a definite association of infection, usage of antibiotics has not shown to be beneficial or alter the course of the disease.

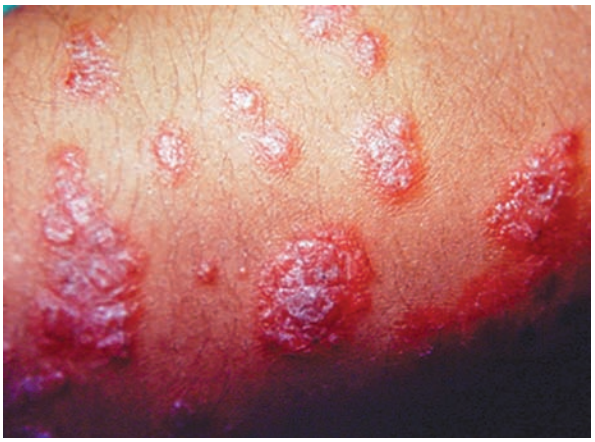

Fig. 8.3 close-up, note intense erythema and scaling

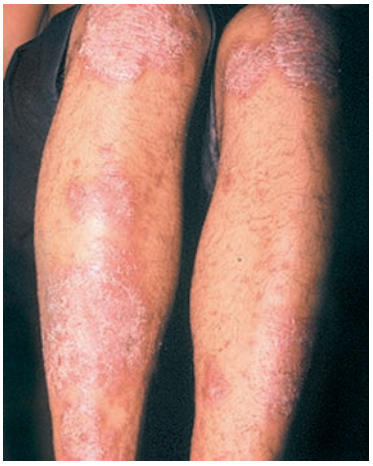

Fig. 8.4 Involvement of knee and shin in a 15-year old boy with PS

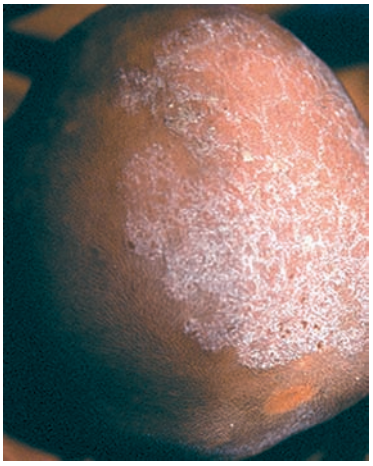

Fig. 8.5 PS over the scalp in a 2-year old boy. The lesions spread following shaving of scalp as a sacred ritual

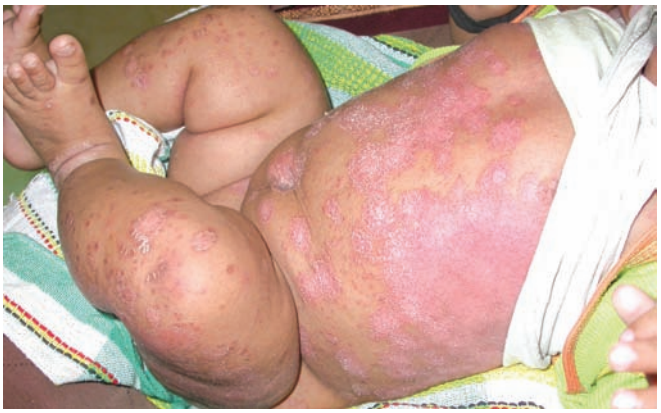

Fig. 8.6 Infantile psoriasis

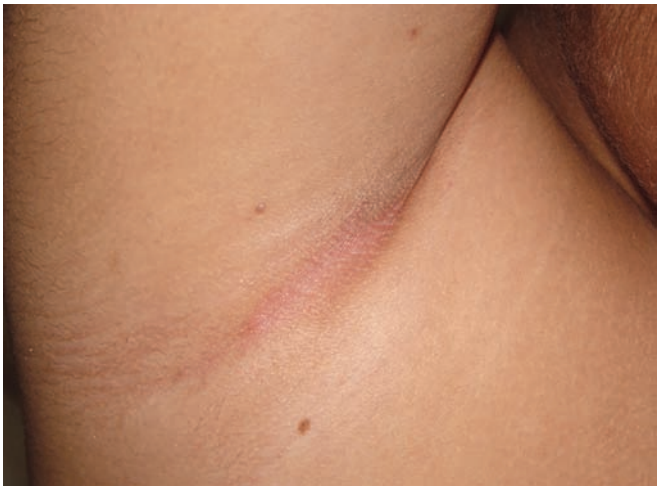

Fig. 8.7 Mild erythema and scaling in flexural psoriasis

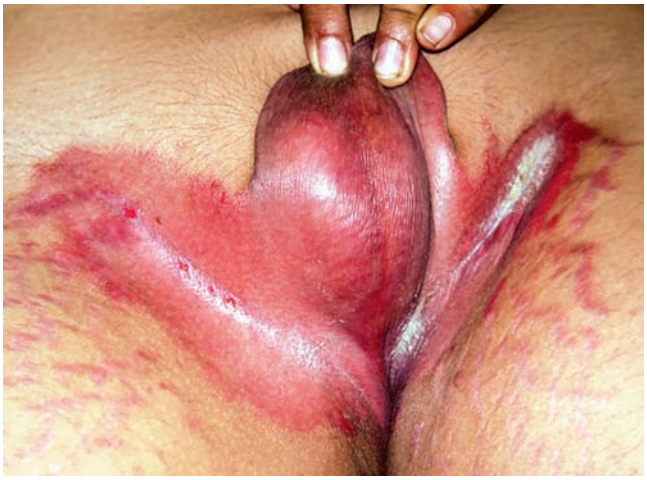

Fig. 8.8 Flexural psoriasis over inguinal region

Accountability is something that is left when responsibility has been subtracted—PasiSahlberg

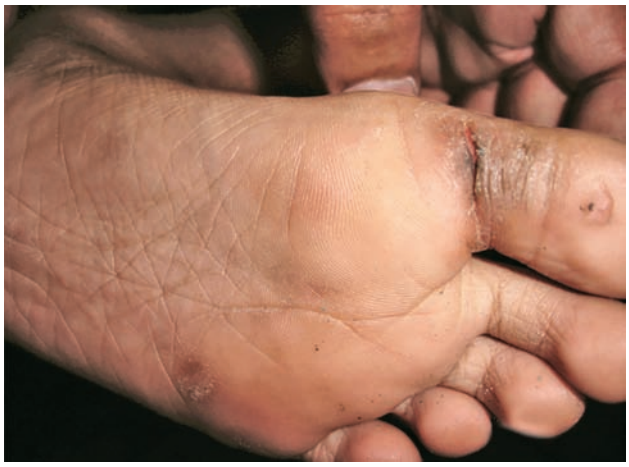

Fig. 8.9A Plantar psoriasis

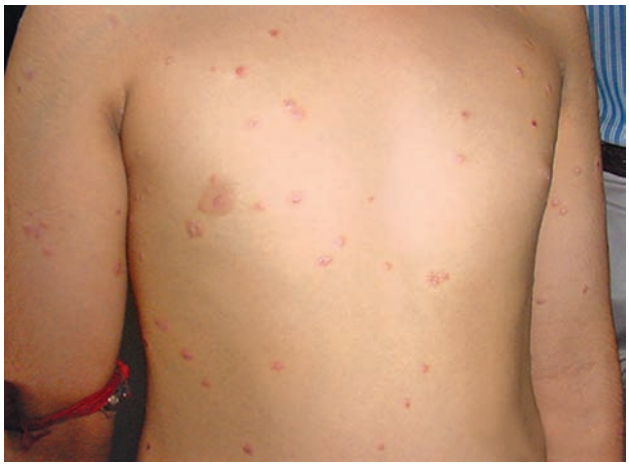

Fig. 8.9B Pinpoint to few mm sized scaly papules of guttate psoriasis

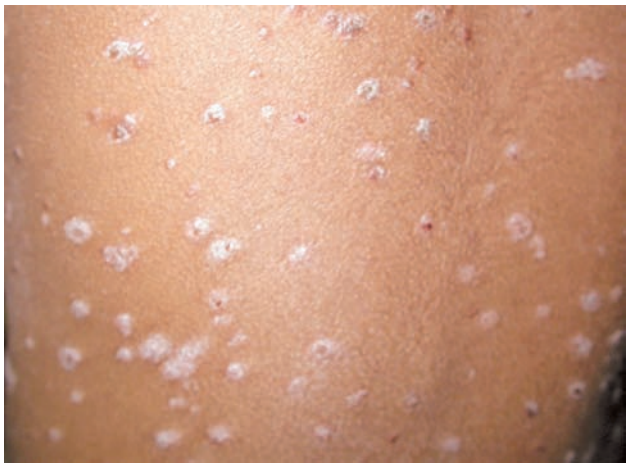

Fig. 8.9C Guttate psoriasis

Diaper Psoriasis (Fig. 8.9D)

This condition also known as napkin dermatitis usually presents between the ages of 3–6 months. It first appears in the diaper area as a bright red, well-demarcated, glazed, diaper rash that may be followed by widespread dissemination of small psoriasis-like lesions. This clinical variant can be differentiated from irritant diaper dermatitis by its unique presentation and poor response to conventional treatment for diaper dermatitis. Unlike other psoriasis it is generally treatment responsive and disappears by the age of 1 year.

Scalp Psoriasis (Figs 8.9E to G)

It presents with discrete, well-defined areas of scaly plaques on an erythematous base. The lesions may extend onto the periphery of the face forming the corona psoriatica, retroauricular area and upper neck. The scales sometimes have an asbestos like appearance and can be attached for some distance to the scalp hair, the so called pityriasis amiantacea. This condition is not easily distinguished from seborrheic dermatitis and at times both may coexist giving rise to sebopsoriasis.

Nail Psoriasis (Figs 8.9H and I)

Nail psoriasis occurs in 7–40% of children, with a similar pattern of clinical presentation to that of adults and the severity increases with increase in age, duration of the disease and arthropathy. In 0.6–2.3% of the patients, nail changes appear as the only sign of the disease, preceding other skin and articular involvement. Coarse nail pits

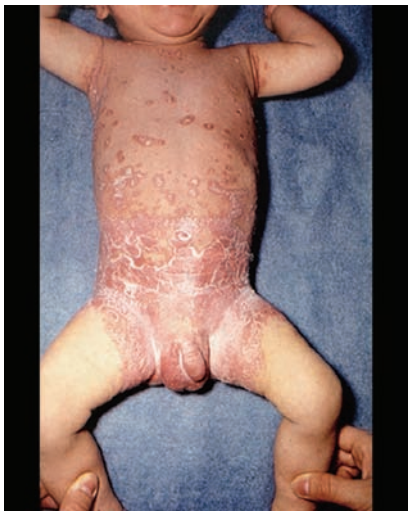

Fig. 8.9D Napkin psoriasis

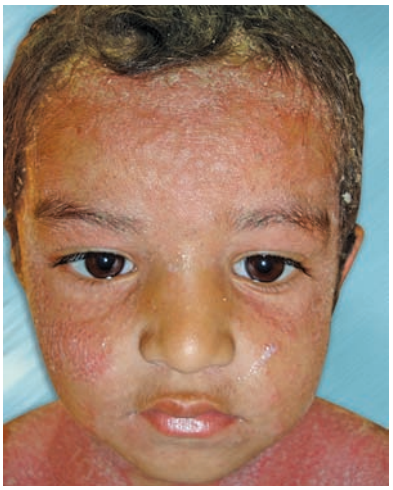

Fig. 8.9E Extensive psoriasis with involvement of scalp

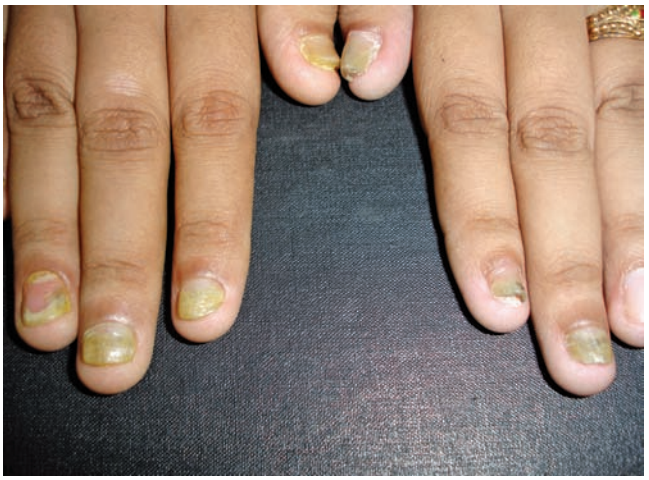

Fig. 8.9H Nail involvement in psoriasis

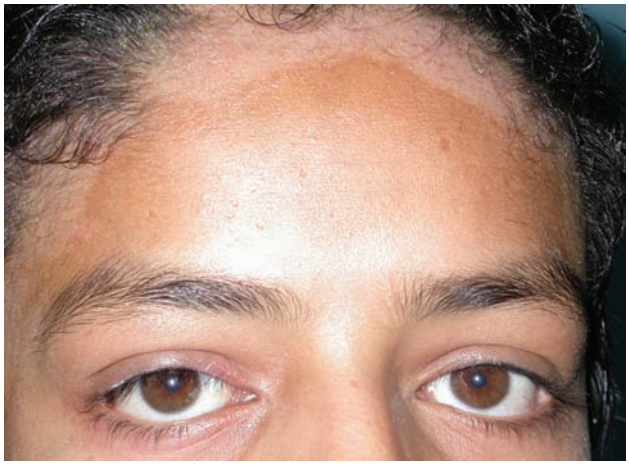

Fig. 8.9F Scalp psoriasis

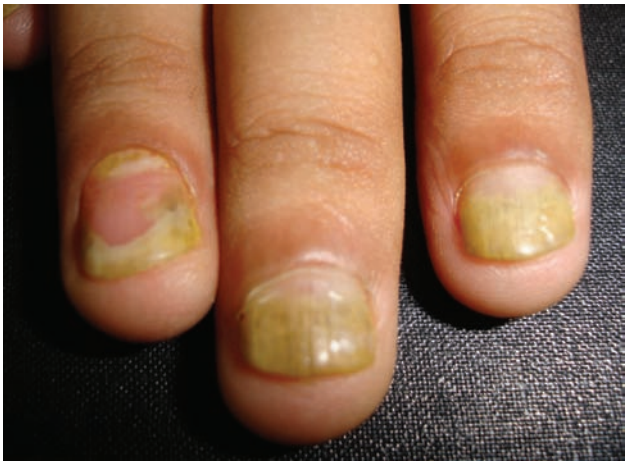

Fig. 8.9I Close-up of nail lesions

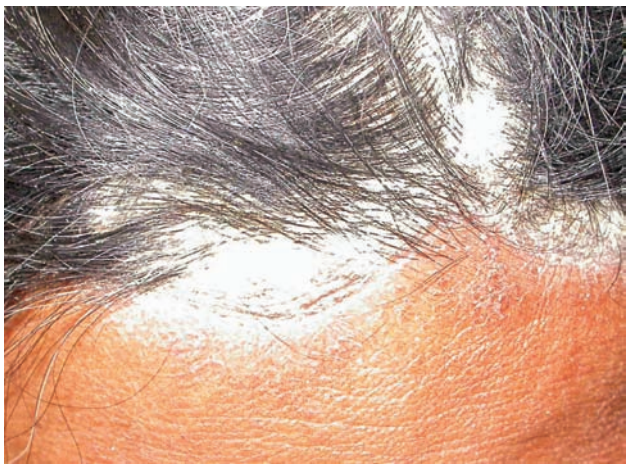

Fig. 8.9G Scalp psoriasis, note shinny silver-like scales

involving the fingers and toes is the most common finding. Other alterations include onychodystrophy, leukonychia, red lunula and crumbling of the nail plate. Oil spots and salmon patches are yellow red discolorations beneath the nail plate. Splinter hemorrhages may result from capillary bleed. Subungual hyperkeratosis may be noted on the distal end of the nail plate. Anonychia or total loss of nail may be seen in advanced disease. Nail psoriasis may affect individual nails of toes and fingers or may involve all the nails of fingers and toes giving rise to twenty nail dystrophy.

Erythrodermic Psoriasis (Figs 8.9J to M)

It represents the generalized form of the disease that affects the entire body. Erythema is the most constant feature with superficial scaling of more than 90% of the body surface

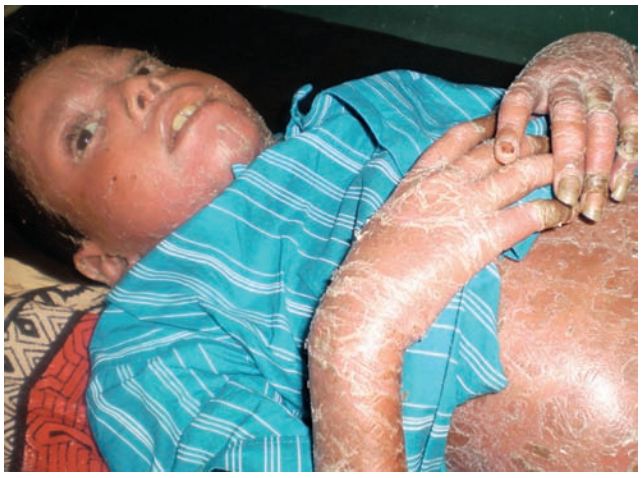

Fig. 8.9J Psoriatic erythroderma

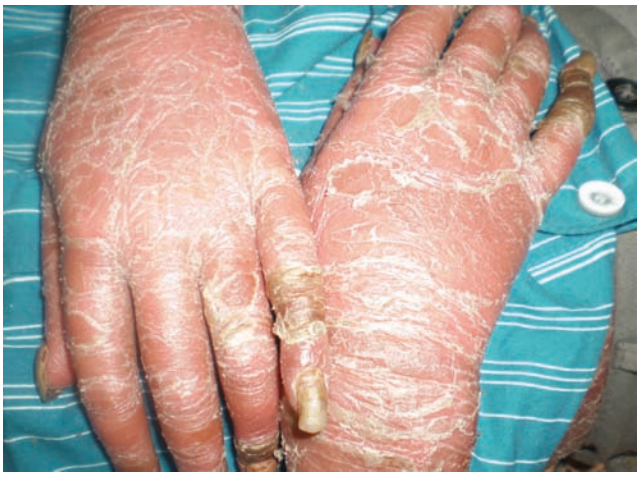

Fig. 8.9M Erythroderma with involvement of small joints of hands

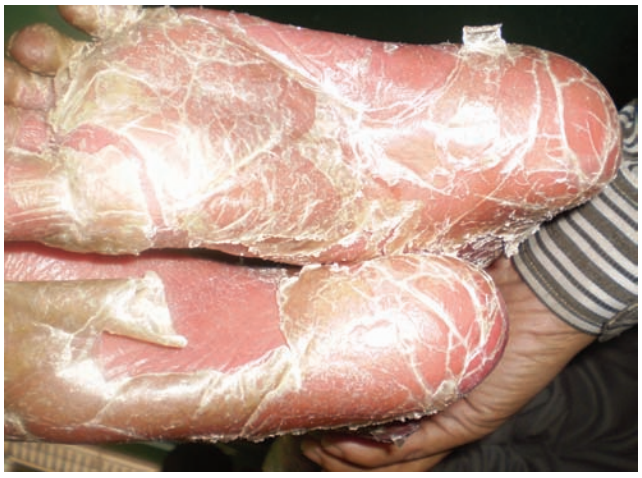

Fig. 8.9K Thick scales of psoriasis over soles

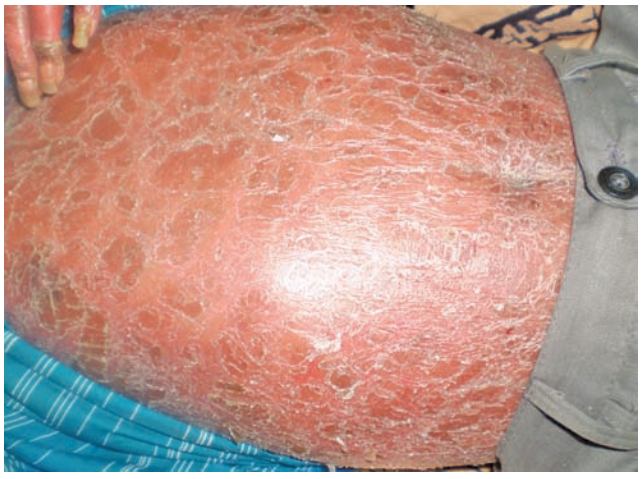

Fig. 8.9L Close-up of erythroderma

area. Erythroderma may be precipitated by the use of certain drugs, topical application of irritant medications, infections, pustular psoriasis or withdrawal of systemic steroids. The skin barrier is impaired and hereby the protective functions of the skin is altered giving rise to a state of skin failure. The patient shows signs of impaired thermal regulation, fluid electrolyte imbalance, hypoproteinemia due to excessive loss of proteins in the form of scales, high output cardiac failure, aspiration pneumonitis and increased susceptibility to infections. As a compensatory mechanism for total heat loss, there is a rise of the basal metabolic rate (BMR) giving rise to a catabolic state. Peripheral edema results due to hypoproteinemia, inflammation and associated cardiac failure. Generalized or localized lymphadenopathy may occur known as dermatopathic lymphadenopathy as a result of the immunological response.

Extracutaneous Involvement in Psoriasis

Psoriasis is predominantly a cutaneous condition but mucosal involvement may be seen in generalized pustular psoriasis. Psoriatic arthropathy affects the spine and the interphalangeal joints giving rise to arthralgia and deformities in advanced stages. Patients of psoriasis are at an increased risk of metabolic syndrome characterized by raised blood sugar, hypertension, dyslipidemia and obesity. There is increased incidence of anterior uveitis with psoriasis and psoriatic arthritis. This condition is also emotionally disabling as it is associated with significant psychosocial comorbidities arising from the appearance, social rejection, guilt, isolation and embarrassment. Risk of myocardial infarction is elevated. Lymph node involvement in cases of erythrodermic psoriasis in the form of dermatopathic lymphadenopathy can occur.

Drug Induced Psoriasis

The etiology of psoriasis is multifactorial and the importance of medications causing either eruption or aggravation of psoriasis must be acknowledged.

Drugs Responsible for the Induction of Psoriasis

- Acetazolamide
- Aminoglutethimide
- Amiodarone
- Amoxicillin
- Ampicillin
- Aspirin
- Atenolol
- Chloroquine
- Cimetidine
- Corticosteroids
- Cyclosporin
- Diclofenac
- Diltiazem
- Hydroxychloroquine
- Indomethacin
- Lithium
- Methicillin
- Penicillins
- Potassium iodide
- Propranolol
- Terbinafine.

Physicians must be reminded that psoriasis is not only a dermatologic condition, but a systemic disease with increased inflammatory markers. The fact that the medications precipitate psoriasis, physicians may cause morbidity and disease is often overlooked. It is important that this problem be acknowledged in order to provide patients with the best health care possible and to prevent any serious complications or discomfort.

Psoriasis is uncommon in infancy. True psoriasis does occur in infancy, generally appears in the napkin area as an isomorphic response in a genetically predisposed child with primary irritant napkin dermatitis.

INFANTILE AND JUVENILE PUSTULAR PSORIASIS (Figs 8.9N to 8.12)

The term pustular psoriasis is reserved for those forms of psoriasis in which macroscopic pustules appear. There are two main forms, localized and generalized. In the localized forms, the disease is confined to the hands and feet and tends to be chronic. In the generalized form, the whole body may be involved and the course is subacute, acute or fulminating and life theratening. All forms of pustular psoriasis are rare in childhood. Infantile cases are often benign. Systemic symptoms are often absent and spontaneous remissions occur. Majority of children are aged 2–10 years at onset.

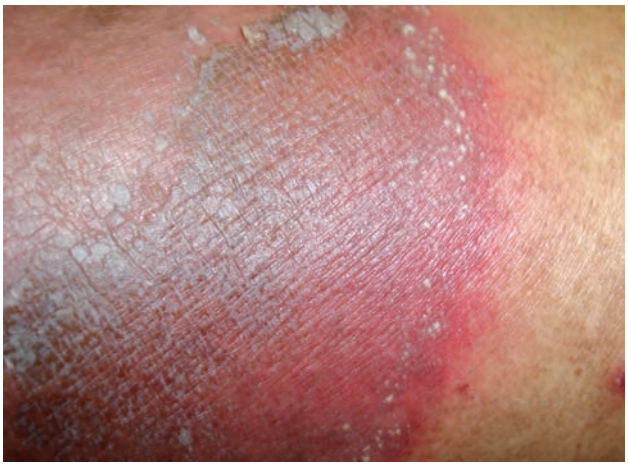

Fig. 8.9N Psoriasis with localized pustules

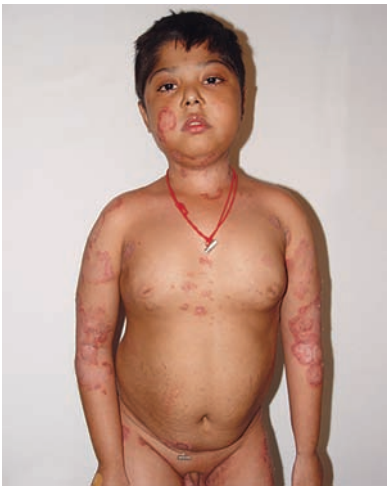

Fig. 8.10 Annular erythematous plaques with pustules at the periphery

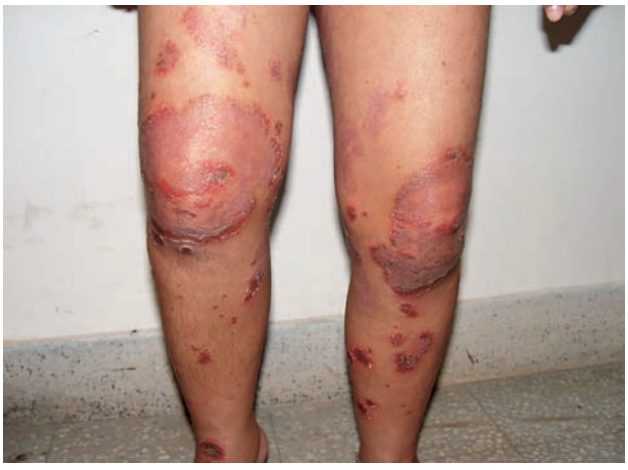

Fig. 8.11 Generalized pustular psoriasis over thighs and legs

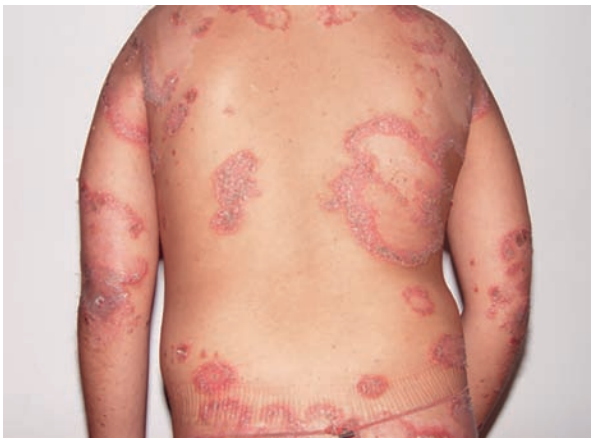

Fig. 8.12 Close-up of pustular psoriasis lesions

The disease may be Zumbusch pattern but annular and cincinate forms are seen. In the Zumbusch pattern, psoriasis may be abrupt with toxicity with an erythrodermic background and become generalized rapidly. Attacks often settle within a few days but repeated waves of inflammation may follow. In older children, the disease resembles that in adults.

Treatment modalities of psoriasis are divided into two categories (i) topical (ii) systemic.

Topical Treatment

Various topical modalities are topical emollient, corticosteroids, coal tar, dithranol, calcipotriol, tazarotene, etc. Topical coal tar in combination with salicylic acid forms the age old treatment modality for psoriasis. It is an effective modality for lesions over body, palms and soles. It is kept over these areas for 8–10 hours and then washed off, once daily for 3–6 months. It is also used as shampoo for scalp lesions for 6 months or so. It is, however, cosmetically not acceptable as it is messy, smells badly and causes discoloration of skin and scalp.

Anthralin is an effective antipsoriatic substance mostly used for resistant plaque psoriasis, hyperkeratotic psoriasis, plantar psoriasis, etc. It is not recommended over intertriginous areas, face, head neck, genitalia and hands is children. It also stains skin, clothings and bed linens irreversibly. Short contact dithranol therapy (SCDT) is an effective but less irritant modality. The ointment is to be kept for 20–30 minutes, then washed off once everyday. The regimen is continued for few months till the clearance of psoriasis lesions.

Topical corticosteroids are often prescribed for psoriasis lesions over trunk, extremities, scalp, flexures, palms and soles. Clobetasone, fluticasone, hydrocortisone or mometasone, etc. are usually chosen for their less atrophogenic potential. Topical calcipotriol (vitamin D_3 analog), calcitriol and tazarotene are in use recently for psoriasis in children but their efficacy has not yet been proved beyond doubt.

Systemic Therapy

Photochemotherapy is given with trimethyl psoralen or 8-methoxy psoralen. It is, however, not recommended below 8 years (according to some 12 years) of age because of the chance of development of premature cataract (in mice not documented in human beings). After intake of the medicines (know as psoralens), serum level peaks at 2 hours when ultraviolet—an exposure is given either from ultraviolet chamber or by exposure to sunlight. It is given at a dose of 0.6 mg/kg of body weight preferably with the breakfast. After 2 hours, the affected parts are exposed (in India where UVA chambers are not available at most of the centers) to sunlight for 10–15 minutes initially. The duration of exposure is gradually escalated every weekly. The regimen is repeated on 2 days a week (not consecutive days) till the clearance of lesions. Nausea, vomiting, phototoxic reactions are some of the early adverse effects, although not very common. Long term side effects can be hepatotoxicity. Hence, pretreatment LFT is to be carried out in every patient.

Methotrexate (MTx) may be given is extensive and severe psoriasis at a dose of 0.2–04 mg/kg dived in to 3 doses given at 12 hours interval every weak. The author has good experience of treating psoriasis in children with methotrexate. The drug is usually tolerated well in children. Before starting MTx, complete blood count (CBC), liver function test (LFT), renal function test (RFT) and a baseline chest X-ray are to be carried out. In cases of accidental ingestion of MTx in large amounts, leucovorin (folinic acid) rescue is done at a dose of 20–200 mg 6 hourly depending upon serum MTx levels. Reduction of doses of MTx is needed with concomitant use of nonsteroidal anti-inflammatory drugs (NSAIDs), ampicillin, cephalosporins and allopurinol.

Oral retinoids and systemic steroids have very limited role is the treatment of childhood psoriasis. Both psoriatic arthritis and nail involvement in psoriasis are fairly uncomon and do not pose much problem in pediatric age group.

LICHEN PLANUS (Figs 8.13 to 8.16H)

Lichen planus (LP) is characterized by shiny, flat papules, which individually vary in size from pin point to a centimeter or more and may be closely aggregated or widely dispersed. On the surface, there may be white lines known as Wickham's striae. The overall color is violaceous. In most cases, the papules flatten after a few months but are often replaced by an area of pigmentation that retains the shape of the papules and persists for months or years. New papules may form while others are clearing. LP can affect any part of the body but certain sites are more commonly affected, e.g. the front of the wrists, the lumbar region and around the ankles. Vesicles and bullae in LP may occasionally occur and create diagnostic confusion. Itching is fairly common in LP. Burning and stinging are least common complaints.

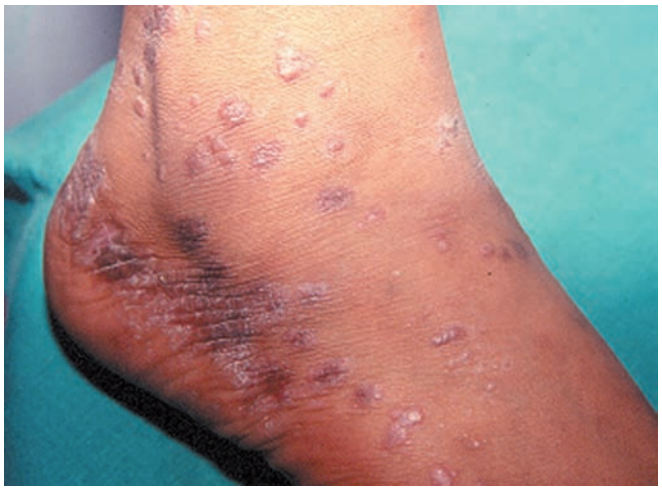

Fig. 8.13 Flat topped violaceous papules and plaques of LP over foot

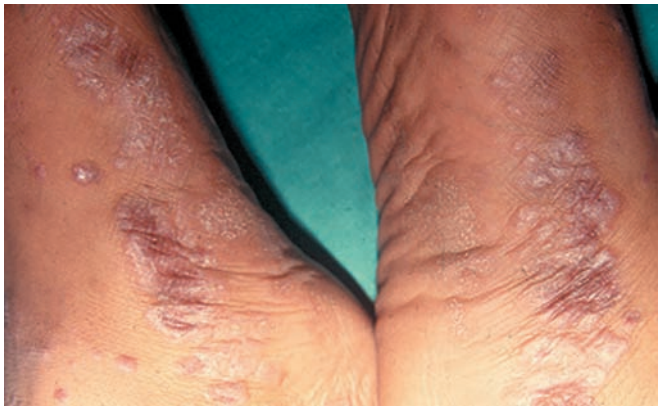

Fig. 8.14 Classical lesions of LP, note bilateral symmetrical distribution

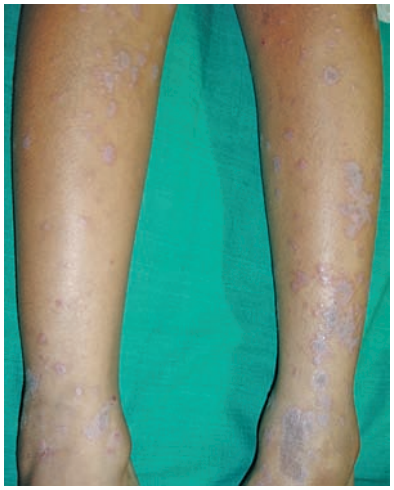

Fig. 8.14A Eruptive LP over legs

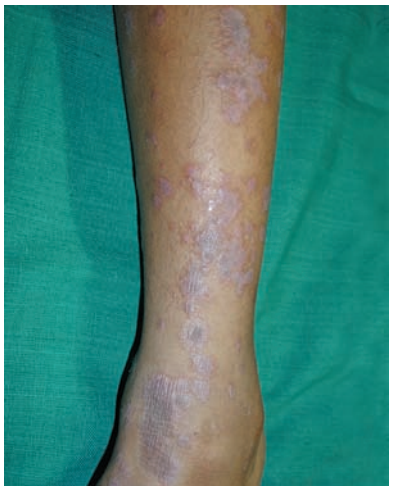

Fig. 8.14B Close-up

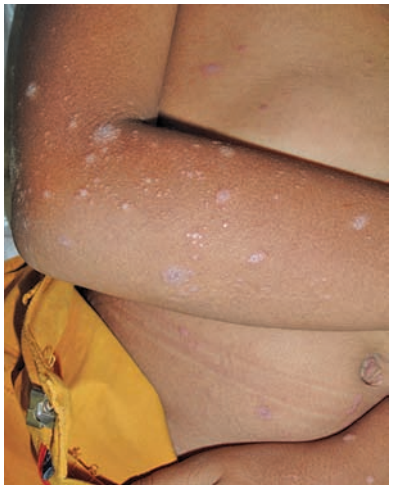

Fig. 8.14C Classical violaceous papules of LP

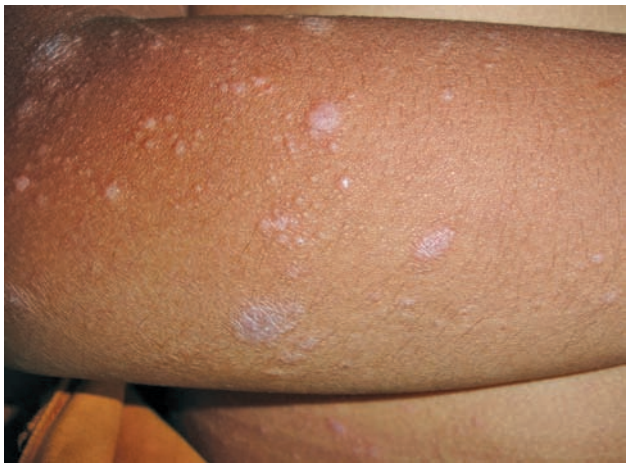

Fig. 8.14D Close up of LP lesions

"When one person suffers from a delusion it is called insanity; when many people suffer from a delusion it is called religion."—Robert Pirsig

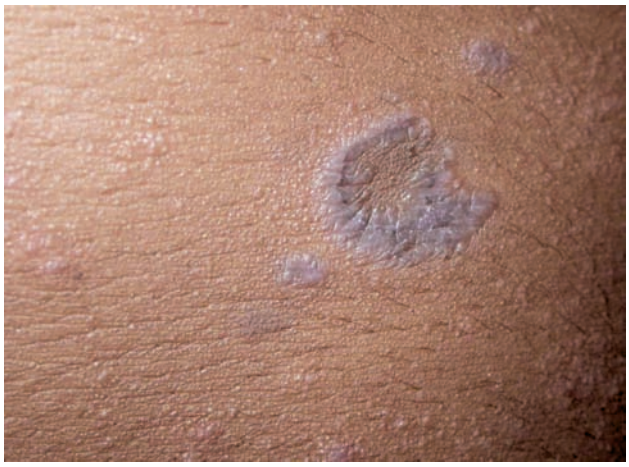

Fig. 8.14E Flat topped violaceous papules of LP

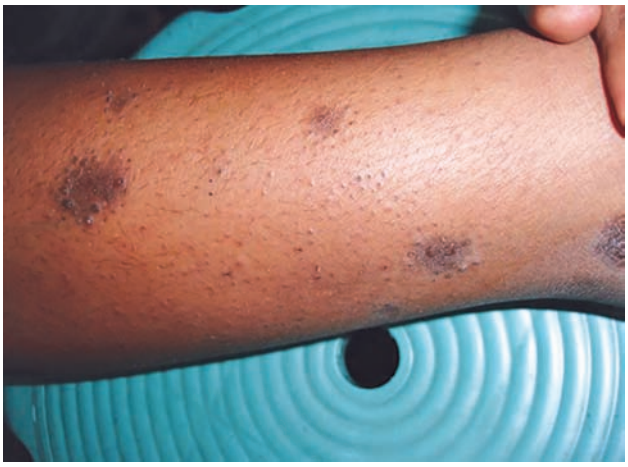

Fig. 8.15A Follicular lesions of LP

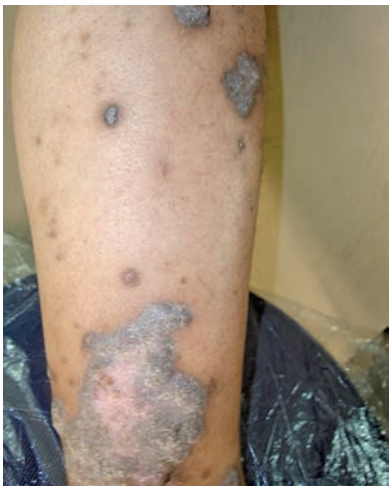

Fig. 8.14F Hypertrophic lesions of LP over legs

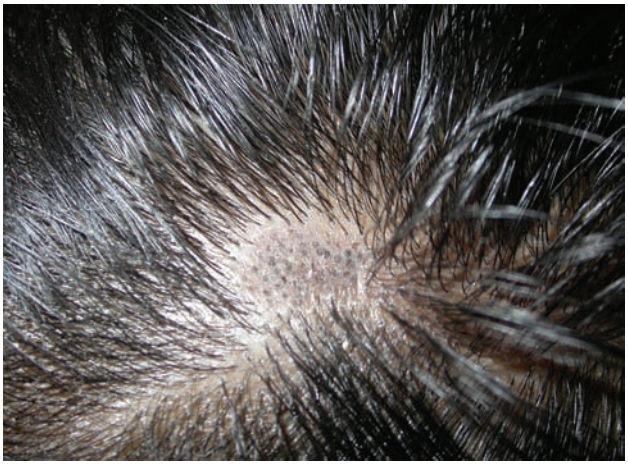

Fig. 8.15B LP over scalp with loss of hairs

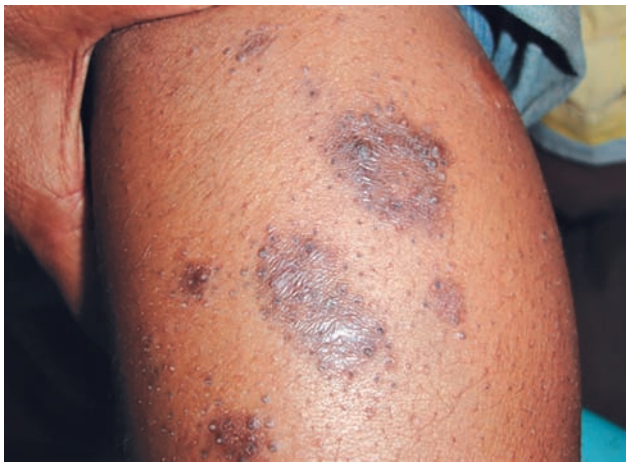

Fig. 8.15 Lichen planus lesions, note follicular lesions

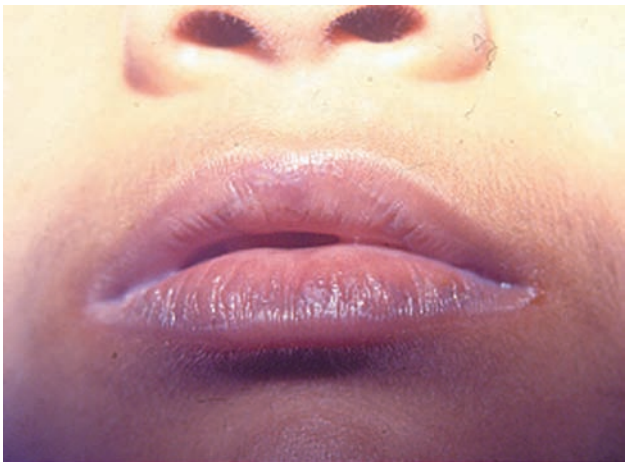

Fig. 8.16 Lichen planus over lips

"People demand freedom of speech to make up for the freedom of thought which they avoid."—Soren Aabye Kierkegaard

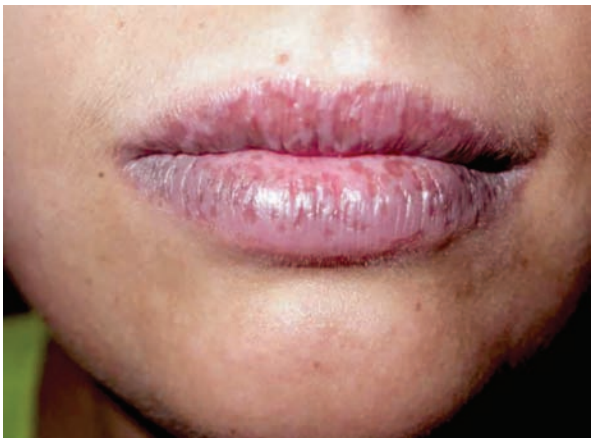

Fig. 8.16A LP over lips

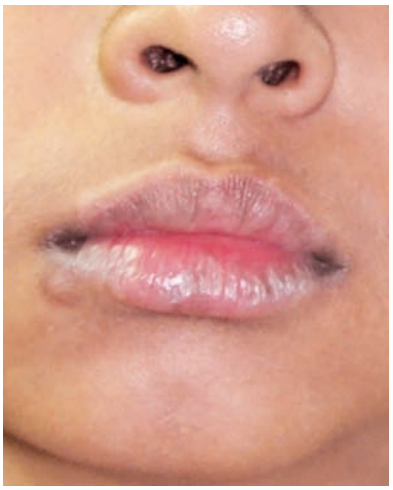

Fig. 8.16B Lips affected by LP

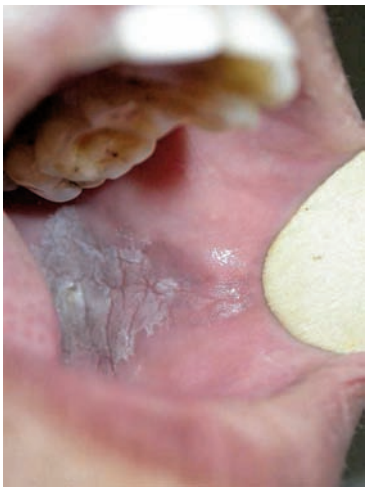

Fig. 8.16C LP of oral mucosa, note violaceous color

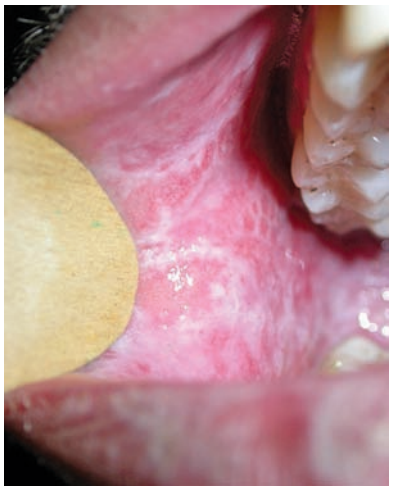

Fig. 8.16D Classical white lacy pattern of oral LP

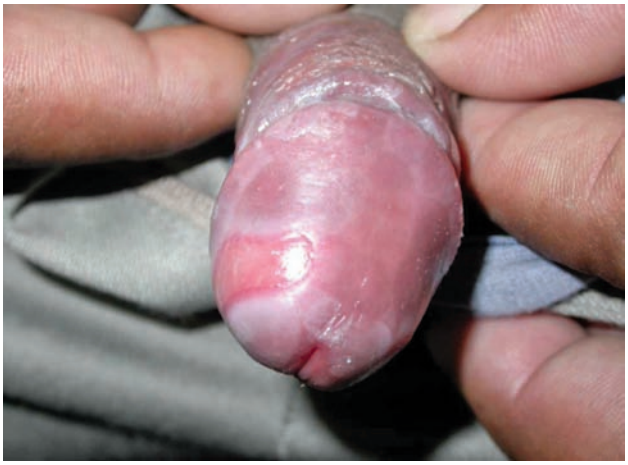

Fig. 8.16E LP of glans and prepuce in a 17-year-old boy

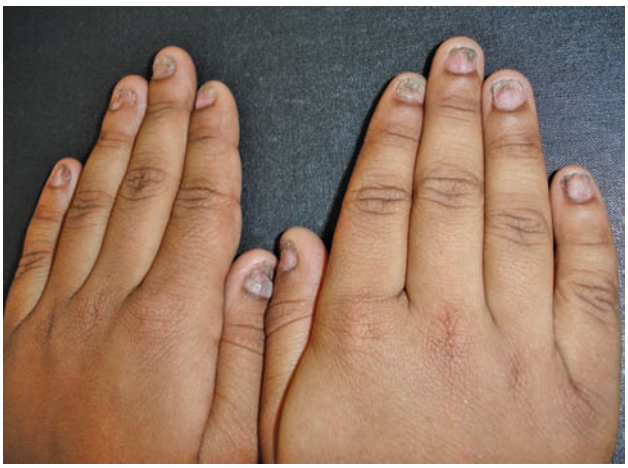

Fig 8.16F Nail affection in LP

"Not everything that can be counted counts, and not everything that counts can be counted."—Albert Einstein

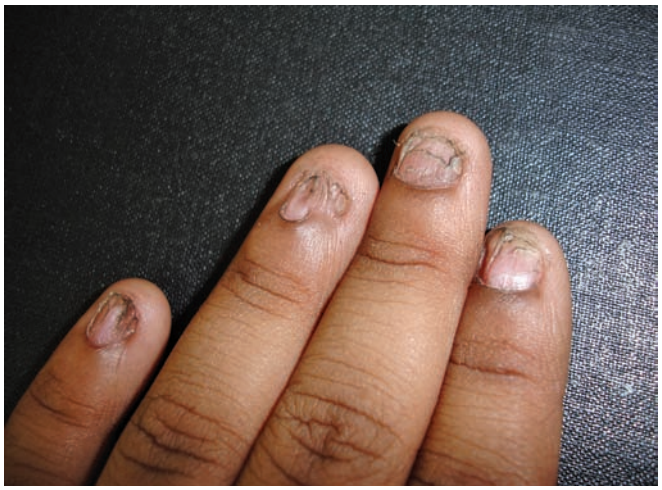

Fig. 8.16G LP of nails, close-up

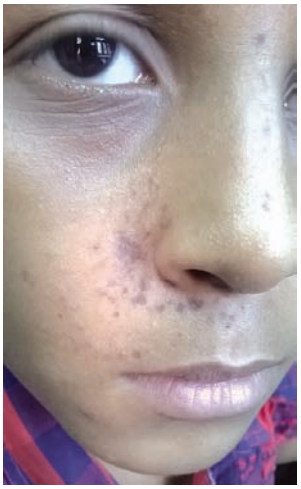

Fig. 8.16H LP atrophicus over face

Association

Lichen planus may be associated with vitiligo, alopecia areata in the same child or there may be a family history of these diseases or family history of diabetes mellitus, hypertension, thyroid disease, ulcerative colitis, etc.

Natural History

In majority of the cases of lichen planus, the lesions tend to resolve spontaneously over a period of 9–12 months. Lichen plano pilaris and hypertrophic lichen planus tend to persist for years together. Fortunately, such cases are rare is children.

Treatment

For majority of cases of childhood LP, moderately potent topical steroids are quite useful. They may be used for 3 weeks to 3 months. Mild topical steroids may be required for lesions over the face, flexors or genitalia. Oral dapsone can be given at a dose of 1–2 mg/kg/day for 1–3 months in cases of extensive LP. Systemic corticosteroids are given for short duration in extensive and rapidly developing cases of LP at a dose of 1–2 mg/kg/day. Oral cyclosporin at a dose of 2–3 mg/kg/day can be a good alternative to oral corticosteroids and is devoid of any adverse effects of long term use of corticosteroid viz., growth retardation and suppression of HPA axis, etc. However, it is costly and may cause hypertrichosis in older children and adolescents. The hypertrichosis induced by cyclosporin is usually irreversible.

ROLE OF CYCLOSPORINE IN LICHEN PLANUS

Cyclosporin A has now been successfully used in a variety of inflammatory dermatoses, although the mechanism of action remains obscure and may not be related to the drug's potent immunosuppressive properties. Lichen planus (LP) is a disease that is characterized by a predominantly T-cell inflammatory infiltrate. Cyclosporin A is postulated to act via its selective inhibition of T-lymphocyte proliferation or by some other as yet unknown mechanism. The major side effects include renal dysfunction, electrolyte disturbances, hypertension. The mucocutaneous side effects include hypertrichosis and gingival hyperplasia.

ROLE OF ORAL RETINOIDS IN LICHEN PLANUS

Systemic retinoids are able to affect pathways involved in cellular differentiation, apoptosis, inflammation and sebaceous glandular activity. In children the use of systemic retinoids for lichen planus depends more on the severity of disease rather than the age and weight of the patient. Most patients are seen to respond in about 4 weeks. Retnoids may be combined with systemic steroids in case of extensive disease, hypertrophic lesions or oral erosive lichen planus. Few reports have also mentioned the absolute necessity to combine retinoids with oral steroids for the control of sever disease. The most common side effects include retinoid dermatitis, telogen effluvium, onycholysis, keratoconjunctivitis, cheilitis and epistaxis. Effects on other system includes deranged lipid profile, diffuse skeletal hyperostosis and premature closing of epiphysis in the bone, transaminitis, pseudotumor cerebri and depression.

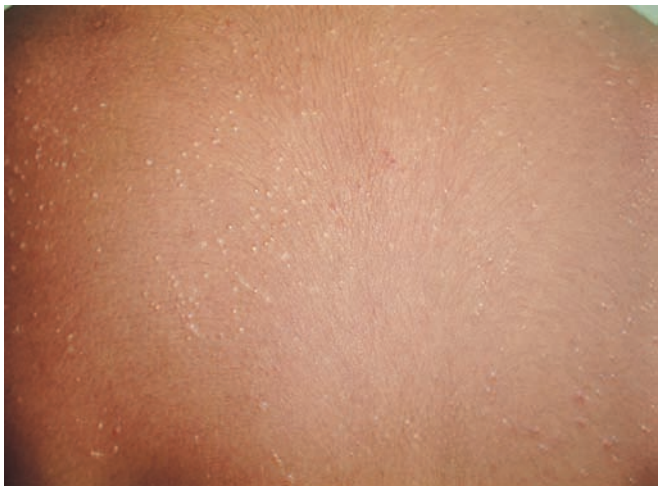

Fig. 8.17 Lichen nitidus over back, note Koebner's phenomenon

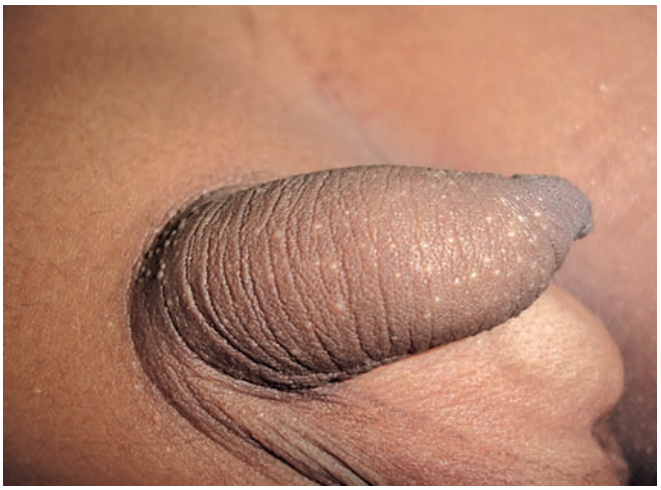

Fig. 8.17B Lichen nitidus lesions over penile skin and prepuce

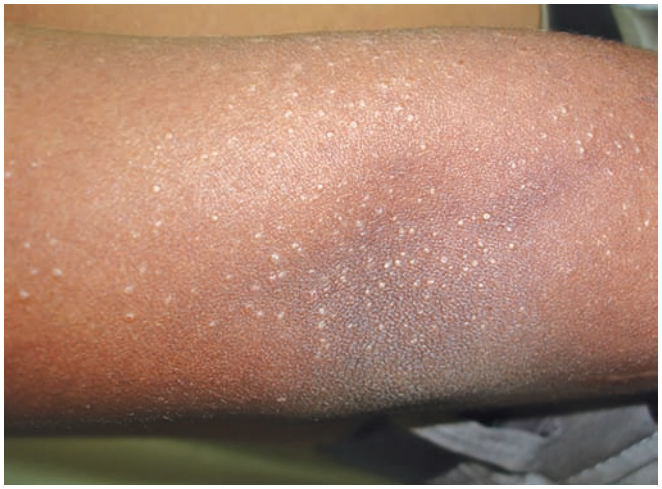

Fig. 8.17A Lichen nitidus over elbow

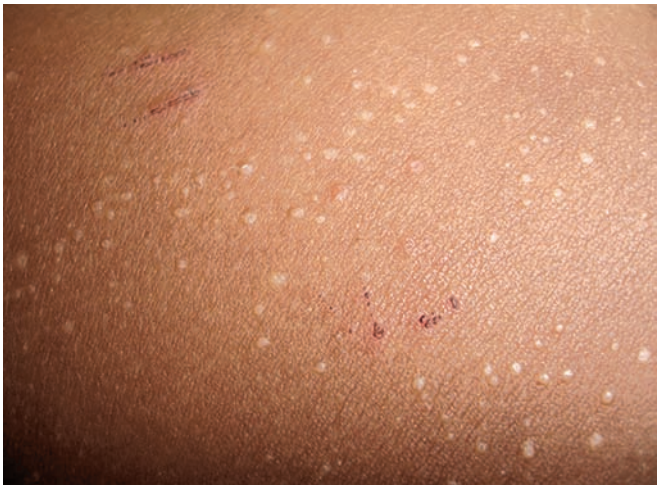

Fig. 8.18 Close-up of lichen nitidus lesions

LICHEN NITIDUS (Figs 8.17 to 8.18)

This condition is clinically characterized by minute papules pinpoint to pinhead sized and have a flat or dome-shaped shiny surface. They usually remain discrete, although they may be closely grouped. Sites of predilection are the forearms, penis, abdomen, chest and buttocks. Coexistence with LP is quite common. Lichen nitidus must be distinguished from lesions of lichen scrofulosus where there are grouped follicular papules in small patches on the trunk, and from keratosis pilaris where there are horny follicular papules mainly on the extensor surface of the limbs.

Natural History

The condition is mostly self limiting and tends to subside spontaneously by 3–6 months.

Treatment

Mild to moderately potent topical corticosteroids are useful in most of the cases. Itching is an exception rather than the rule (unlike lichen planus). Oral antihistamines are not required in majority of the cases.

"I do not feel obliged to believe that the same God who has endowed us with sense, reason, and intellect has intended us to forgo their use."—Galileo Galilei

9

Vesiculobullous Diseases

CHRONIC BULLOUS DERMATOSIS OF CHILDHOOD (Figs 9.1 to 9.4B)

Chronic bullous dermatosis of childhood (CBDC) is a chronic, acquired subepidermal disease of children and adults with cutaneous and mucosal involvement, characterized by IgA basement membrane antibodies. The mean age of onset is under 5 years; it is usually acute and the initial attacks are more severe than subsequent recurrences. Symptoms vary from absent or mild pruritus to severe burning. The face and perineum are involved, particularly in younger children. The perioral area, the eyelids, ears, and scalp may be affected. The involvement of the perineum and vulva has been mistaken for sexual abuse in some patients. The eruption may spread to the trunk, thighs, arms, hands and feet. The lesions comprise urticated papules and plaques, annular, polycyclic lesions often with blistering around the edge, the 'string of pearl sign'. The blisters may occasionally turn hemorrhagic. Mucosal involvement is common. The mouth may be involved with ulcers and erosions, and hoarseness may indicate pharyngeal involvement. The nose may bleed. The eyes may be sore and gritty with conjunctiva.

Natural History

Spontaneous remissions occur in the majority after an average of 3–6 years. Usually the diseases does not extend beyond puberty.

Treatment

Dopsone is the drug of choice since sulfapyridine is not available in our country. It is given in a dose of 1–2 mg/kg/day is two divided doses. The drug may be stopped when the old lesion heal and the new lesions have stopped coming. However, several such courses may be require. Oral

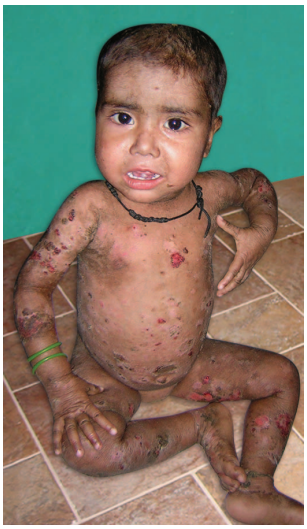

Fig. 9.1 Chronic bullous dermatosis of childhood over trunk, mostly ruptured bullae

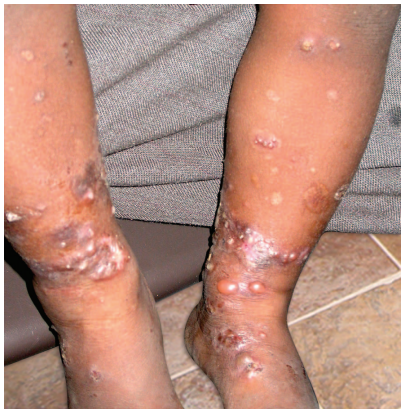

Fig. 9.2 Distribution of bullae in chronic bullous dermatosis of childhood over legs

"The artist is nothing without the gift, but the gift is nothing without work."—Emile Zola

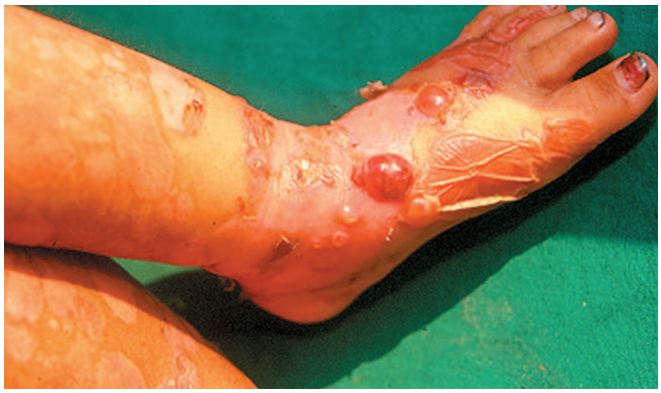

Fig. 9.3 Chronic bullous dermatosis of childhood, close-up of foot, note hemorrhagic bulla

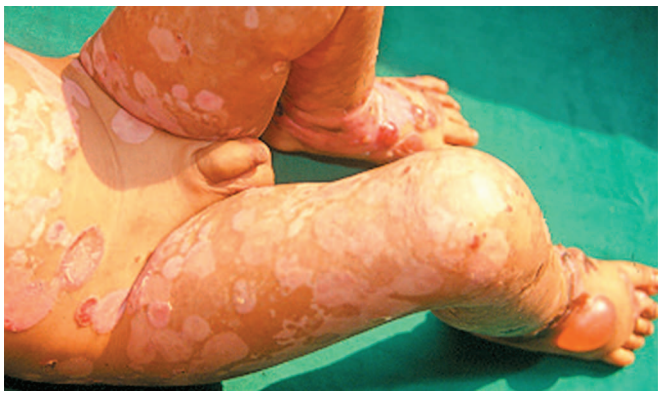

Fig. 9.4 Vesicles and bullae over perigenital area

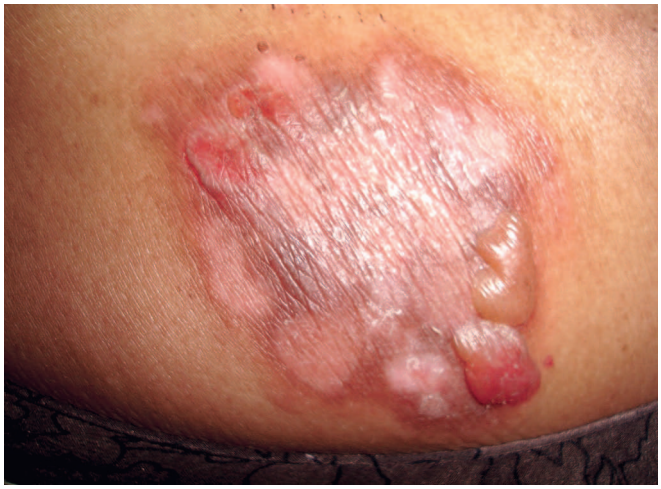

Fig. 9.4A Close-up of chronic bullous dermatosis of childhood lesions, 'cluster of jewels' appearance

corticosteroids may be required in short courses to control the severity of CBDC to bring the disease under control. For few lesions topical potent or moderately potent topical steroid

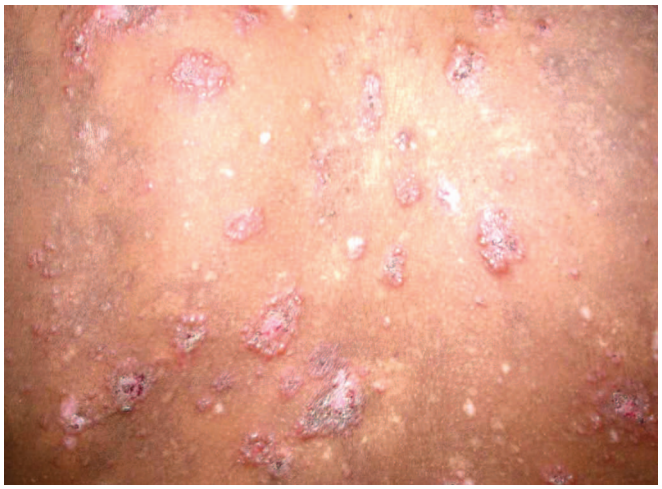

Fig. 9.4B Lesions of chronic bullous dermatosis of childhood over back

may be applied for few weeks. For associated pruritus, if any, oral antihistamines can be prescribed. Pretreatment blood analysis for screening of G-6PD enzyme should be done in all cases planned to be treated with dapsone.

CICATRICIAL PEMPHIGOID (Figs 9.5A to D)

It affects mucosal surfaces, and a localized form (chronic pemphigoid of Brunsting-Perry) is seen which is usually limited to the head and neck. In this disease, recurrent bullae are seen in the oral mucosa and conjunctiva and other mucous membranes such as nasopharynx, esophagus, larynx, genitalia and anal canal. Until many years after the onset of the condition, the ocular form may not occur and the oral involvement often takes the form of a desquamative gingivitis. Entropion, trichiasis, symblepharon, dryness of the cornea, corneal ulceration and at times eventual blindness can develop. Esophageal lesions can result in stricture formation and laryngeal lesions when presents, may be life-threatening sometimes.

Diagnosis

In childhood the clinical features of bullous pemphigoid are indistinguishable from those in adults. Biopsy specimens of cutaneous lesions show subepidermal blister formation, usually without papillary microabscesses (important diagnostic feature of dermatitis herpetiformis). Direct immunofluorescence reveals deposition of C_3 and IgG at the lamina lucida of the basement membrane zone. Indirect testing of serum for circulating IgG antibasement membrane zone antibodies is positive in approximately 70% of patients. Antibody titers do not correlate with clinical disease activity.

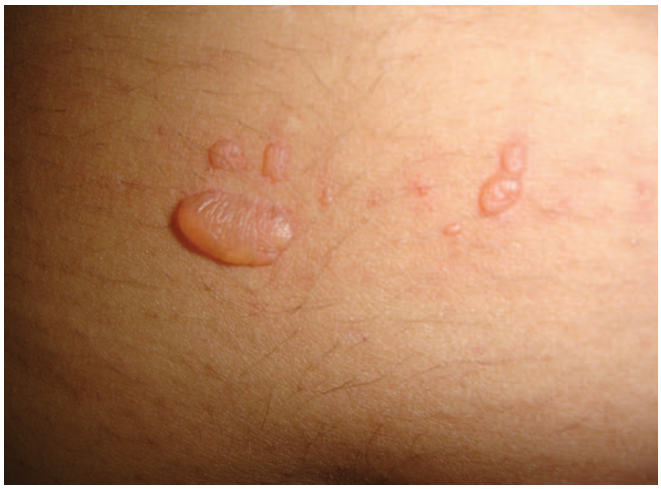

Fig. 9.5A Subepidermal tense bullae in a case of cicatricial pemphigoid

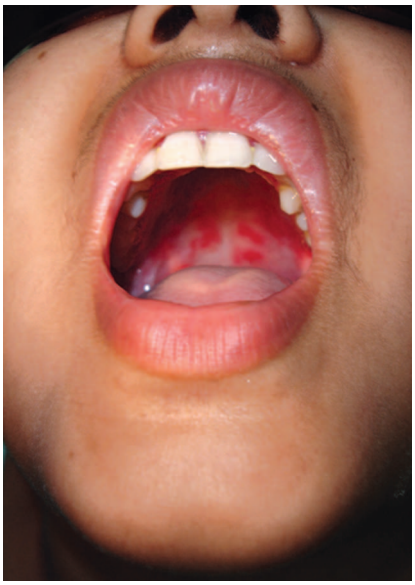

Fig. 9.5C Same girl, note palatal ulcer

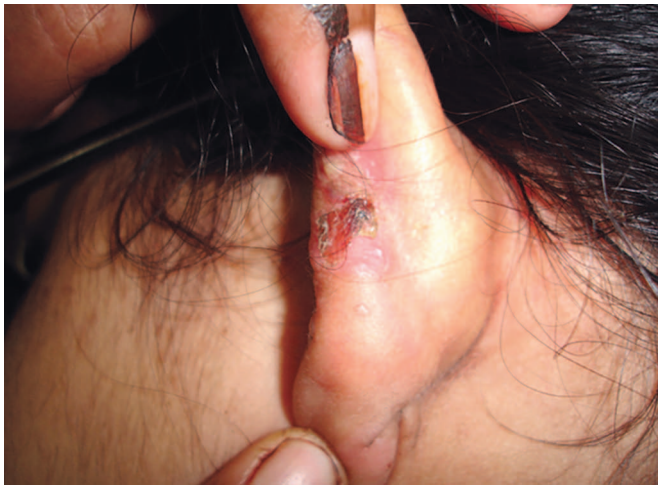

Fig. 9.5B Subepidermal bullae over pinna with scarring in cicatricial pemphigoid

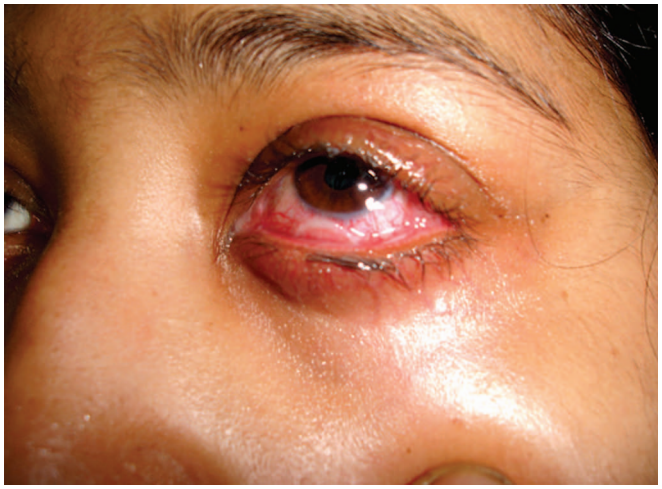

Fig. 9.5D Conjunctival scarring in the same girl

Treatment

The response to treatment of this disease in childhood is variable. The eruption may be suppressed by systemic corticosteroids. A combination of dapsone or chlorambucil with corticosteroids may be helpful. In some patients cyclosporine and cyclophosphamide (alone or with low doses of corticosteroids) appear to have been effective. For few lesions, topical corticosteroids may be given. If there is associated itching, oral antihistaminic may be prescribed.

DERMATITIS HERPETIFORMIS (Fig. 9.5E to G)

Dermatitis herpetiformis (DH) is a rare, intensely pruritic, chronic, papulovesicular disease. It can present in childhood and old age. Males are more commonly affected than females. The onset may be acute or gradual and pruritus is usually the first and predominant symptom. Early lesions on the skin are erythematous papules, urticarial weals or groups of small vesicles often excoriated so rapidly that it may be impossible to find one intact. The vesicles are usually grouped

"Give me a museum and I'll fill it."—Pablo Picasso

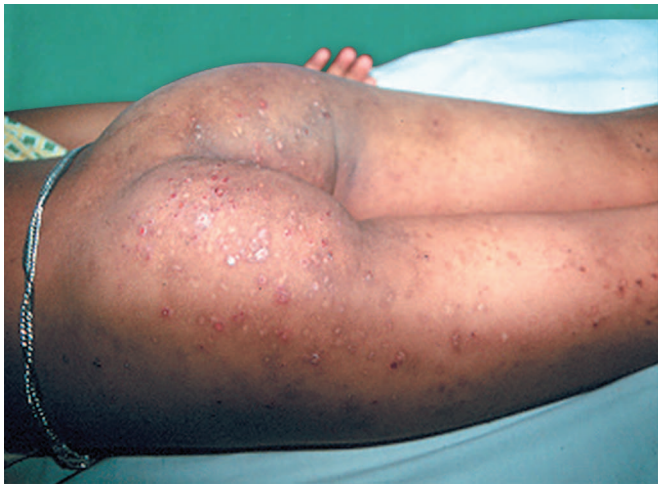

Fig. 9.5E Excoriated papulovesicles of dermatitis herpetiformis over buttocks and thighs

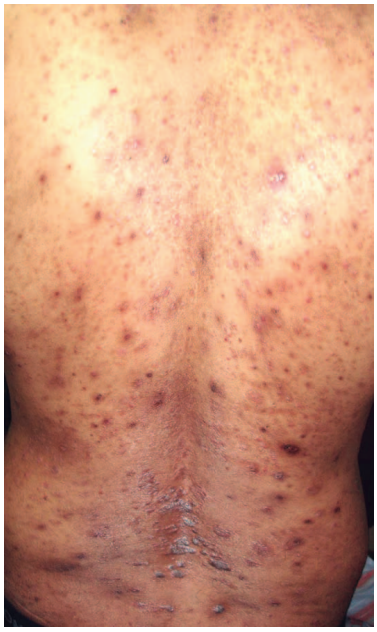

Fig. 9.5F Dermatitis herpetiformis in a 18-year-old boy

together on plaques of erythema and rarely blisters, 1–2 cm in diameter develop. The sites of predilection are the extensor aspects of the limbs, especially the knees just below the point of the elbow, buttocks and the natal cleft. The axillary folds, shoulders, trunk, face and scalp are all frequently involved. Oral lesions are common but asymptomatic. Active disease may be associated with a feeling of malaise. In addition, constitutional symptoms due to gluten sensitive enteropathy may be present.

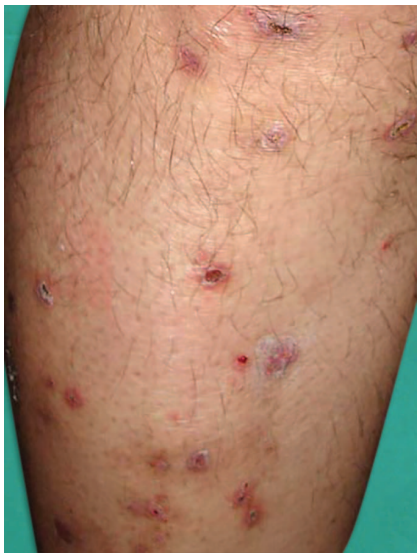

Fig. 9.5G Close-up of dermatitis herpetiformis lesions

Treatment

The drug of choice for DH is dapsone. The dosage and duration of treatment is more or less same as in cases of CBDC. The initial dose is 2 mg/kg/day, with an increase or decrease in dosage depending on the clinical response and the side effects associated with therapy. Once a favorable response is achieved, the dose is decreased gradually to a minimum level of 25–50 mg/day. Various adverse effects observed are nausea, vomiting, headache, giddiness, fever, lymphadenopathy, exfoliative dermatitis or hemolysis, particularly in G-6PD enzyme deficient cases. The condition is extremely pruritic. Oral antihistamines form an integral part of management of cases with DH.

EPIDERMOLYSIS BULLOSA (Figs 9.6 to 9.16D)

In between the cells of the epidermis there is desmosome—tonofilament complex which keep the cells knit together. The epidermis is attached to the dermis by anchoring fibris and anchoring filaments. Epidermolysis bullosa (EB) is a group of inherited disorders in which there is defective formation of anchoring fibrils and filaments. As a result, on slightest trauma, there is separation either in the epidermis or dermoepidermal junction with formation of blisters. Therefore, these diseases in one word called 'mechanobullous disorders'. On the basis of clinical, histopathological and electron microscopic findings, three groups of EB are recognized: epidermal, junctional and dermal (Table 9.1). Because of great differences in progress, identification of type of EB is often very important.

Table 9.1 Details of various types of epidermolysis bullosa

Type	*Epidermolysis bullosa*	*Distribution*	*Inheritance*	*Oral ulcer*	*Scarring*	*Prognosis*
Epidermal	EB Simplex	Generalized	AD	+	–	Good
	EB Cockayne	Hands, Feet	AD	–	–	Good
	EB Dowling-Meara (herpetiform)	Generalized	AD	–	Atrophy	Improves by school age
Junctional	EB Letalis	Generalized	AR	+	–	Usually fatal
	EB Benign	Generalized	AR	+/–	Atrophy	Good
Dermal	EB Dystrophic-Dominant	Extremities	AD	+/–	+	Good
	EB Dystrophic-Recessive	Generalized	AR	++	+++	Poor
	EB Dystrophic-Recessive	Localized	AR	+	+	Good
	EB Dystrophic-Inversa	Mainly trunk Generalized	AR	+	+, Late	Good
	EB Acquisita		–	+	+	Good

(*Adapted from Lever's Histopathology of the skin, 1997)

AD—Atopic dermatitis; AR—Autosonal recessive

Fig. 9.6 Erosion and crusting of epidermolysis bullosa in a newborn

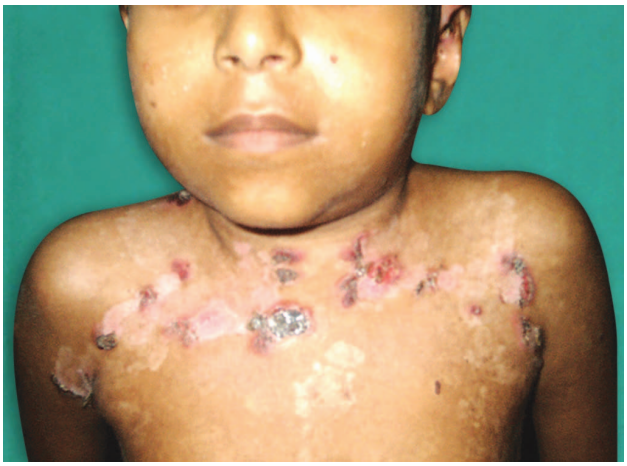

Fig. 9.8 Epidermolysis bullosa in a 8-year-old girl, note erosion, crusting and hypopigmentation

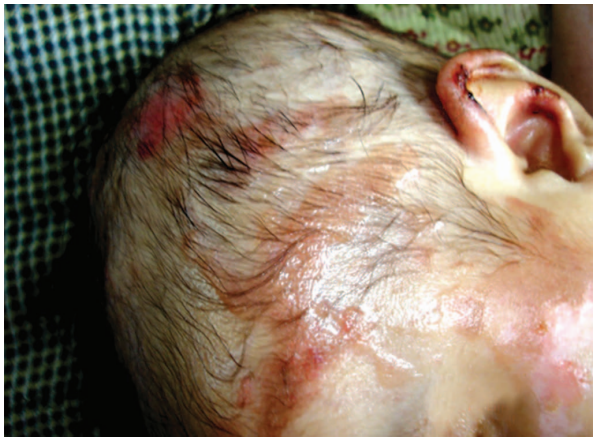

Fig. 9.7 Bullae and erosion of epidermolysis bullosa

The clinical features inheritance and prognosis have been highlighted in the Table 9.1.

Treatment depends on the severity of EB. In mild variants, parents are educated about the child care and how to avoid trauma. Pain and progression of large blisters may be controlled by gently unroofing lesions or cutting a square skin window and covering with a topical antibiotic cream/ointment. Sterile gauze adhesives are applied from dressing to dressing and kept out of direct contact with the skin.

In severely affected children, a multidisciplinary approach to the management is necessary. The dermatologist, pediatric internist, ophthalmologist, gastroenterologist, otolaryngologist, pediatric surgeon, dentist and a physical therapist may be involved in the care of such infants and children.

"I find that the harder I work, the more luck I seem to have."—Thomas Jefferson

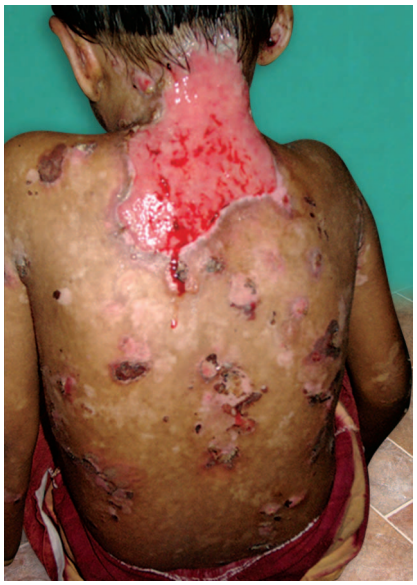

Fig. 9.9 Large area of erosion over back

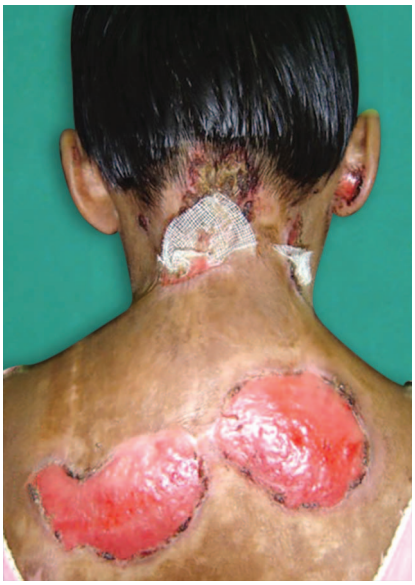

Fig. 9.11 Same girl, close-up view

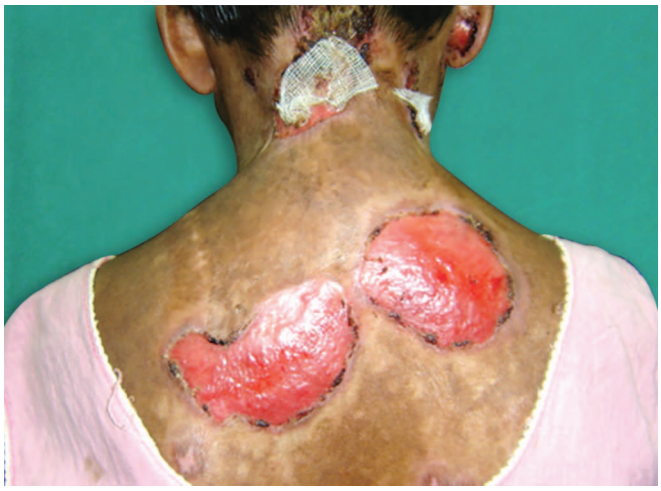

Fig. 9.10 Reappearance of erosions after skin grafting

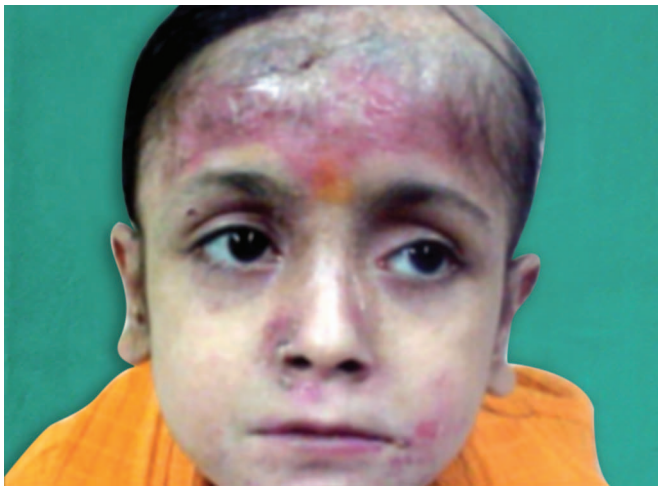

Fig. 9.12 15-year-old boy with autosomal recessive dystrophic epidermolysis bullosa since birth

Management

Prevention of trauma, treatment of infection with topical and/or oral antibiotics are important. Vaseline gauze or sofratulle® is useful to retain moisture, reduce pain and facilitate healing of erosions and ulcers. Topical dressings are gently held by gauze and soaked off without tearing at fresh granulation tissue. Semipermeable (Tagamet®, Opsite®) dressings, may be useful in recalcitrant wounds. Oral zinc, multivitamins, minerals particularly iron supplementation may facilitate wound healing. Good nutrition is mandatory for maintenance of good health and early healing of erosions/ulcers.

FUTURE THERAPIES OF EPIDERMOLYSIS BULLOSA

Epidermolysis bullosa requires a multidisciplinary approach for the holistic care of the affected individual. Keeping in mind this necessity the concept of all in one clinic has been started where in a single clinic specialists from various branches are available to deal with the multisystem disorder.

Wound care: Wound infection is the most common complication in these patients. The most common offending organisms include *Staphylococcus aureus*, *Staphylococcus*

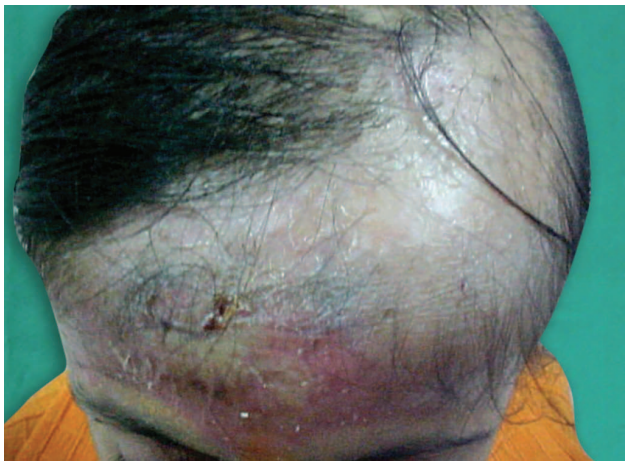

Fig. 9.13 Same boy, close-up of scarring alopecia

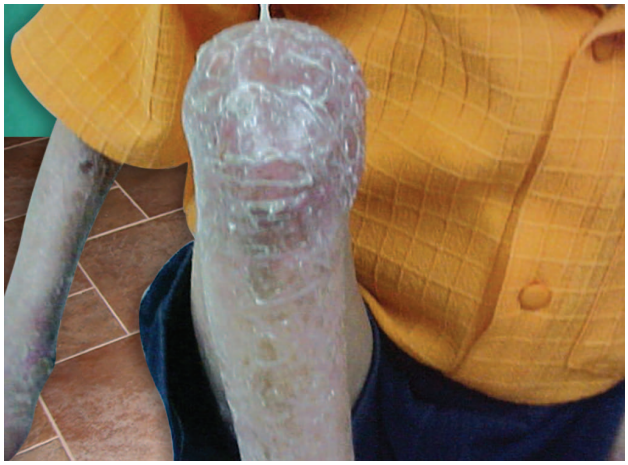

Fig. 9.14 Scarring and psoriasiform scaling over knee

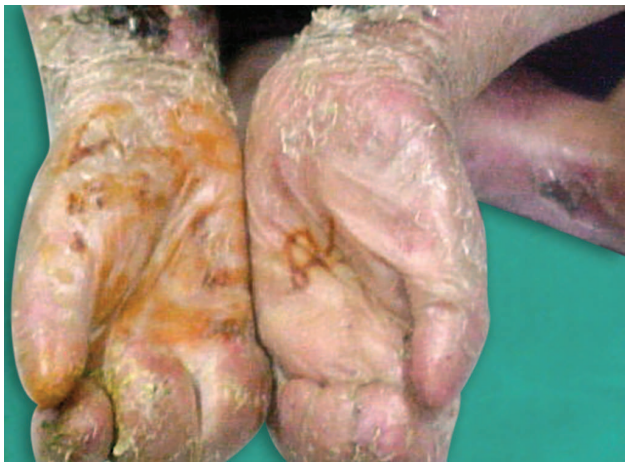

Fig. 9.15 Mitten like deformity of hands

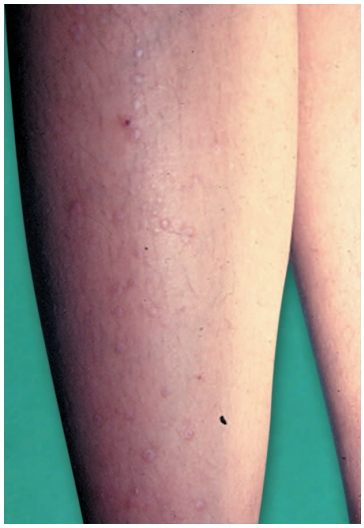

Fig. 9.16 Multiple skin colored scar like spontaneously appearing lesions over the trunk (albopapuloid lesions) in dominant dystrophic epidermolysis bullosa

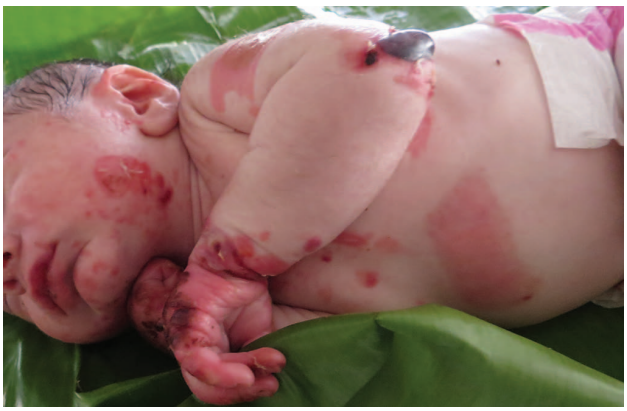

Fig. 9.16A Epidermolysis bullosa in a 8-month old boy, note hemorrhagic bulla

epidermidis and *Pseudomonas aeruginosa*. The dressings include nonadherent dressings like silicon mesh, lipid colloid contact layer, Vaseline gauze impregnated dressings and burns mesh. Foam dressings are being used to separate the toes in order to avoid formation of adhesions. Silver and honey impregnated dressings are available which are said to have antibacterial activity thereby preventing secondary infections. Collagen based dressings modify the cell kinetics and provide faster wound healing. Artificial skin substitutes are available in the form of dermal allograft and apligraft. Synthetically prepared skin products like bioengineered skin products and biological dressings in the form of amniotic membranes are being increasingly used.

"The only way to get rid of a temptation is to yield to it."—Oscar Wilde

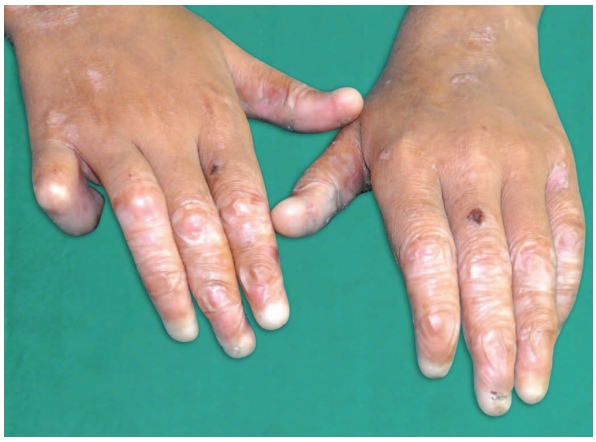

Fig. 9.16B Dystrophic epidermolysis bullosa, note anonychia

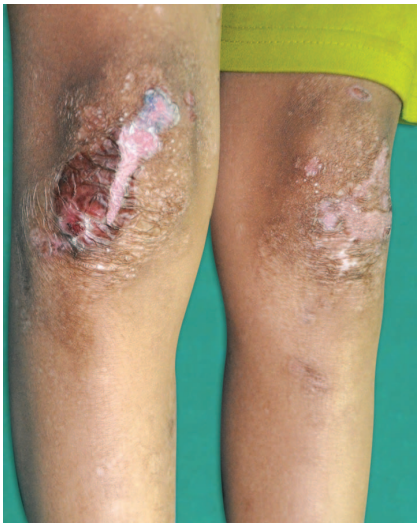

Fig. 9.16C Dystrophic epidermolysis bullosa, note cigarette paper like scars over knees

Gene therapy: It implies the use of keratinocyte cultures from normal skin of affected patient. These cells are then propagated and transduced with a DNA containg vector in culture and the corrected keratinocytes are allowed to grow in sheets, which are then grafted back to the affected site. However, the major limitation of this concept is the concern of carcinogenesis.

Protein replacement therapy: This concept makes use of recombinant proteins which are topically applied or injected or administered systemically. The goal is to replace the defective protein or replenish a missing protein. This concept has been successfully used in mice with recessive dystrophic epidermolysis bullosa (RDEB) however the efficacy in human models is yet to be studied.

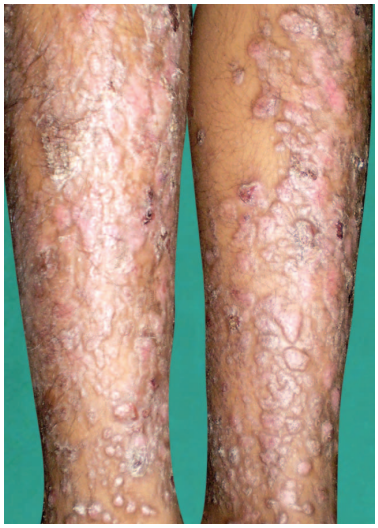

Fig. 9.16D Albopapuloid lesions over legs

Cell based techniques: The latest attempts in molecular strategies revolve around the use of fibroblasts and stem cell therapy. Fibroblasts are artificially cultured and injected to the skin of the affected patients which results in increased collagen 7 in cases of RDEB.

Bone marrow stem cell transfer: The rationale is the existing ability of bone marrow cells to differentiate into skin cells given the right micro environment. It is hypothesized that in RDEB chronic skin injury generates a micro environment that promotes the homing of bone marrow derived stem cells which can differentiate into skin cells, produce type 7 collagen and restore the defective anchoring fibrils. Bone marrow transplant results in long-term survival and reversion of phenotype with normalization of basement membrane and formation of anchoring fibrils.

PEMPHIGUS VULGARIS AND PEMPHIGUS FOLIACEUS (Figs 9.17 to 9.22A)

In pemphigus vulgaris (PV) erosions inside the month or tongue or blisters over the scalp precede wide spread cutaneous lesions in more than 50% of children. Vesicles and bullae develop gradually over face, scalp, trunk and extremities. The bullae may subsequently rupture to form large areas of erosions. Blisters heal insidiously without scarring. However, often they have a tendency to get secondarily infected. Pruritus pain and burning of the skin and mucous membranes may be severe. On putting pressure on the skin surrounding the blisters, the normal looking skin peels off like the peel of a boiled potato. This is known

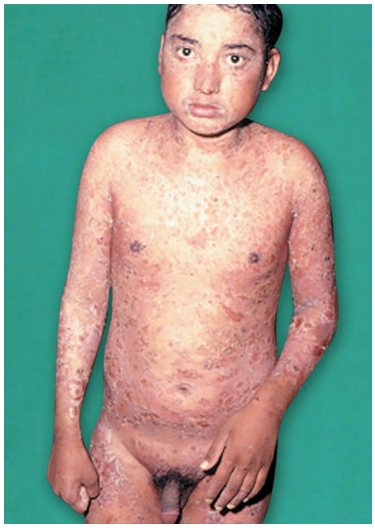

Fig. 9.17 Dried-up vesicles, crust and scab of pemphigus foliaceus. The lesions are mostly distributed ove seborrheic area

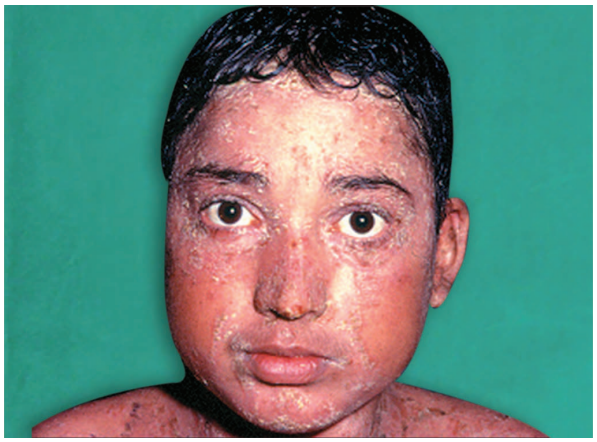

Fig. 9.18 Face of the same boy

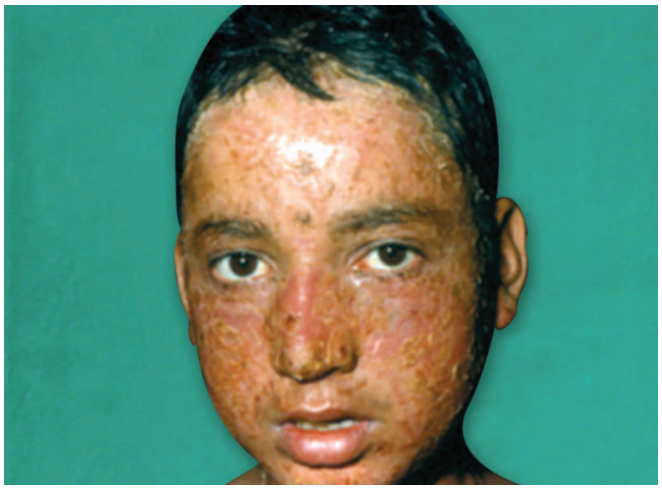

Fig. 9.19 Close-up of face in another boy with pemphigus foliaceus

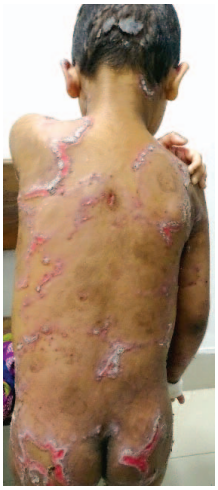

Fig. 9.20 Lesions of pemphigus vulgaris in 6-year-old boy

as Nikolsky's sign. The bullae are formed suprabasally as a result of acantholysis. There is deposition of IgG, IgM, C_3 in the intercellular spaces.

DRUG INDUCED PEMPHIGUS

The incidence of drug induced pemphigus reported in children is very rare. Drugs causing pemphigus can be divided into sulfhydryl containing or the thiol group and the nonthiol group. Drugs belonging to the thiol group like penicillamine and captopril have a sulfhydryl group that is postulated to interact with the sulfhydryl groups in desmoglein 1 and 3, thus modifying the antigenecity of desmogleins. The nonthiol group drugs include ceftazidime, penicillin, rifampicin and progesterone. Drug induced pemphigus requires several months of exposure before the onset. It generally presents as nonspecific morbilliform, annular or urticarial eruption which further progresses to form vesiculobullous lesions. Drug induced pemphigus more often clinically resembles pemphigus foliaceus than pemphigus vulgaris. Oral lesions are rare. Treatment includes withdrawal of offending drug and initiation of oral steroids along with supportive measures.

Diagnosis

The clinical diagnosis is supported by histopathological examination of the skin biopsy specimen and confirmed by direct immunofluorescence (DIF) testing. Circulating

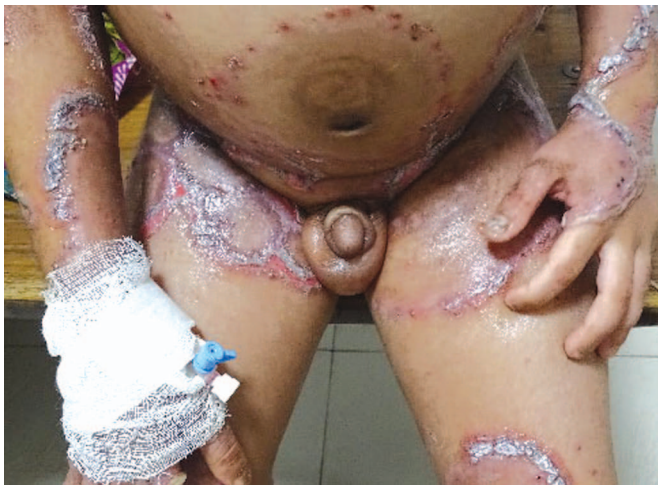

Fig. 9.21 Same boy, note scrotal oedema

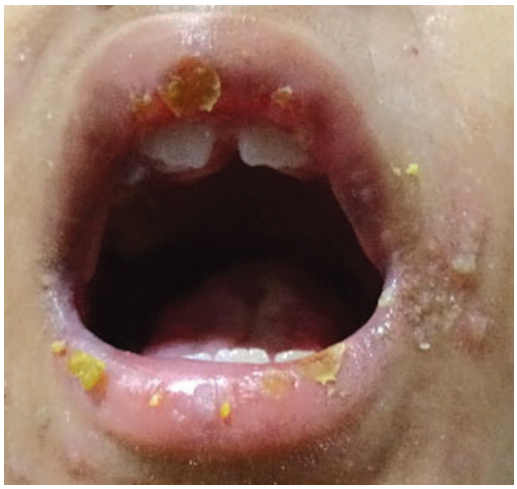

Fig. 9.22A Oral erosion in the same boy

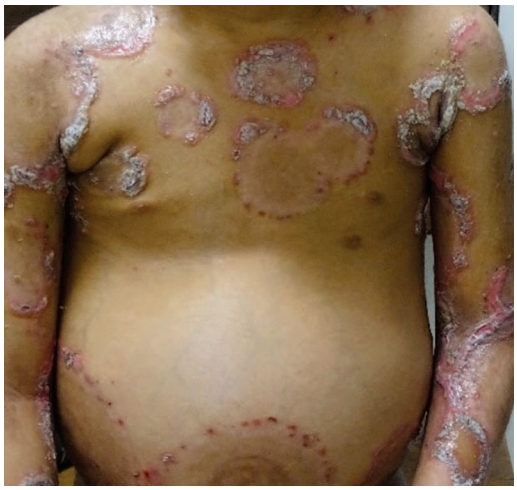

Fig. 9.22 Same boy, close-up

immune complexes may be picked up by indirect immunofluorescence testing (IIF). Pemphigus foliaceus is an autoimmune blistering disorder, akin to a more severe disease, pemphigus vulgaris. In both diseases, there is separation and destruction of epidermal cells called acantholysis. While in the former the acantholysis is at granular cell layer with formation of subcorneal blisters, in the latter the separation is at suprabasal level with formation of suprabasal intraepidermal bullae. In both the conditions there is deposition of IgG, IgM and C3 in the intercellular spaces. Pemphigus foliaceus is a milder version of the disease with a seborrhoeic distribution of superficial bullae, rare involvement of mucosae, requiring much lesser dosage of systemic corticosteroid(s) with a fairly good prognosis (cf. Pemphigus vulgaris).

Treatment

Before the advent of corticosteroids, most of the patients with PV used to die of septicemia and related complications. Corticosteroids are given in high dosage (2–5 mg/kg/day). Subsequently immunosuppressive, e.g. azathioprine or cyclophosphamide may be added while tapering off the steroids once the severity of PV is brought under control. Pulse therapy of steroid using either methyl prednisolone or dexamethasone along with cyclophosphamide has also been used successfully in the treatment of PV in children.

Pemphigus foliaceus (PF) usually follow a less severe course as compared to PV. It may be treated successfully with dapsone 1–2 mg/kg/day. If dapsone fails, oral corticosteroids may be used, but at a much lower dosage (1–2 mg/kg/day) for shorter duration than PV. Immunosuppressives are usually not required. For localized lesions, moderality potent or potent topical corticosteroids may prove useful. For both PV and PF, oral antistaphylococcal antibiotics may be required from time to time, since the skin erosions may get secondarily infected mostly by *Staphylococcus aureus*.

SUBCORNEAL PUSTULAR DERMATOSES (Figs 9.23 to 9.26)

It is a rare, chronic, vesico-pustular disease characterized by exacerbation and remission and chiefly affects middle aged women.

However, occasionally it can affect adolescent boys and girls also. Pathogenesis is poorly understood. Cytokines such as IL-8, TNF-α liberated from keratinocytes and monocytes may have some role in neutrophilic activation. Some cases are reported to be associated with monoclonal gammopathy.

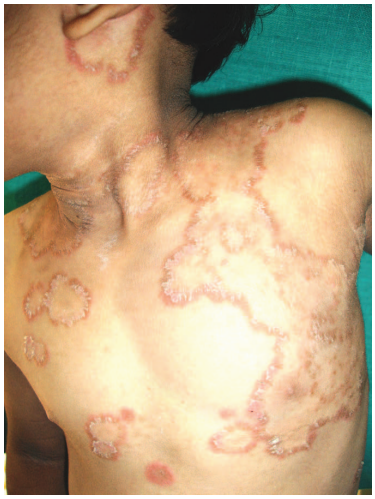

Fig. 9.23 Subcorneal pustular dermatoses in a 7-year-old boy

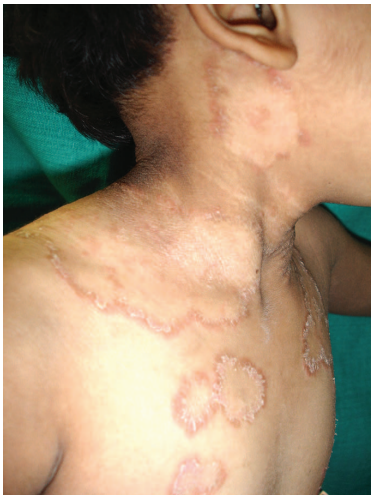

Fig. 9.25 Annular scaly lesions of subcorneal pustular dermatoses

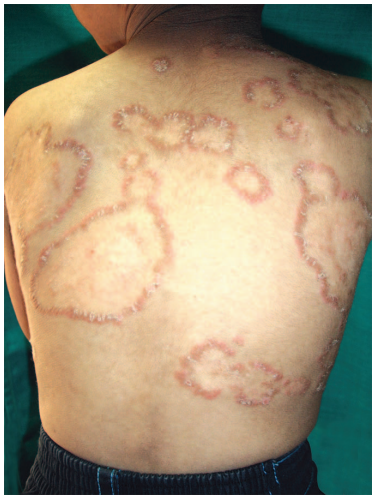

Fig. 9.24 Same boy, lesions over back

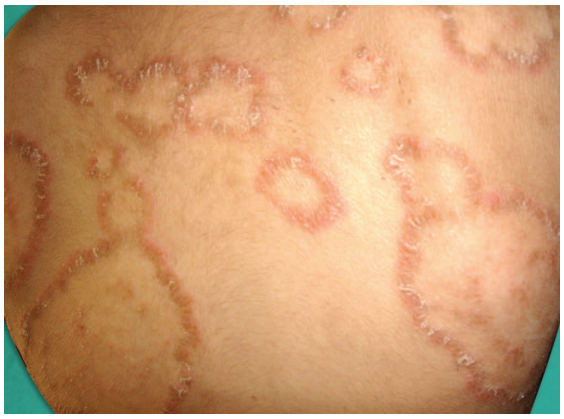

Fig. 9.26 Close-up of subcorneal pustular dermatoses lesions

Clinically the disease is characterized by crops of small, flaccid, superficial pustules on an erythematous or normal base and arranged in a serpiginious or annular pattern. Lesions are chiefly distributed over axilla, groin, abdomen, inframammary region and flexor aspect of limbs. Palms, soles, face, mucous membranes are usually spared. Within a few days lesions resolve with thin, dry, superficial crust. Healed lesions may leave some residual hyper pigmentation without atrophy or scarring. Patient may complain of mild pruritus but systemic symptoms are characteristically absent.

Histopathology revels subcorneal pustules filled with polymorphonuclear leukocytes. Though acantholytic cells are usually absent, some of the older lesions show acantholytic cells near the base. Spongiform pustules may be noted in the upper epidermis. Though negative immunofluorescence is the usual feature, some cases are found to be associated with intercellular IgA staining in the upper epidermis. Pustules are sterile on bacterial culture.

Differentiation between subcorneal pustular dermatoses (SCPD) and impetigo can be made by negative culture of the former and excellent response to antibiotics of the latter. Findings favoring diagnosis of subcorneal type of IgA pemphigus and pemphigus foliaceus are abundant acantholytic cells in histopathology and positive immunofluorescence. Generalized pustular psoriasis can be diagnosed by presence of systemic symptoms, spongiform pustules in the epidermis and failure to respond to sulfones.

Localized cases may be treated with topical steroids. Drug of choice is dapsone (50–200 mg). Sulfapyridine is also very effective. During dapsone therapy regular monitoring of complete blood count should be kept in mind. Other modalities such as acitretin, narrow band UVB therapy, colchicine, biologicals and azithromycin can be tried.

10

Neurocutaneous Disorders

TUBEROUS SCLEROSIS COMPLEX (Figs 10.1 to 10.6A)

This represents a genetic disorder of hamartoma formation in many organs like the skin, brain, eye, kidney and heart. It is an autosomal dominant disease and genetic studies have shown that about half the tuberous sclerosis complex (TSC) families are linked to *9q34 (TSC 1)* and the other half to *16p13 (TSC 2)*. The characteristic features of the syndrome are skin lesions, mental retardation and epilepsy. Onset is usually before the age of 5 years. The 'Tuberous Sclerosis Association' divides the clinical features into three groups:

Primary Features

Facial angiofibromas, multiple ungual fibromas, cortical tuber, subependymal nodule or giant cell astrocytoma.

Secondary Features

Affected first degree relatives' cardiac rhabdomyoma, retinal hamartoma, cerebral tubers, noncalcified subependymal nodules, shagreen patch, forehead plaque, pulmonary lymphangiomyomatosis, renal angiomyolipoma, renal cysts.

Tertiary Features

Hypomelanotic macules, renal cysts, dental enamel pits, hamartomatous rectal polyps, bone cysts, pulmonary lymphangiomyomatosis, gingival fibromas, hamartomas of other organs, infantile spasms. The presence of one primary and two secondary features or one secondary and two tertiary features allows the diagnosis of definite TSC. Skin lesions are found in 60–70% of cases. Lesions of four types are pathognomonic.

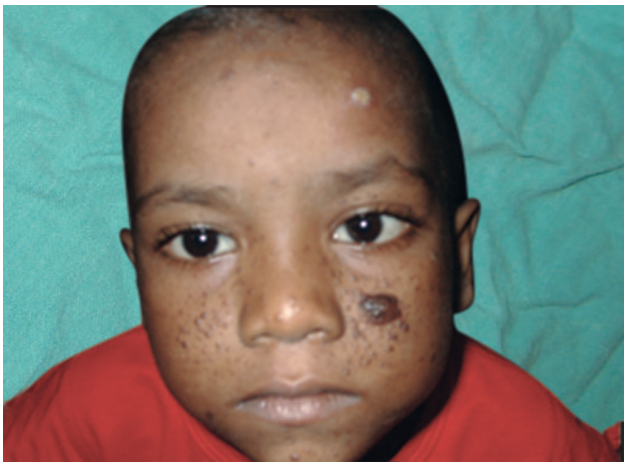

Fig. 10.1 Adenoma sebaceum over the face

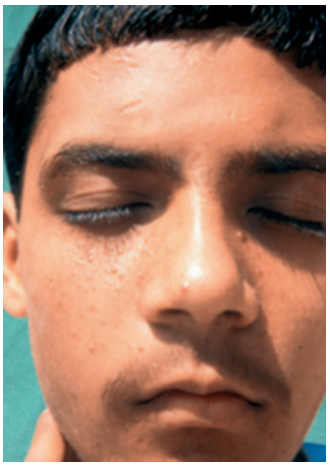

Fig. 10.2 A full blown case of epiloia with angiofibroma over face

"But at my back I always hear Time's winged chariot hurrying near."—Andrew Marvell

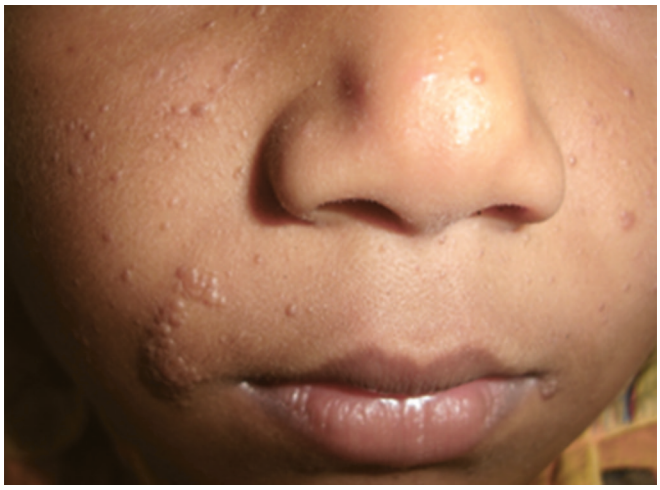

Fig. 10.2A Adenoma sebaceum lesions

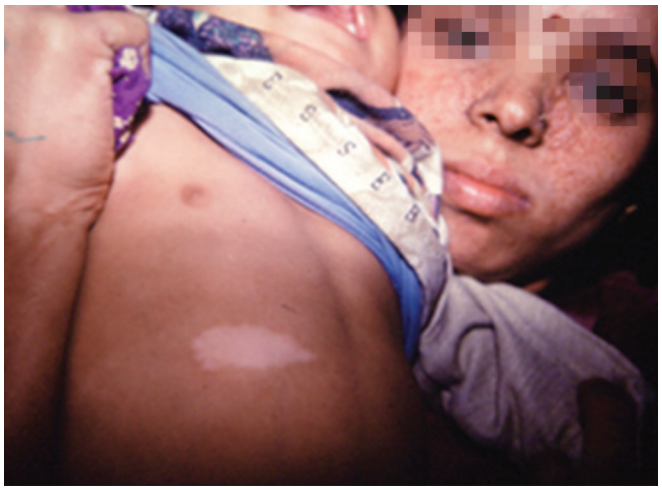

Fig. 10.3A Adenoma sebaceum in mother and ash-leaf macule in child

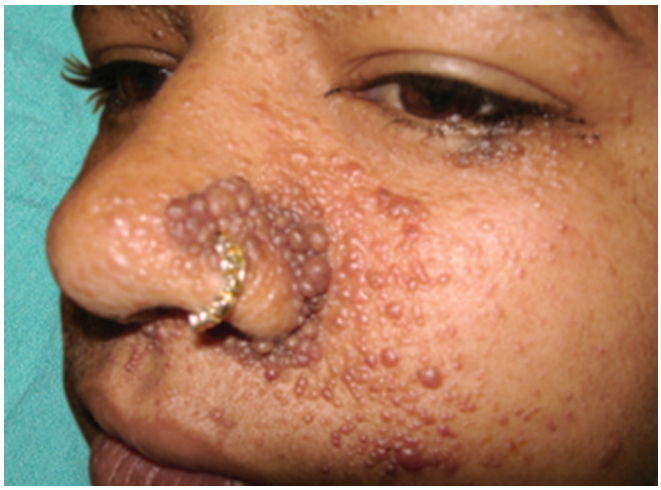

Fig. 10.2B Classical angiofibroma (adenoma sebaceum)

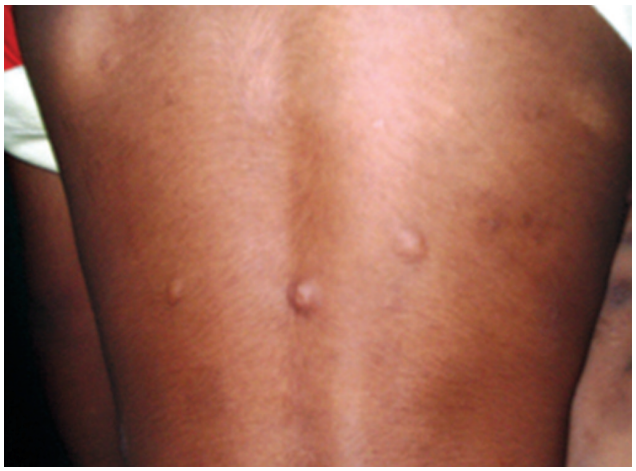

Fig. 10.4 Collagenoma or shagreen patches over back

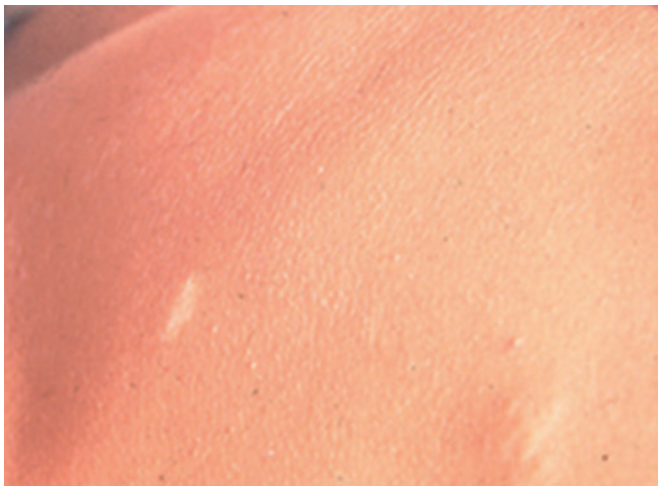

Fig. 10.3 Shagreen patch and ash-leaf macule over back

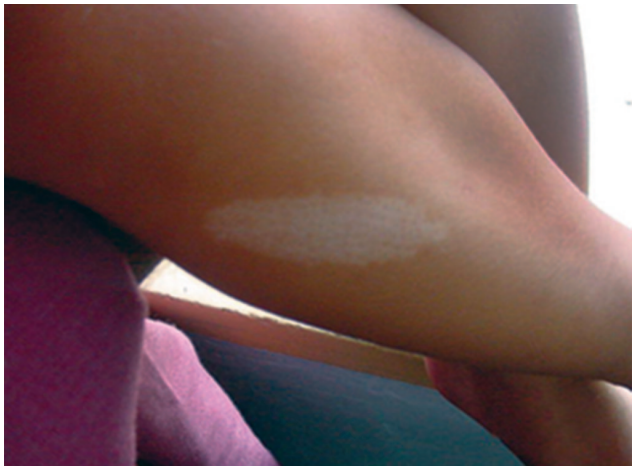

Fig. 10.5 Ash-leaf macule, note the typical shape of it

"Good people do not need laws to tell them to act responsibly, while bad people will find a way around the laws."—Plato

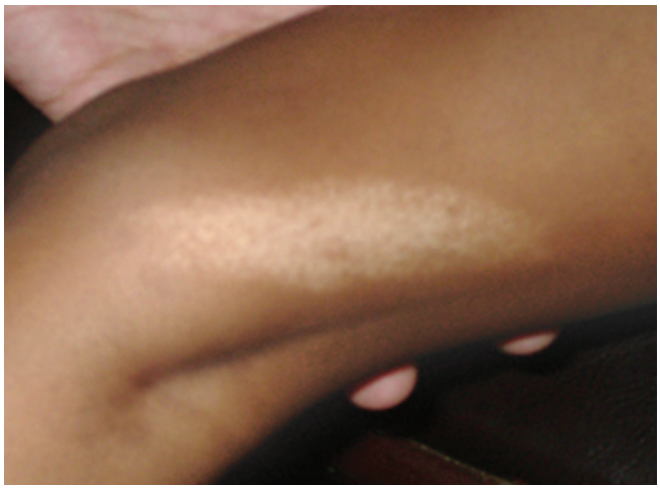

Fig. 10.5A Ash-leaf macule, close-up

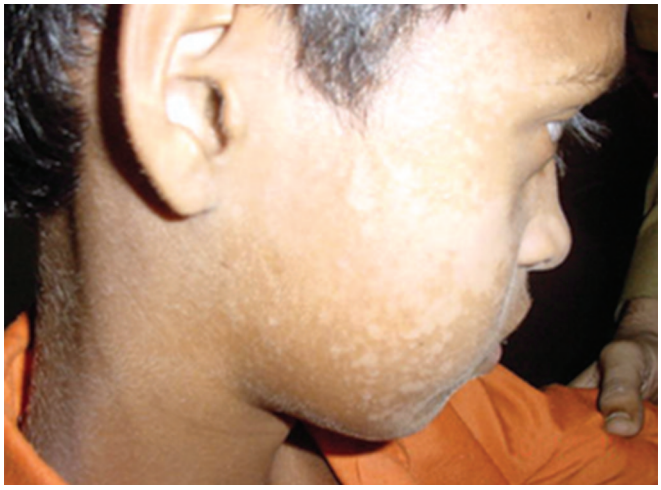

Fig. 10.6 Hypopigmented macules of tuberous sclerosis

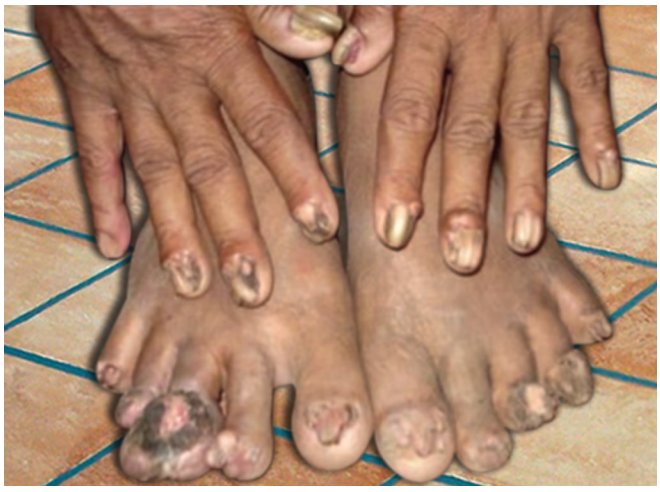

Fig. 10.6A Periungual fibroma or Koenen's tumor

Angiofibroma

Often called adenoma sebaceum, these usually appear between 3 and 10 years, often become more extensive at puberty and then remain unchanged. Firm discrete, red-brown, telangiectatic papules, 1–10 mm in diameter, extend from the nasolabial furrows to the cheeks and chin. They may be numerous and conspicuous. They may be overlooked, when confined to a small area on each side of the nose or chin.

Periungual Fibromas

These appear at or after puberty as smooth, firm flesh colored excrescences emerging from the nail folds. They are usually 5–10 mm in length, but may be very large.

Shagreen Patch

This presents as an irregularly thickened, slightly elevated, soft, skin colored, plaque usually over the lumbosacral region.

Ash-Leaf Macules

These white macules 1–3 cm in length, most easily detectable by examination under Woods light, are frequently present on the trunk or limbs. This valuable sign may be found at birth or in early infancy, some years before the other signs of the disease develop and may suggest the diagnosis in infants with convulsions.

Seizure disorders associated with tuberous sclerosis often respond to anticonvulsant therapy. Death may result from status epilepticus, pulmonary or renal insufficiency, cardiac failure, etc. Adenoma sebaceum is a cosmetic problem and may be removed by electrosurgery, cryosurgery, dermabrasion or Laser therapy. For relief of symptoms related to tumors of internal organs, surgery may be required. Genetic counseling against childbearing is recommended as their children may be more severely affected. Most children with tuberous sclerosis die before the age of 25 years. All patients with skin lesions do not develop seizures or mental retardation. Many patients have abortive form of this disease and may have normal expectancy of life.

NEUROFIBROMATOSIS AND CAFÉ-AU-LAIT MACULES (Figs 10.7 to 10.8C)

This is an autosomal dominant disorder characterized by cutaneous pigmentation (café-au-lait macules or CALMs) and tumors of the nervous system, which present as changes in the skin, muscle, bones and endocrine system. It has no predilection for race, color or sex. There are 8 distinct types of neurofibromatosis each with prognostic significance and

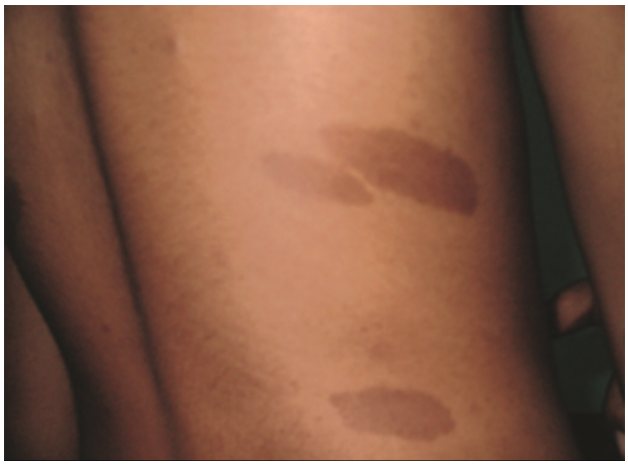

Fig. 10.7 Café-au-lait macules of neurofibromatosis, note regular border of macules

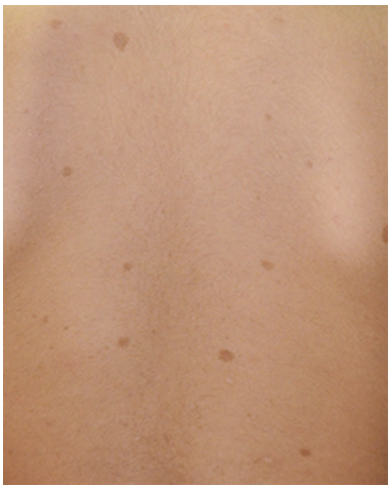

Fig. 10.7C Multiple small CALMs

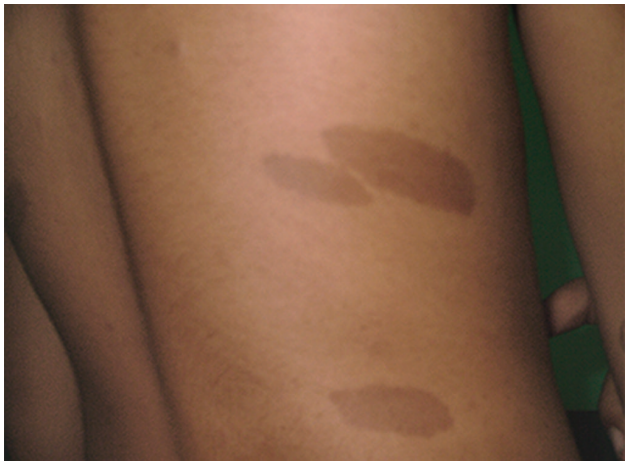

Fig. 10.7A Big sized CALM suggestive of NF

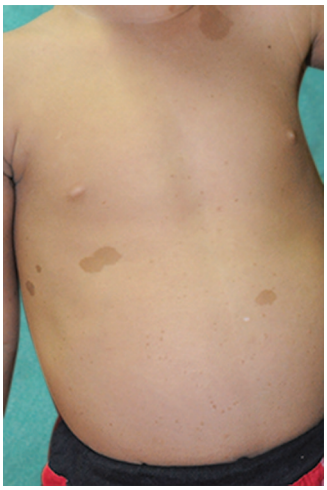

Fig. 10.7D Café-au-lait macules small sized and few in number

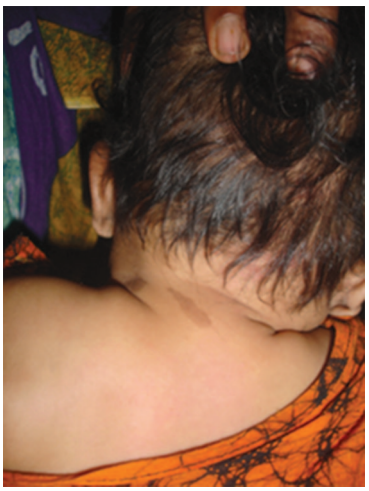

Fig. 10.7B CALM in a newborn

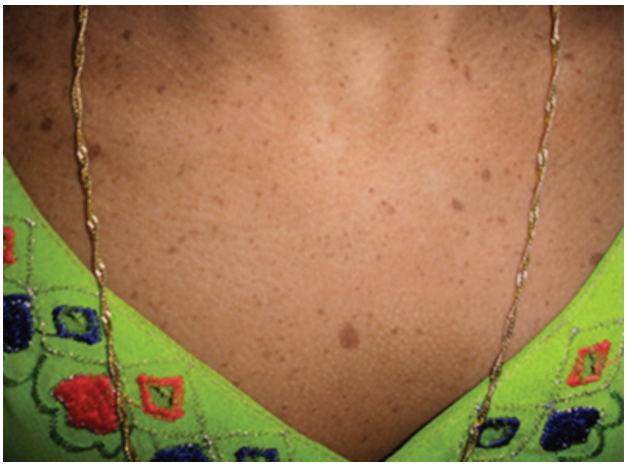

Fig. 10.7E CALM, multiple but very small sized

"Whenever I climb I am followed by a dog called 'Ego'."—Friedrich Nietzsche

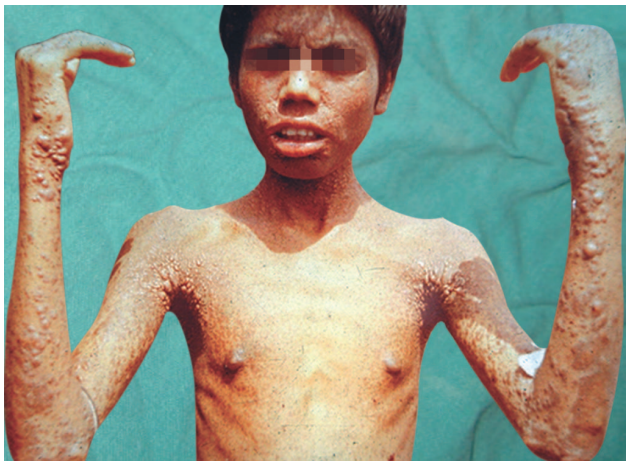

Fig. 10.8A Neurofibromatosis

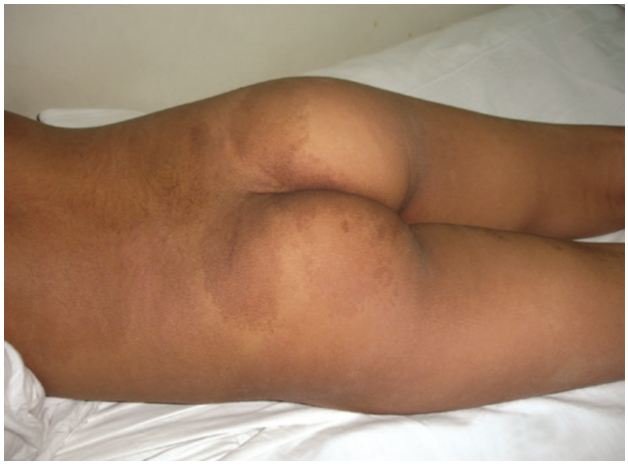

Fig. 10.8B Café-au-lait macule over buttock in a normal child

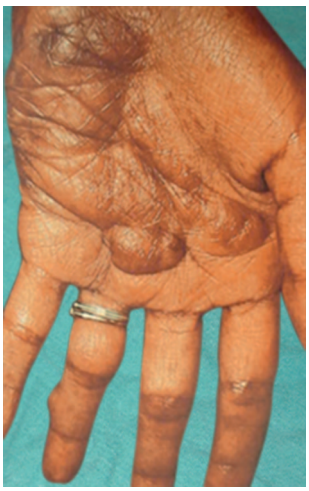

Fig.10.8C Neurofibroma over palm

implications for genetic counseling. Neurofibromatosis-1 is the most common accounting for 85% of the cases. The most characteristic cutaneous manifestations are the café-au-lait macules, the hallmark of the disease. Occurring anywhere on the body, the CALMs may be present at birth or may make this appearance during the first few months and often continue to increase in size and number during the first decade. Axillary freckling is another form of café-au-lait macules which also serves as valuable diagnostic tool in the early diagnosis of neurofibromatosis. The disease is also characterized by dermal and subcutaneous neurofibromas of Schwann cell origin derived from peripheral nerve sheaths. These cutaneous tumors usually appear in the late childhood or adolescence. They vary in number from a few to hundreds with a progressive increase in the size and number with the increasing age. They may appear as superficial tumors 1–2 mm to several centimeters in diameter or as discrete beaded, nodules, elongated masses along the course of the nerves. Plexiform neurofibromas involve deeply located large nerves, may reach enormous proportions and have a bag of worm consistency. Although, most of these tumors are benign, some may undergo malignant transformation, which is, however, rare before the age of 40 years. Another characteristic lesion occurring in NF-1 is the yellowish brown hamartomas on the iris known as Lisch nodules and are best visible on slit-lamp examination. Neurofibromatosis eventually leads to some form of systemic problem or compromise before the age of 20 years. The severity and progression is, however, variable and the cutaneous involvement is not indicative of the extent of the disease in other organs. Neurologic manifestations occur in 40% of the patients. Acoustic neuromas and optic gliomas are the most common lesions of the cranial nerves. Mental retardation, seizures and tumors are the neurologic manifestations of neurofibromatosis. Occasional defects in the form of scoliosis and kyphosis are common in neurofibromatosis. Disorders of the autonomic nervous system, intestinal involvement and endocrinal disturbances are the other systemic manifestations.

Management

Since many patients have minor or incomplete forms, reassurance for the parents and children affected with mild form is helpful. Treatment of the cutaneous tumors comprises of surgical excision, dermabrasion is targeted towards removal of the tumors which are either disfiguring or interferes with the function or are subject to irritation.

McCUNE ALBRIGHT SYNDROME (Fig. 10.9)

Café-au-lait spots also occur in Albright's syndrome (McCune Albright Syndrome which consists of polyostotic fibrous

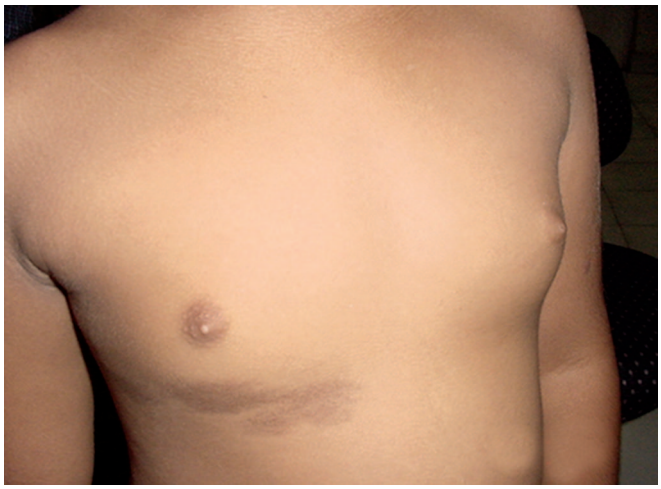

Fig. 10.9 Café-au-lait macule of McCune Albright's syndrome, note irregular border and midline restriction of the macule

dysplasia, endrocrine dysfunction, sexual precocity, and precocious somatic development, (especially in girls). In this disorder the pigmented lesions are few, light to dark brown, usually large and unilateral, frequently have a jagged irregular border (resembling the coast of Maine), and generally stop abruptly at the midline. This is in contrast to the smooth outline (resembling the coast of California) and light brown color of the spots seen in Von Recklinghausen's disease.

INCONTINENTIA PIGMENTI (Figs 10.10 to 10.12)

Incontinentia pigmenti (IP) is a complex hereditary syndrome in which vesicular, verrucous and pigmented cutaneous lesions are associated with developmental defects of the eye, skeletal system and central nervous system. This syndrome is due to an X-linked dominant trait that is lethal in males. The skin changes are often present at birth, have usually developed before the end of the first week and rarely appear after the first 2 months. Three clinical stages are recognized: bullae, papular and warty lesions and pigmentation, but their sequence is irregular, their duration variable and they may overlap. Clear tense bullae, often in linear groups develop in the limbs in recurrent crops. The crops continue for a few days or for a month or two. They are accompanied or followed by smooth, red nodules or plaques often irregularly linear, on the limbs and trunk. The plaques may be extensive and may precede the bullae. Linear warty lesions may appear on the backs of hands and feet, particularly on the fingers and toes. The pigmentation which may be the only abnormality may be present from the first or may appear as the inflammatory lesions are subsiding although not necessarily in the same sites, and inflammatory lesions can develop in areas already

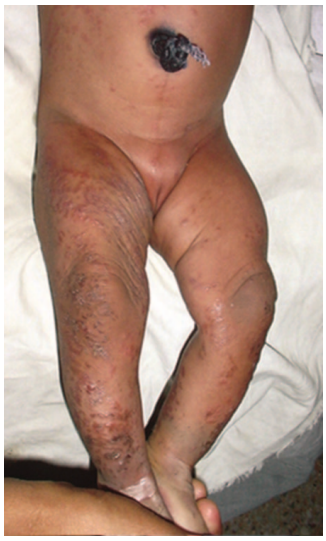

Fig. 10.10 Papules, vesicles and crusting along the Blaschko's lines over leg, thigh and trunk in a female baby with incontinentia pigmenti

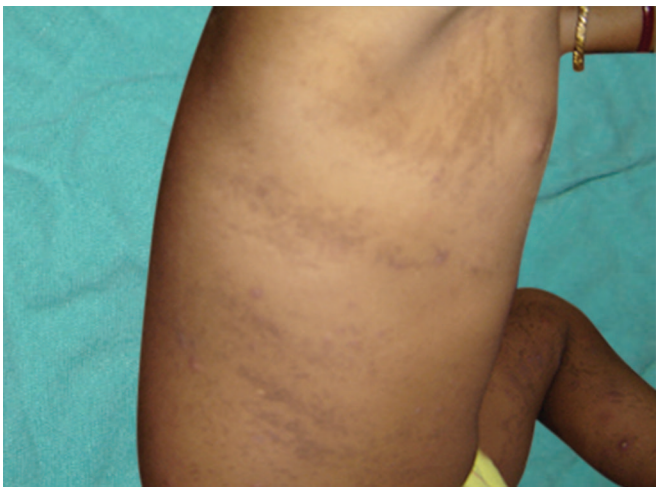

Fig. 10.10A Incontinentia pigmenti over trunk

pigmented. The pigmentation ranging in color from blue-gray or slate to brown, is characteristic of the syndrome and the bizarre splashed or Chinese figure distribution is characteristic. The pigmentation persists for many years slowly fading until it is imperceptible by the 2nd or 3rd decade.

Systemic Association

Other associated defects found in this condition are dental defects, ocular defects, central nervous system disorders and skeletal system abnormalities.

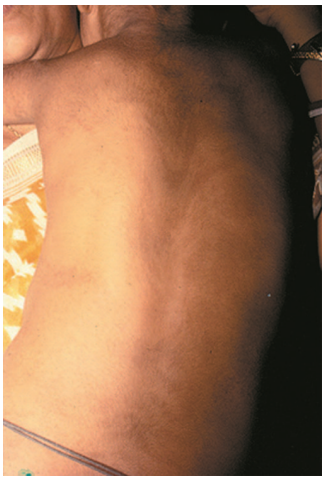

Fig. 10.11 Wavy bilateral symmetrical pigmented streaks of patches of IP over back

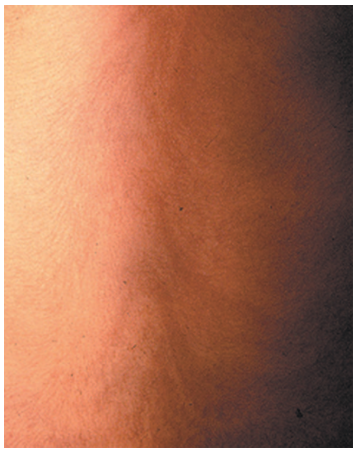

Fig. 10.11A Close-up of back of the same child

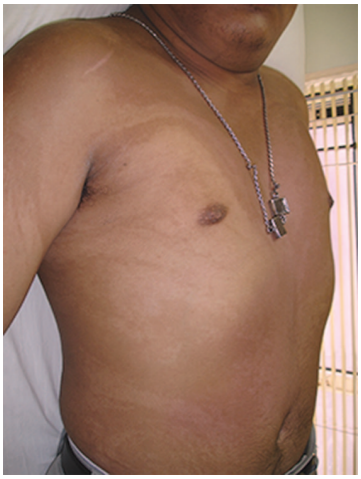

Fig. 10.12 Incontinentia pigmenti in an adolescent boy

Treatment

There is no specific treatment. Genetic counseling for carrier females is advisable. Associated systemic defects are to be addressed. Fever in the first week of life in association with IP heralds a poor prognosis with subsequent developmental delay. Normal developmental milestones and absence of seizure early in life offer a better prognosis.

HYPOMELANOSIS OF ITO (Figs 10.12A to 10.13)

This is manifested by whorled appearance of depigmented areas of varying extent, unilateral or bilateral. The appearance resembles the late stage of incontinentia pigmenti but this is a separate disease without the preceding inflammatory stages and without the sex-linked inheritance of incontinentia pigmenti. There may be associated disorders in the musculoskeletal system, teeth, eyes and central nervous system.

Appearance of hypopigmented lesions in absence of previous inflammatory dermatosis, should alert a pediatrician/dermatologist about hypomelanosis of Ito (HMI).

Treatment

All patients with multiple and bilateral hypopigmented lesins should be evaluated for musculoskeletal, developmental, ocular, dental, hair and other anomalies. Neurologic assessment and a electroencephalogram (EEG) are also mandatory.

PIGMENTARY MOSAICISM (Fig. 10.13A)

Pigmentary mosaicism is a term used for all pigment anomalies caused by chromosomal mosaicism. It is

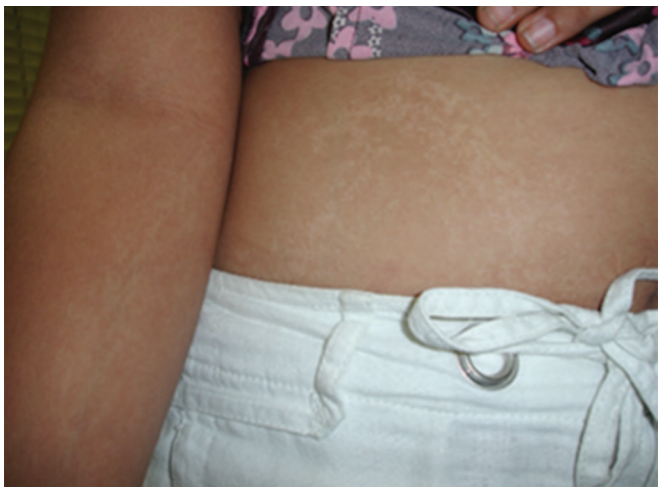

Fig. 10.12A Hypomelanosis of Ito (close-up)

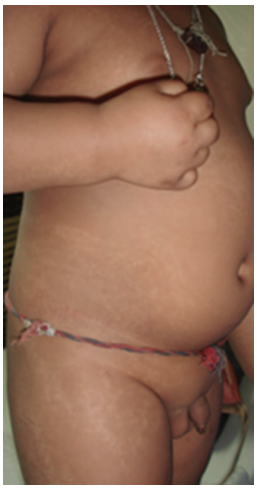

Fig. 10.12B Hypomelanosis of Ito(very faint lesions)

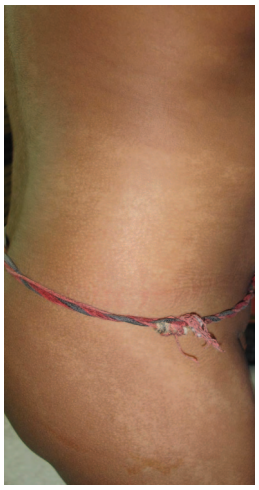

Fig. 10.12C Same boy with HMI

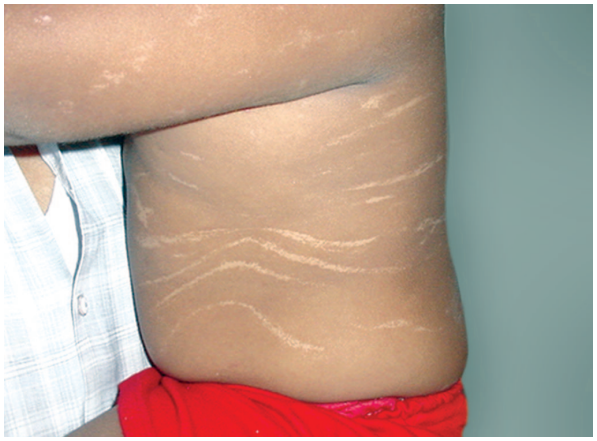

Fig. 10.13 Streaks of hypo/depigmented macules over the trunk in a 3-year-old girl with hypomelanosis of Ito

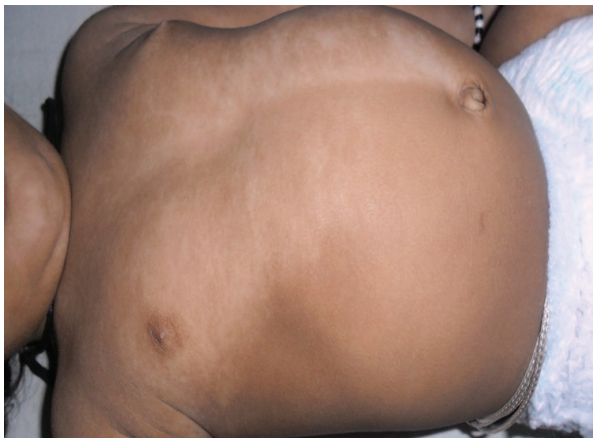

Fig. 10.13A Pigmentary mosaicism

characterized by hypo-or hyperpigmented lesions along the lines of blaschko, phylloid, chequer board pattern and patchy pigmentation without midline separation. It is an umbrella term that includes conditions hypomelanoses of Ito, linear and whorled nevoid hypermelanosis, phylloid hypo- and hypermelanosis and pigmentary mosaicism of hypopigmented and hyperpigmented type. This group of disorders may be associated with or without systemic abnormalities. Pigmentary mosaicism has been associated with extracutaneous features. Most common association is neurological deficits like epilepsy, learning difficulties, spasticity, hypotonia, and microcephaly and musculoskeletal features facial dysmorphism, asymmetry of limbs, short stature, syndactyly and kyphoscoliosis. Pigmentary mosaicism should be differentiated from incontinentia pigmenti, nevus depigmentosus and Goltz syndrome.

FAUN TAIL NAEVUS (Fig. 10.14)

Spina bifida occulta usually involves lumbar spine (diastematomyelia) and may occur in as many as 20% of all individuals; only a small percentage will have significant associated neurological defect. In about 50% of cases there is a dermal dimple or sinus, a lipoma, soft silky hairs (called faun tail), a pigmented macule, a skin tag, a dermoid cyst, an infantile hemangioma or a port wine stain.

Treatment

Underlying neurological defect is to be treated by a pediatric neurologist. For cosmetic purpose, the hairs can be removed by epilating creams, or may be shaved off time-to-time. Laser epilation will give long-term cosmetic camouflage.

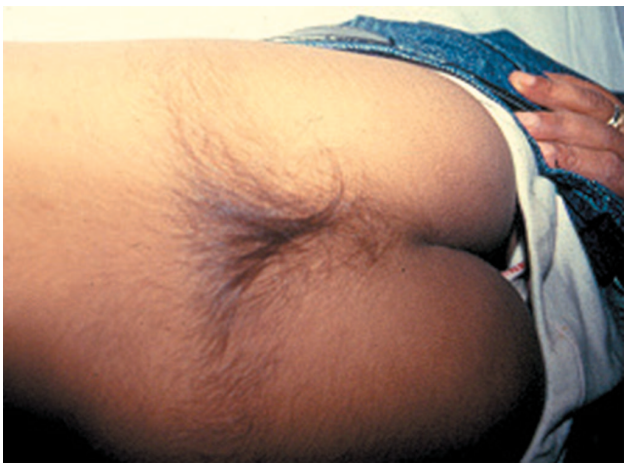

Fig. 10.14 Tuft of hairs over lumbosacral area in a child with spina bifida

MENINGOMYELOCELE (Figs 10.15 and 10.16)

Meningomyelocele are common form of spinal dysraphism. It is the most common neurological congenital anomaly affecting approximately 300,000 newborns yearly worldwide. They affect 1 in 1000 established pregnancies. Meningomyelocele are open neural tube defects resulting from incomplete closure of vertebral column during embryogenesis resulting in exposure of the meninges or spinal cord. The progression of spinal neurulation along the body axis is delayed or halted. The inheritance of meningomyelocele is multifactorial. Maternal folic acid deficiency is strongly associated with neural tube defects.

Clinically, meningomyelocele presents with swelling over the back noticed from birth. Initially presents as CSF leak since the skin is poorly developed. Sites involving meningomyelocele are thoracolumbar, lumbosacral, lumbar, sacral and cervical. Cutaneous lesions associated with spinal dysraphism includes hypertrichosis, dimples, acrochordons, lipomas, hemangioma, aplasia cutis, dermoid cyst, telangectasia, capillary malformation, hyperpigmentation, melanocytic nevi, small sacral dimples and teratomas. Meningomyelocele is associated with various neurological and skeletal defects. Management of meningomyelocele is multidisciplinary. Surgery with treatment of complication is the main stay of management. Parents must be counseled about the prognosis.

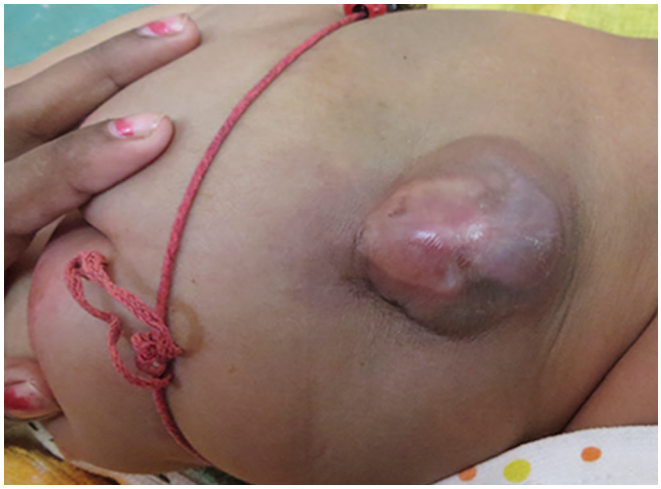

Fig. 10.15 Meningomyelocele in a newborn

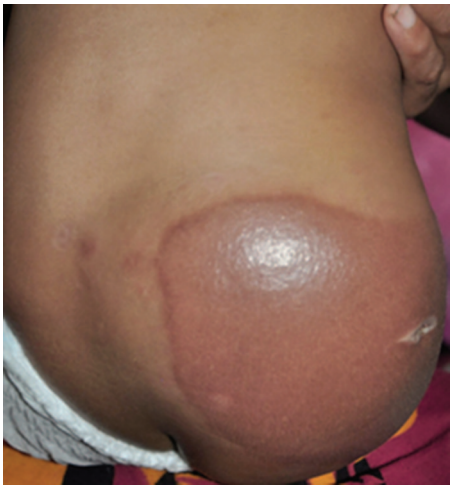

Fig. 10.16 Meningomyelocele in a 5-month-old baby

"To live is the rarest thing in the world. Most people exist, that is all."—Oscar Wilde

11

Pigmentary Disorders

VITILIGO (Figs 11.1A to 11.4C)

Vitiligo results from autoimmune destruction of the melanocytes, the exact etiology for which is still elusive. Depending on the distribution of lesions, it can be of several types: focal, segmental, vulgaris, universal, lip-tip (involvement of lips and tip of the fingers and toes), etc. The disease is often associated with other autoimmune cutaneous and systemic disorders, e.g. alopecia areata, lichen planus, psoriasis or Addison's disease, autoimmune thyroiditis, autoimmune hepatitis, pernicious anemia, diabetes mellitus, etc. Familial incidence is approximately 20–30% of the cases. It is not uncommon disease in pediatric age group where segmental variant is seen more commonly, infrequently associated with auto-immune systemic disease and the response to treatment is better (cf. western literature), so also the prognosis. Repigmentation, perifollicular and at the border of patches is fairly good with topical steroid(s).

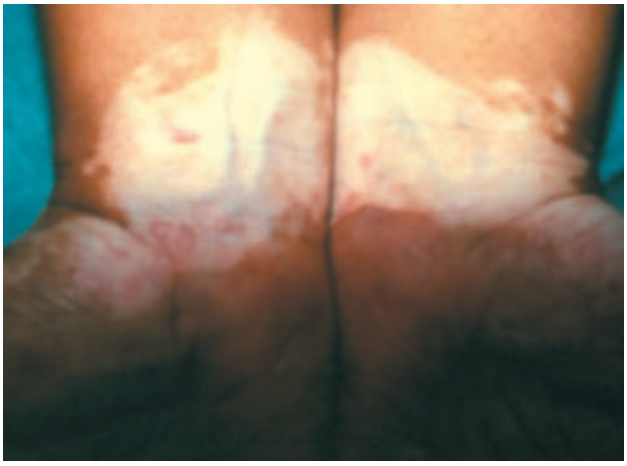

Fig. 11.1A Depigmented patches of vitiligo in a mirror-image distribution over the wrists

Prognosis

Presence of leukotrichia over vitiligo patches is a bad prognostic sign as far as the repigmentation of patches is concerned.

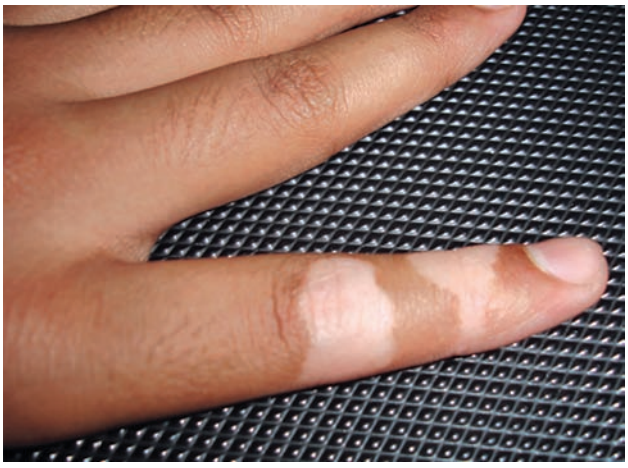

Fig. 11.1B Focal vitiligo

Differential Diagnosis

However, presence of leukotrichia helps to differentiate vitiligo from other hypo/depigmentary disorders, e.g. leprosy, nevus depigmentosus, post kala-azar dermal leishmaniasis (PKDL), post-inflammatory hypopigmentation, etc.

Treatment

Treatment is broadly classified into medical therapy and surgical therapy. In the medical therapy, topical corticosteroids are used. Mild for face and flexures, e.g. clobetasone,

"God is a comedian playing to an audience too afraid to laugh."—Voltaire

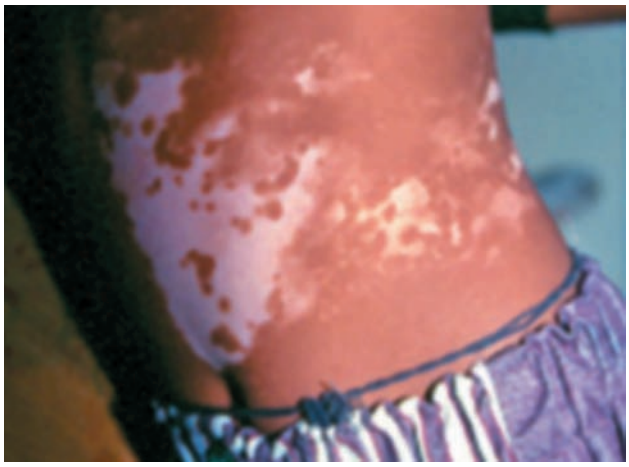

Fig. 11.2 Perifollicular repigmentation in vitiligo patch

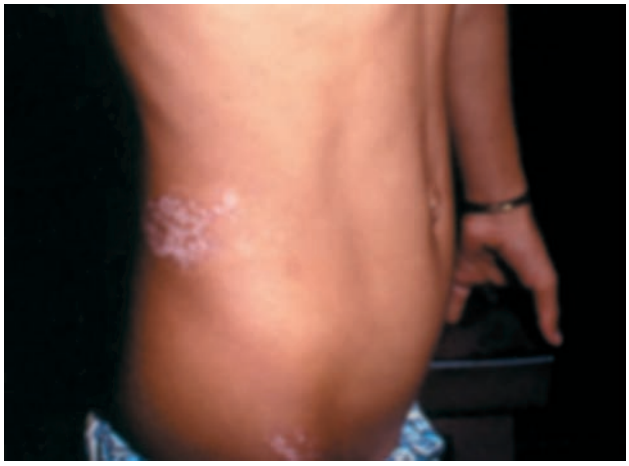

Fig. 11.3 Repigmenting vitiligo with topical corticosteroid

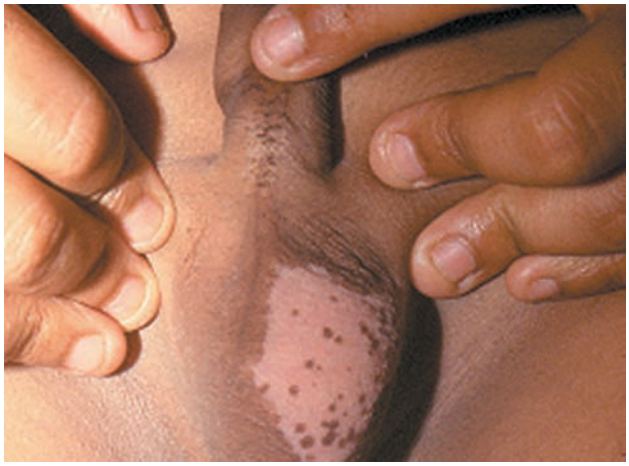

Fig. 11.4 Repigmentation over a scrotal patch in a boy aged 8 years (difficult site)

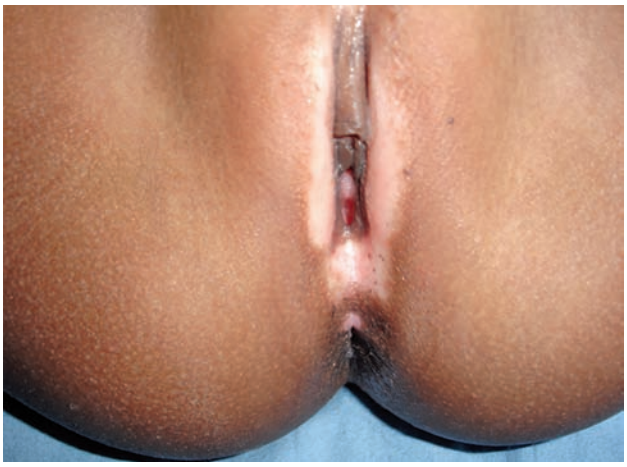

Fig. 11.4A Vitiligo over genitalia in a young girl

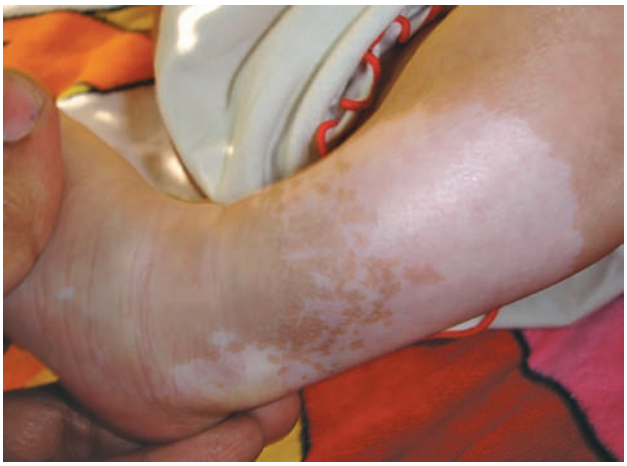

Fig. 11.4B Newborn with congenital vitiligo

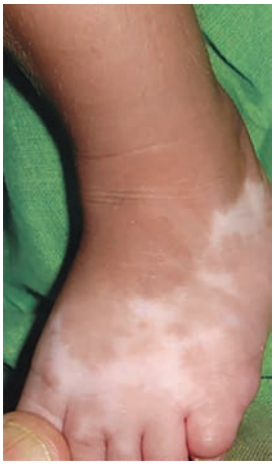

Fig. 11.4C Congenital vitiligo

"I am ready to meet my Maker. Whether my Maker is prepared for the great ordeal of meeting me is another matter."—Sir Winston Churchill

fluticasone, mometasone, moderately potent steroid, e.g. betamethasone valerate or potent steroid, e.g. clobetasol, betamethasone dipropionate are to be applied once/day for 2–3 months depending upon the response. The other popular medical therapy for vitiligo is photochemotherapy, where psoralen is combined with ultraviolet A (UVA), also known as PUVA therapy. Psoralens used are either trimethyl psoralen, 8-methoxy psoralen or 5-methoxy psoralen. Since 8-methoxy psoralen can cause marked phototoxicity, the preferred psoralen is trimethyl psoralen (TMP). It is given in a dose of 0.6 mg/kg/day with milk or light breakfast. Two hours after intake of medicine, exposure to sunlight is given 10–15 minutes initially followed by increments of 5 minutes every week to a maximum of 30 minutes. It is given on 2–3 days a week. Psoralen and ultravoilet A (PUVA) light therapy is recommended above 8 years (according to some workers 12 years) of age only. Other drugs which may be used for extensive vitiligo in children are oral levamisole, short course of corticosteroids, cytotoxic drugs, chloroquine, topical placental extract, etc. Recently topical tacrolimus (0.03 and 0.1%) have shown promising results in the treatment of localized vitiligo.

Once the spread of vitiligo is brought under control or the stability of vitiligo is achieved, various surgical procedures which can be undertaken are micropigmentation or tatooing, punch grafting, dermabrasion, split thickness skin grafting, melanocyte transfer, etc. One must remember that there is no dietary restriction required in such patients. There is no scientific documentation in favor of avoidance of sour food/drink, vitamin C or fruit juice, etc. Lots of reassurance, explaining and counseling of children and/or parents are required in the management of vitiligo.

CHEMICAL (CONTACT) LEUKODERMA (Figs 11.4D to G)

Contact leukoderma is an acquired leukoderma that occurs as a result of repeated topical or systemic exposure to a variety of chemicals and contact with metal, leather, etc. These chemicals are mainly alkyl phenols and catechols. They are used in the manufacturing of plastics, resins, synthetic rubber, paints, petrolatum products, deodorants, pesticides, disinfectants, germicides photographic chemicals, printing ink, varnishes, etc. These chemicals are also present in certain objects of our daily use e.g. foot wear, plastic watch strap, purse and bindis. Compounds of the phenolic group are thought to cause contact leukoderma by competitive inhibition of tyrosinase and release of toxic metabolites producing injury to the melanocytes. Injection of triamcinolone and botulinum toxin has also been implicated as a cause for contact leukoderma. This condition presents as well demarcated areas of depigmentation in the areas suspected to be in contact with a possible chemical implicated in the causation. Diagnosis is generally made

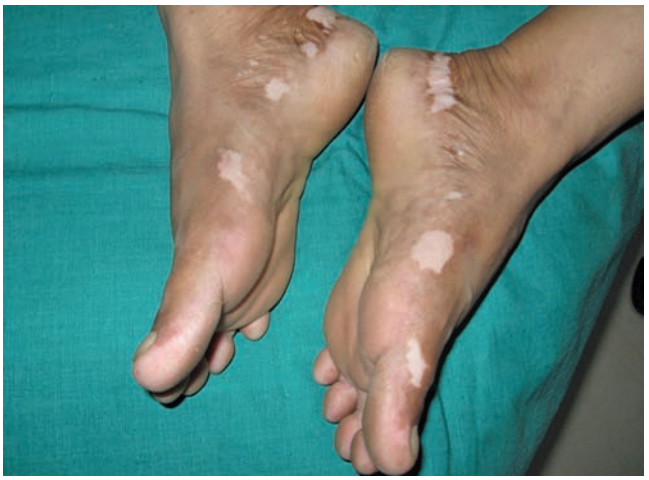

Fig. 11.4D CD to metal leading to depigmentation

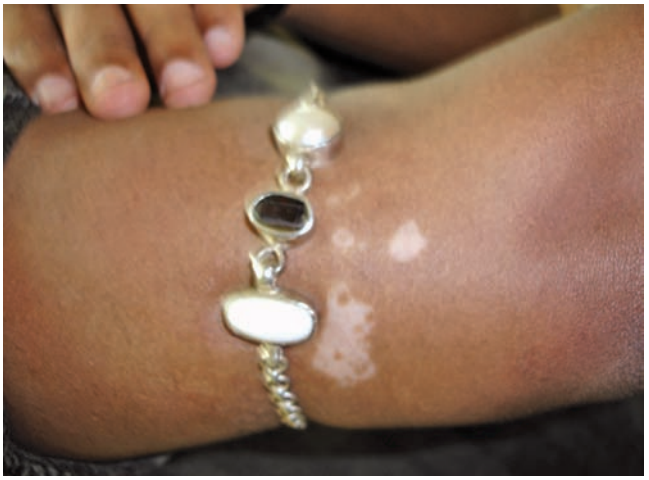

Fig. 11.4E CD metal with leucoderma

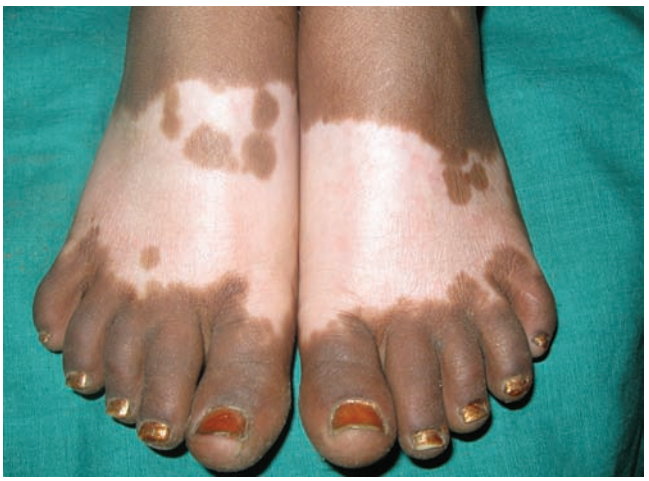

Fig. 11.4F Footwear leucoderma

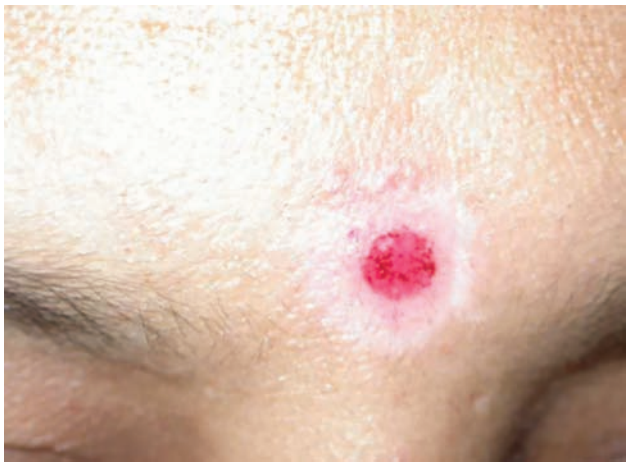

Fig. 11.4G Chemical leucoderma in 18-year-old girl

by history and clinical examination. Treatment includes removal of the offending agent and educating the patient regarding the possible sources of the implicated chemicals. Topical application with corticosteroids and tacrolimus has shown beneficial effects.

HALO NEVUS (Figs 11.4G1 to I)

Halo nevus is a benign melanocytic nevus in which a ring of hypopigmentation develops around the nevus. This hypopigmentation is due to immunologically medicated melanocytic damage. Majority of such nevi occurs in childhood and are mostly seen on the back. It classically presents as a ring of depigmentation around a dermal melanocytic nevus. Halo nevus are often seen in children having vitiligo.

Treatment

The nevi are usually benign and do not require excision. However, when the central melanocytic nevus looks atypical, it may require excision.

IDIOPATHIC GUTTATE HYPOPIGMENTATION (Figs 11.4J to L)

It is a disorder which is more common in the adults. The incidence of this condition increases with an increase in age. It is found occasionally in children with a female preponderance. It presents as about 5 mm–1 cm sharply defined porcelain white macules which are asymptomatic and does not increase in size. These macules are most commonly located on the extensor aspect of the forearms and shins, however lesions can also occur on the trunk.

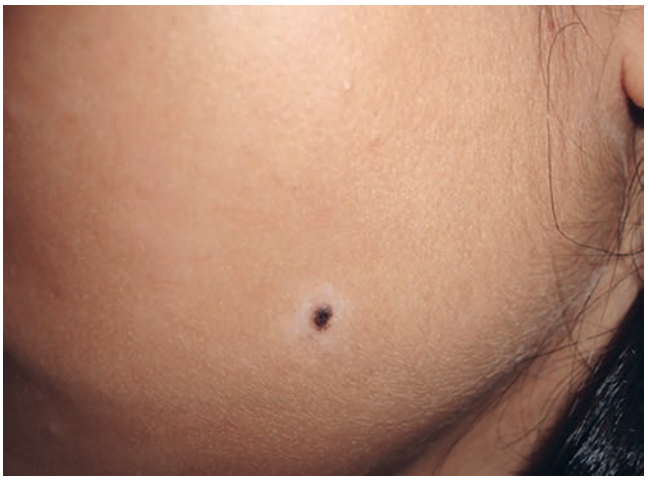

Fig. 11.4G1 Halo nevus

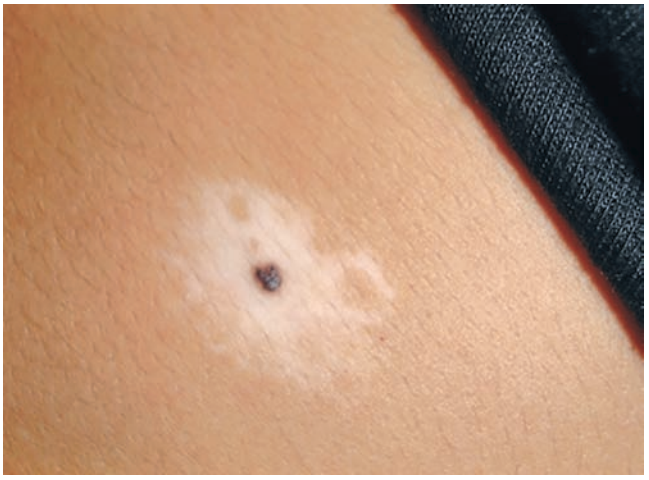

Fig. 11.4H Close-up of halo nevus

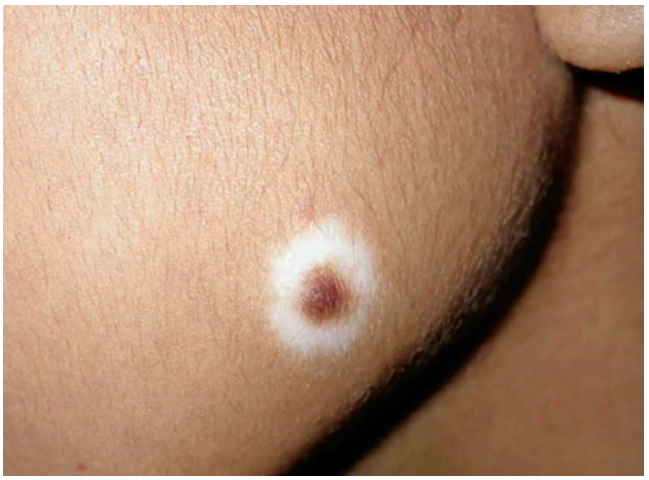

Fig. 11.4I Halo nevus in 6-year-old boy, note leukotrichia

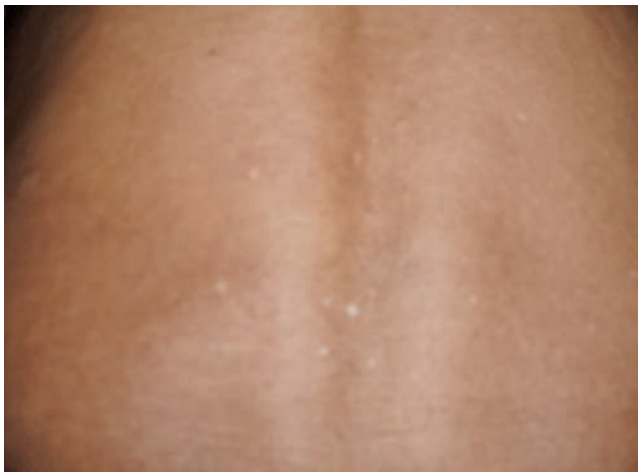

Fig. 11.4J Idiopathic guttate hypomelanosis over back

The pathogenesis remains unknown, although sun exposure is considered to be a triggering factor for this condition. The diagnosis is almost always clinical and the closest differential diagnosis is that of vitiligo. No treatment has been found to be effective for this disorder.

NEVUS DEPIGMENTOSUS (Figs 11.5 to 11.6A)

This is an isolated nevoid abnormality of skin presenting as circumscribed area of depigmentation usually present at birth, changing little thereafter. The lesions are often single but may be multiple, circumscribed and either rounded, dermatomal or in whorls and streaks resembling incontinentia pigmenti achromians of Ito. The condition is a fairly common congenital anomaly of skin.

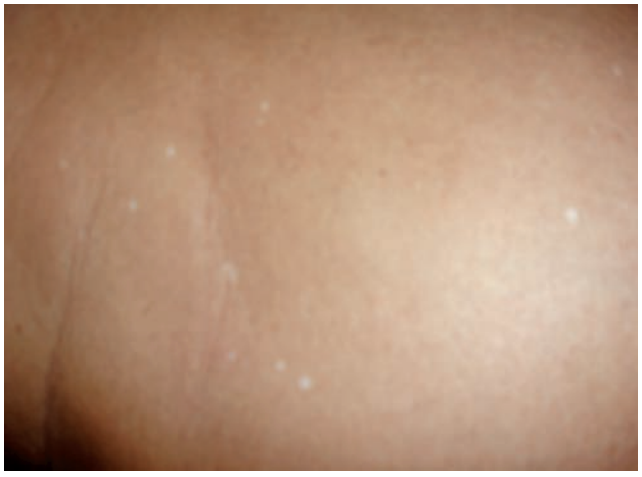

Fig. 11.4K IGH lesions

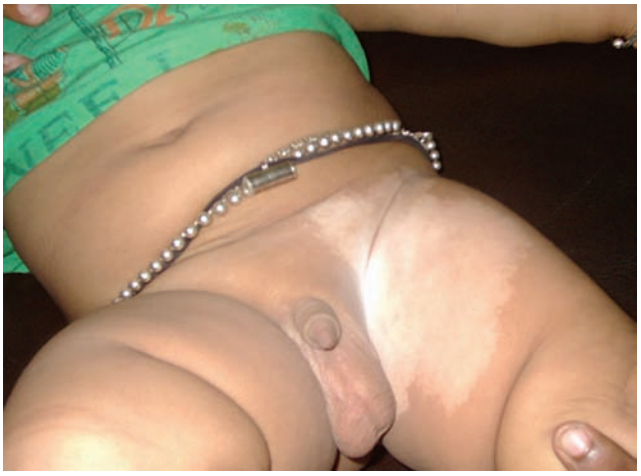

Fig. 11.5 Nevus depigmentosus, note irregular border

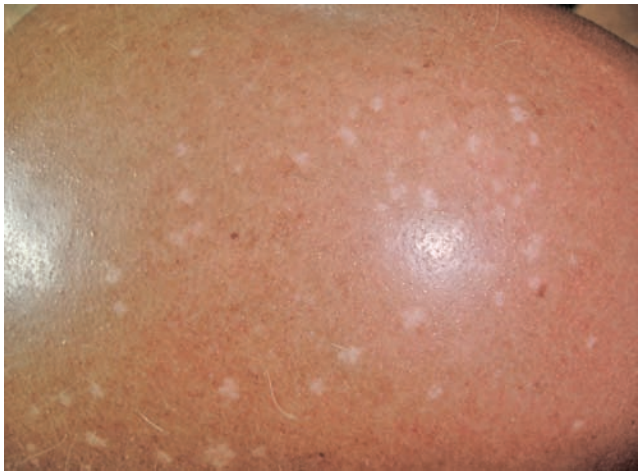

Fig. 11.4L Close-up of IGH lesions

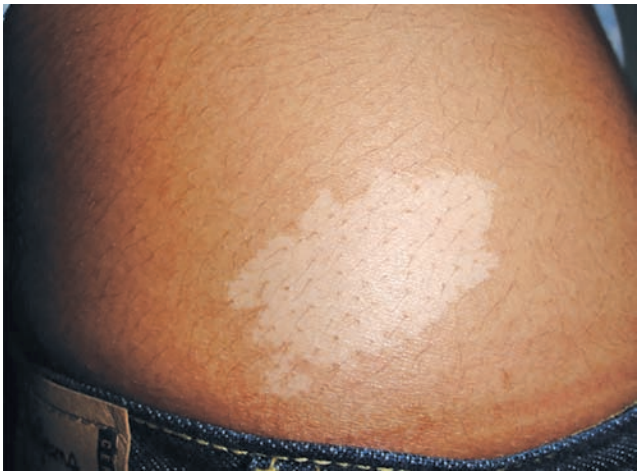

Fig. 11.6 Nevus depigmentosus

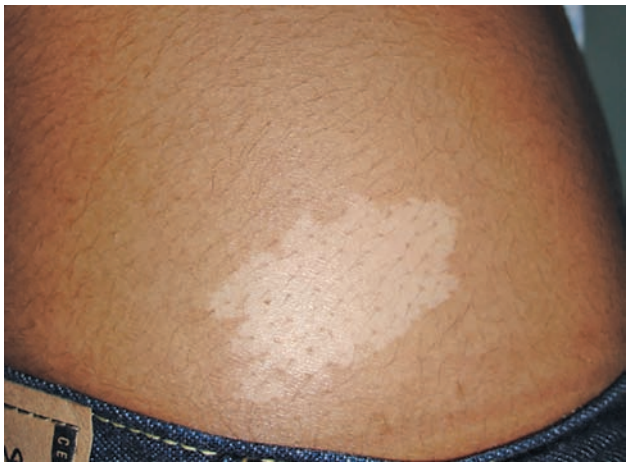

Fig. 11.6A Close-up of nevus depigmentosus, note serrated well-defined margin

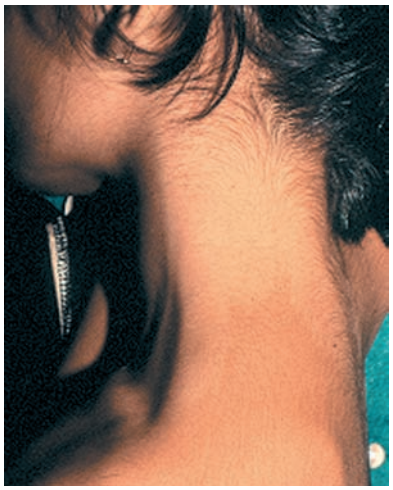

Fig. 11.7 Nevus anemicus over neck

Treatment

There is no specific treatment for this condition. The worried parents are to be told about the nature of this skin problem and that it is not leukoderma (meaning vitiligo) and that it will increase in size at par with the increase in body surface area with the growth and development of the child. And that appearance of new depigmented patches over other areas of the body is less likely. Reassurance and counseling of the parents form the cornerstone of management.

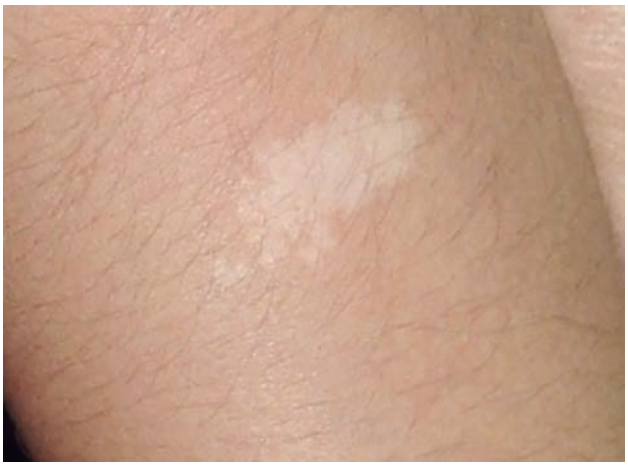

Fig. 11.7A Nevus anemicus

NEVUS ANEMICUS (Fig. 11.7 and 11.7A)

Nevus anemicus is a congenital anomaly of the skin, and is seen as circumscribed rounded, oval or linear area of pallor having a normal texture. Lesions may be single or multiple. Small blotches may be irregularly grouped. The margins of the lesion or lesions are ill-defined. Under diascopic pressure, the nevus becomes indistinguishable from the blanched surrounding skin. It occurs most commonly over the trunk. This type of congenital nevus is quite rare.

Treatment

The condition needs to be explained to the children and parents. Reassurance and counseling is very important.

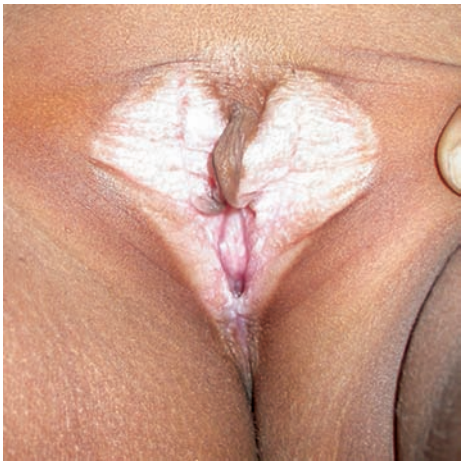

Fig. 11.8 LSA over external genitalia in a young girl

LICHEN SCLEROSUS ET ATROPHICUS (Figs 11.8 to 11.8G)

Lichen sclerosus et atrophicus (LSA) is an uncommon disease with unknown etiology in which small white areas of the skin may be associated with an atrophic scarring over the perineum in adult female. The condition over the female

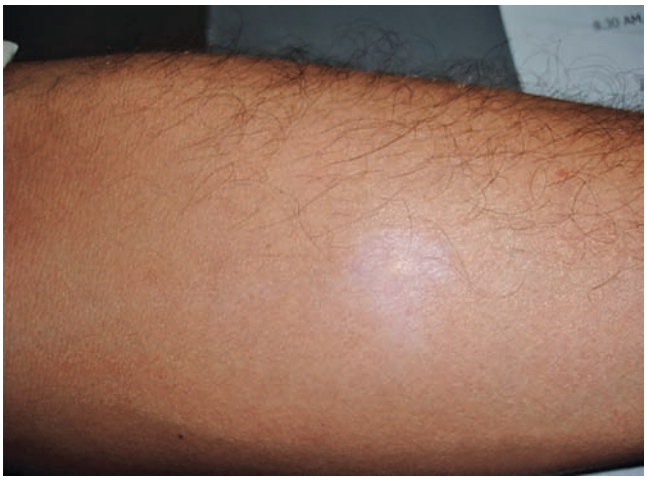

Fig. 11.8A Milky white sclerosed skin of LSA over thigh

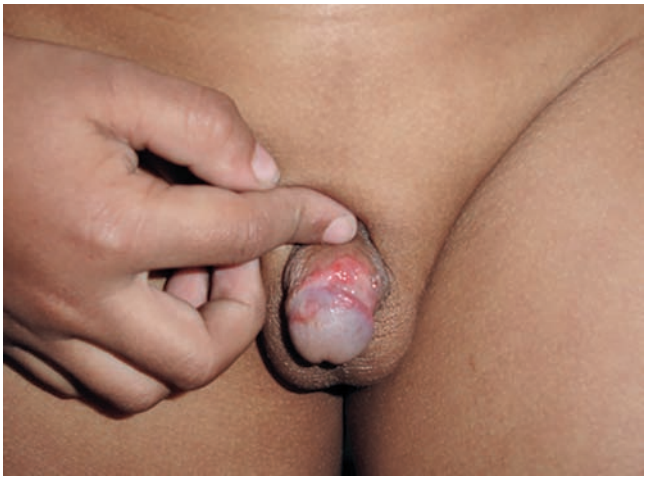

Fig. 11.8B LSA over glans penis and prepuce in 3-year-old boy

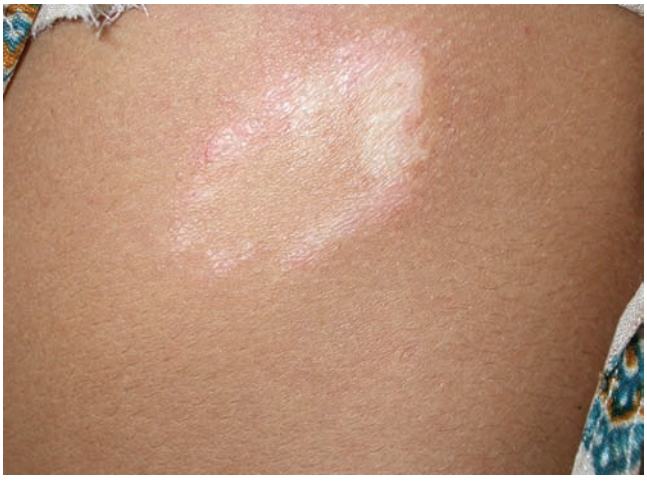

Fig. 11.8C LSA lesion, note lilac border

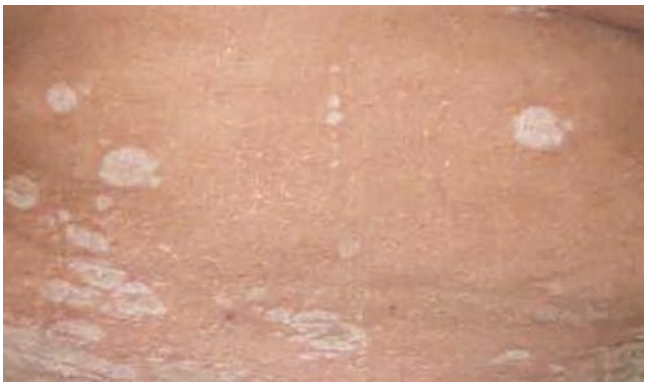

Fig 11.8D Lesions of LSA, note Koebner's phenomenon

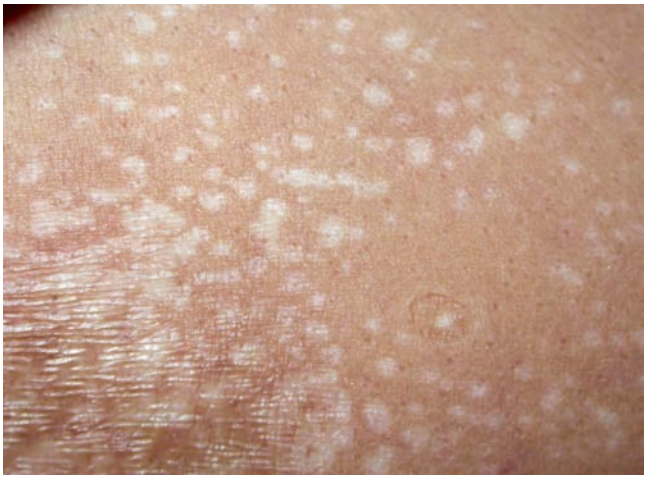

Fig 11.8E LSA lesions,
note porcelain-white appearance of lesions

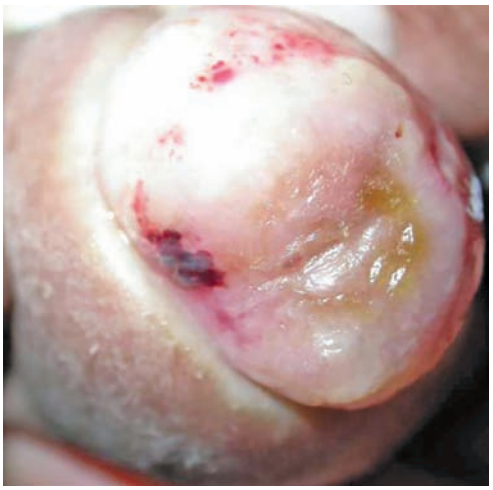

Fig. 11.8F LSA over glans and prepuce in
an adolescent male

"It's kind of fun to do the impossible."—Walt Disney

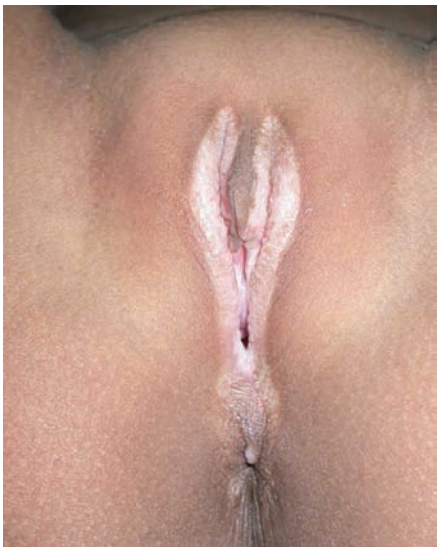

Fig. 11.8G LSA over vulva in a 9-year-old girl

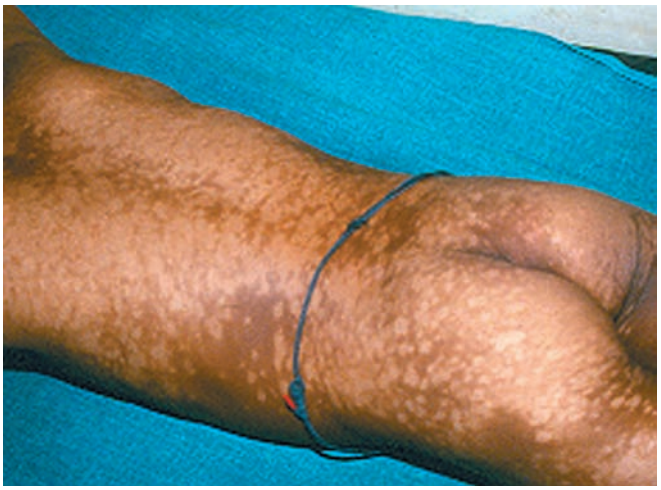

Fig. 11.9 Post kala-azar dermal leishmaniasis (PKDL) presents as hypo to mildly depigmented macules, widely distributed over trunk and/extremities

genitalia is known as kraurosis vulvae. It occurs in pediatric age group as well in the form of white patches over skin with follicular plugging and atrophy of the skin. Often these are misdiagnosed at vitiligo. However, the involvement of genitalia in children is not at all common.

Diagnosis

Histopathology of the skin confirms the diagnosis.

Treatment

Mild to moderately potent topical steroids, emollient offer some symptomatic relief. Over genital areas, addition of topical antibacterials and/or anticandidal may be helpful. Topical (2%) testosterone cream has also been advocated. Topical estrogen or progesterone gel is also used sometimes with success.

POST KALA-AZAR DERMAL LEISHMANIASIS (PKDL) (Fig. 11.9)

Hypopigmentations tend to remain inspite of treatment of PKDL. Nothing extra can be done for the hypopigmentation.

Management

However, counseling of the patients and/or parents of children in very important.

ALBINISM (Figs 11.10 to 11.13)

Albinism is an uncommon inherited disorder of melanin synthesis characterized by a congenital lack of pigmentation of the skin, hair and eyes. It occurs in two forms, oculocutaneous and ocular. Oculocutaneous albinism (OCA) is an autosomal recessive congenital disorder in which there is a generalized decrease or absence of pigment formation in the eyes, skin and hairs. There are at least 10 variants of OCA, tyrosinase positive, tyrosinase negative, yellow mutant, Hermansky-Pudlak syndrome and Chédiak-Higashi syndrome are to name a few. All types of OCA have the following common features.

- Generalized reduction (Brown OCA, Red OCA) or absence (all other types) of skin color.
- Tanning after sun exposure is deficient or absent.
- The skin is sensitive to acute and chronic sun exposure and develops xerosis, pachyderma and keratoses over the exposed parts.
- Translucent irides with nystagmus and hypopigmented ocular fundi.

Clinically, OCA manifests as generalized depigmented skin with white hairs all over from the time of birth. Other anomalies include small stature, mental retardation, developmental anomalies, reduced fertility and life expectancy.

Complications

Sun induced damage of the skin results in premature senility, freckling, lentigenes, actinic keratoses and, squamous cell carcinoma. Occasionally melanoma also develops.

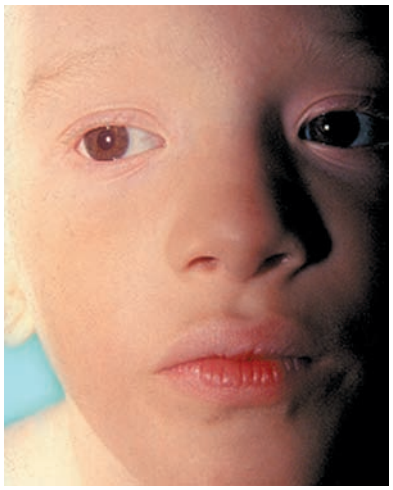

Fig. 11.10 Oculocutaneous albinism with red eye reflex

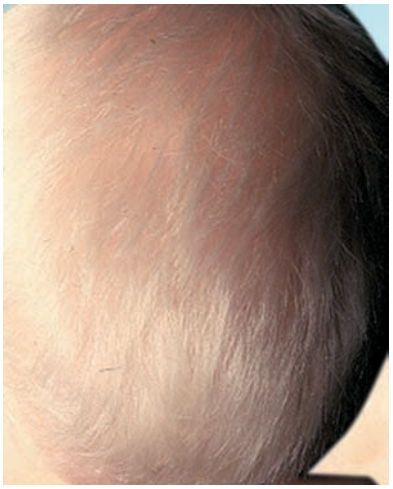

Fig. 11.11 White hairs in albinism

Fig. 11.12 White and brown hairs in albinism

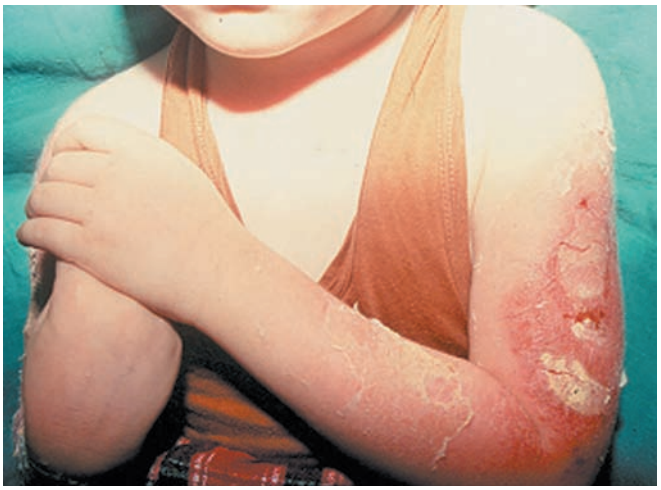

Fig. 11.13 Acute phototoxic reaction in an albino child

Management

Explaining the condition to the parents forms the crux of management protocol. The parents should be educated about exposing the affected children to sunlight as less as possible. An ophthalmological check-up is important. Sunscreens are to be used from the very infancy. In case of acute phototoxic reactions, topical steroids and antihistamines are to be used for 7–10 days to control it. If the reaction is severe, short (7–10 days) course of oral corticosteroids are helpful in providing symptomatic relief as well as enhancing the healing of the wounds. This to be followed by regular use of sunscreens.

LICHEN STRIATUS (Figs 11.14 and 11.14E)

Lichen striatus is a self limiting inflammatory linear dermatitis of unknown origin. It usually occurs in children between the ages of 5 and 15 years and is more common in girls. Small pink, lichenoid papules, discrete at first but rapidly coalescing, appear suddenly and extend over the course of a week or month to form a dull red, slightly scaly, linear band 2 mm–2 cm in width and often irregular. Occasionally the bands broaden into plaques especially on the buttocks. The lesions may be only a few centimeters in length or may extend the entire length of the limb and may be continuous or interrupted. The lesions occur most commonly on one arm or leg or on the neck but may develop on the trunk. They may appear hypopigmented in dark skinned people. Nail involvement in the form of longitudinal ridging, splitting and onycholysis may occur. There are usually no symptoms, but pruritus may occur occasionally.

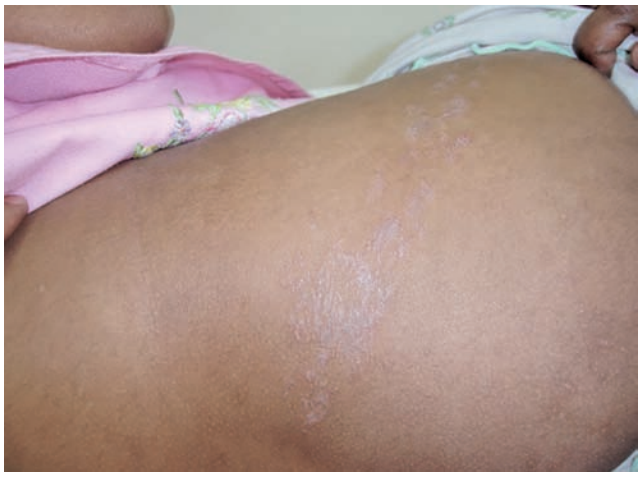

Fig. 11.14 Lichen striatus over thigh in a 3-year-old girl

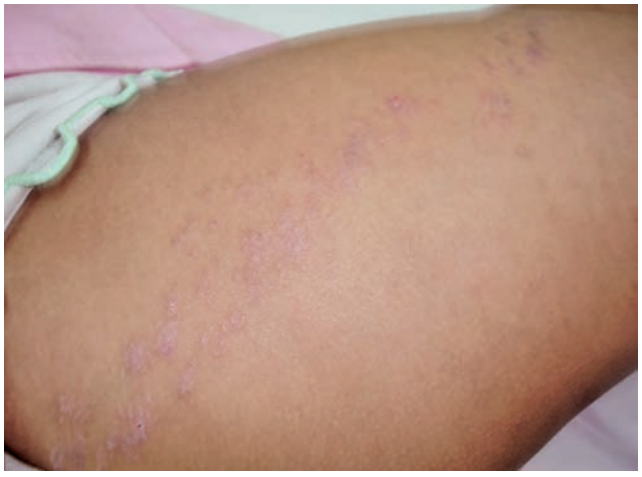

Fig. 11.14A Same girl with lichen striatus

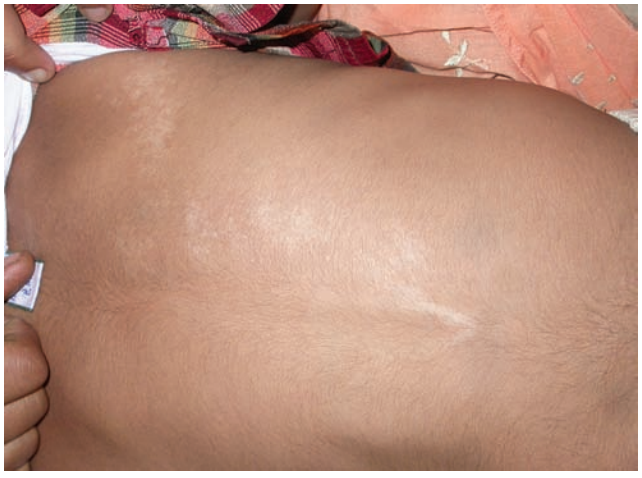

Fig. 11.14B Lichen striatus, note hypopigmented linear lesions

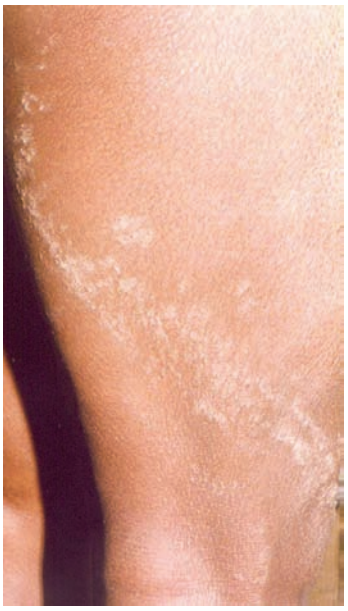

Fig. 11.14C Lichen striatus in an adolescent boy

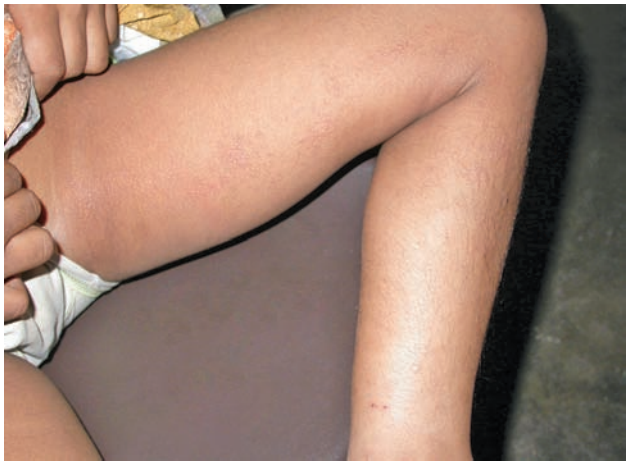

Fig. 11.14D Lichen striatus, note linear lesions

Natural History

The lesion reaches its maximum extent within 2–3 weeks. Spontaneous resolution can be expected within 3–6 months but some lesions may persist for over a year.

Differential Diagnosis

Epidermal nevi and inflammatory linear epidermal nevus may be confused clinically with lichen striatus but nevi persist indefinitely. Linear lichen planus and psoriasis can usually be differentiated clinically.

"All are lunatics, but he who can analyze his delusion is called a philosopher."—Ambrose Bierce

Treatment

Usually the lesions resolves spontaneously. But it takes long time to do so, from 3 months to 2 years. Topical corticosteroids (mild or moderately potent) may hasten the healing process. If the lesions are symptomatic, i.e. mildly pruritic, oral antihistamines may be prescribed. The lesions are dry and, therefore, topical emollient application is helpful.

POST-INFLAMMATORY HYPOPIGMENTATION (Figs 11.15 to 11.16A)

Pigmented skin shows more of a pigmentary reaction following trauma or inflammation than non-pigmented or lightly pigmented skin. It is also not uncommon to see secondary hypopigmentation following eczema, pityriasis alba, sarcoidosis, leprosy, herpes zoster, pityriasis versicolor or other common eruptions. It may also follow cryotherapy and the topical use of, or intralesional injection of corticosteroids.

Natural History

The hypopigmention resolves spontaneously in majority of the cases over a period of 3 months to 3 years.

Treatment

However, in extensive lesions, oral photochemotherapy has been given in children above 8–12 years of age with variable success.

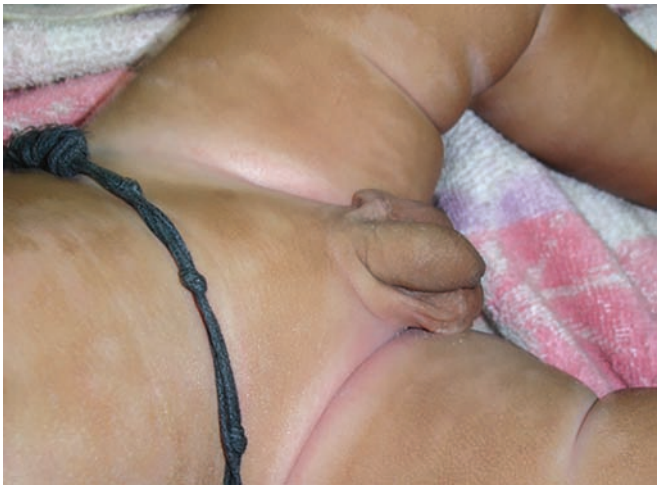

Fig. 11.15 Post-inflammatory hypopigmentation following infantile seborrheic dermatitis

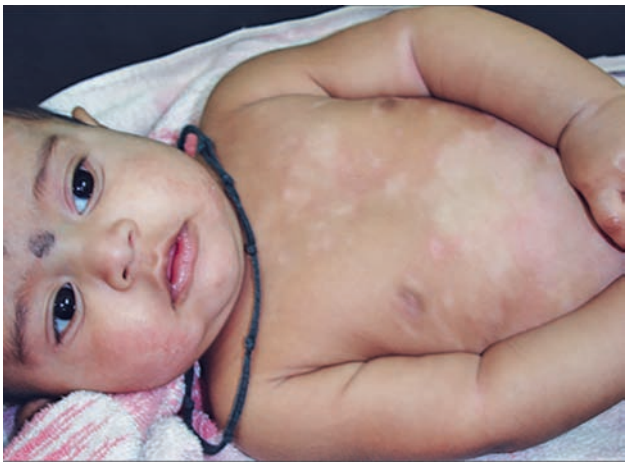

Fig. 11.15A Another view in the same infant

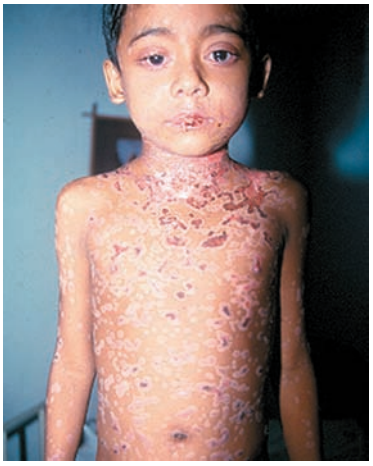

Fig. 11.16 Post-inflammatory hypopigmentation in a boy following Stevens-Johnson syndrome

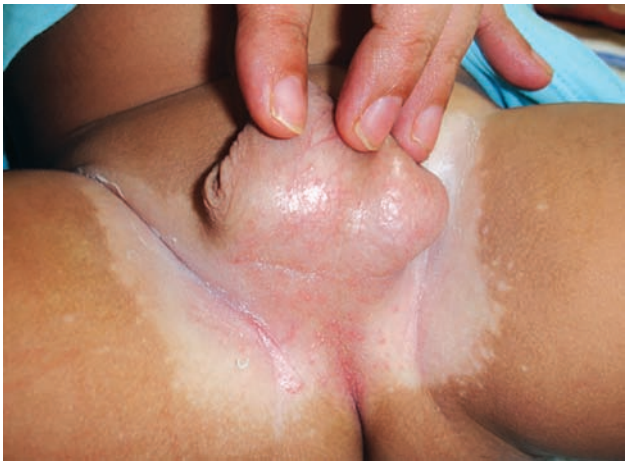

Fig. 11.16A Post-inflammatory hypopigmentation in an infant with intertrigo

"Be nice to people on your way up because you meet them on your way down."—Jimmy Durante

POST-INFLAMMATORY HYPERPIGMENTATION (Figs 11.17 to 11.17B)

It is probably the most common cause of hyperpigmentation in all age groups. Post-inflammatory hyperpigmentation develop following friction, trauma, boils, etc. It is more commonly seen in dark complexioned children and there is a tendency in some children to develop hyperpigmentation. This type of hyperpigmentation is more commonly seen in atopic individuals. The condition may develop on anywhere of the body. However, when it occurs over exposed parts, ultraviolet rays may accentuate the spot and/or delay their resolution.

Natural History

Most of the post-inflammatory hyperpigmentation resolve on their own over a period of 3 months to 2 years.

Treatment

Intervention may be required for resistant patches or to hasten the process of resolution. Topical 2% hydroquinone, 10–20% azelaic acid, kojic, acid, all have been used with variable success. Topical dexamethasone, a moderately potent corticosteroid has also got demelanizing potential and has been used to treat post-inflammatory hyperpigmentation in children and adolescents.

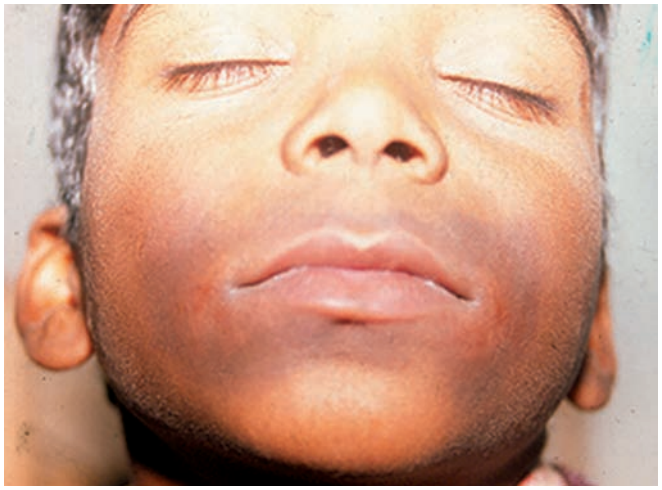

Fig. 11.17 Facial melanosis due to regular massage of mustard oil over face

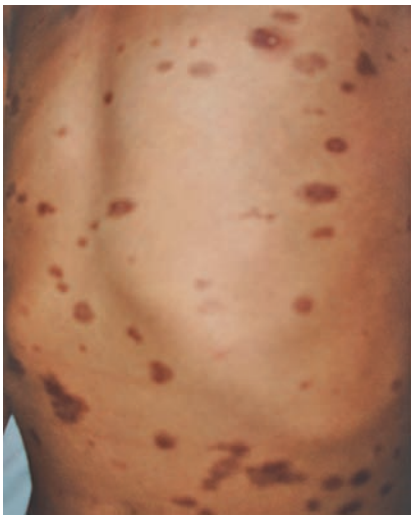

Fig. 11.17A Post-inflammatory hyperpigmentation secondary to PLEVA

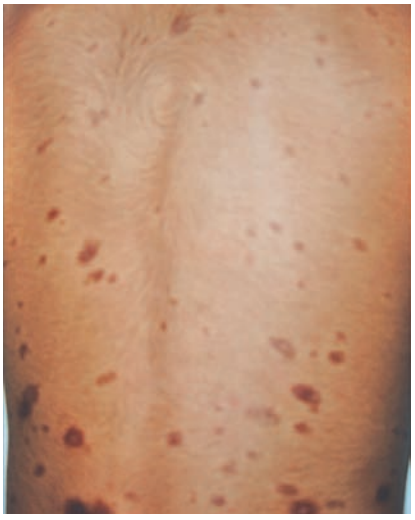

Fig. 11.17B Lesions over back in the same boy

HYPERPIGMENTATION DUE TO ADDISON'S DISEASE (Figs 11.18 to 11.20i)

Several systemic diseases can lead to diffuse hyperpigmentation. However, Addison's disease usually presents with a characteristic type of pigmentation. The pigmentation is diffuse in nature and prominent over the sunexposed areas. Additional sites of involvement include the oral mucosa, palmoplantar creases, sites of friction or pressure, flexural areas, the areola and genitalia.

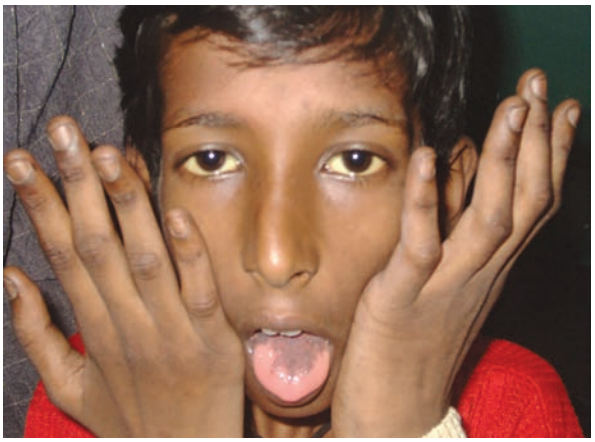

Fig. 11.18 Hyperpigmentation of Addison's disease over fingers and tongue

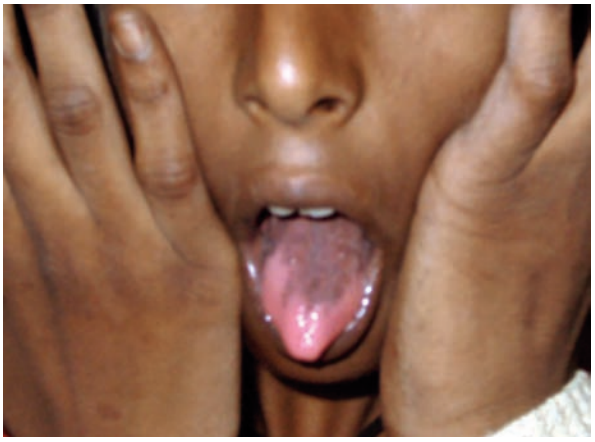

Fig. 11.19 Close-up of tongue pigmentation

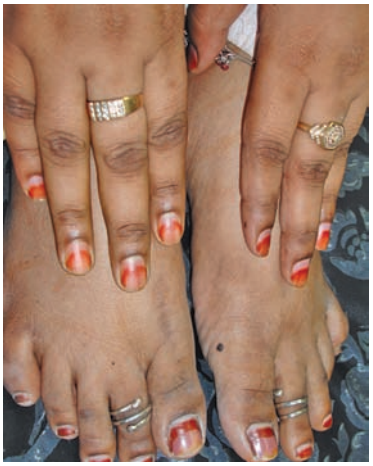

Fig. 11.19B Hyperpigmentation over fingers and toes in a patient with Addison's disease

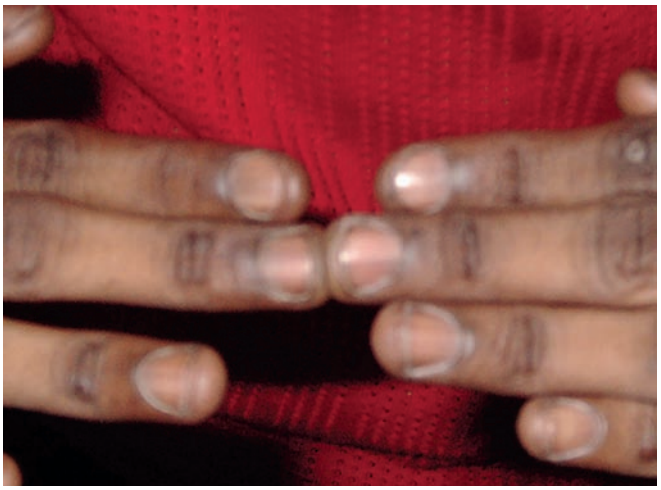

Fig. 11.20 Pigmentation of fingers and nails

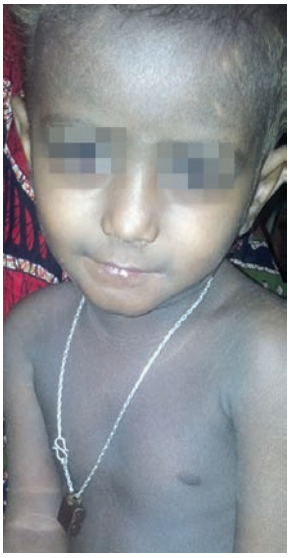

Fig. 11.20i Diffuse hyperpigmentation of Addison's disease in a 5-year-old girl

FAMILIAL HYPERPIGMENTATION OF TONGUE (Figs 11.20A to 11.20D)

Familial hyperpigmentation of the tongue is peculiar hyperpigmentation seen among the various members of some of the families. It does not have a definite inheritance pattern and believed to be mostly sporadic in onset. It is mostly seen in individuals with skin type IV and V. There is either patchy or band–like hyperpigmentation over the dorsum of the tongue. There may be involvement of contiguous oral mucosa also, e.g. gum, cheek, etc.

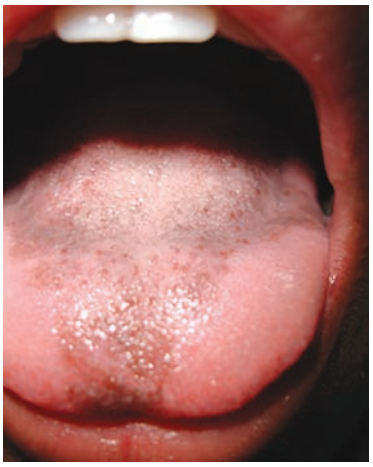

Fig. 11.20A Familial hyperpigmentation of tongue in a 7-year-old girl

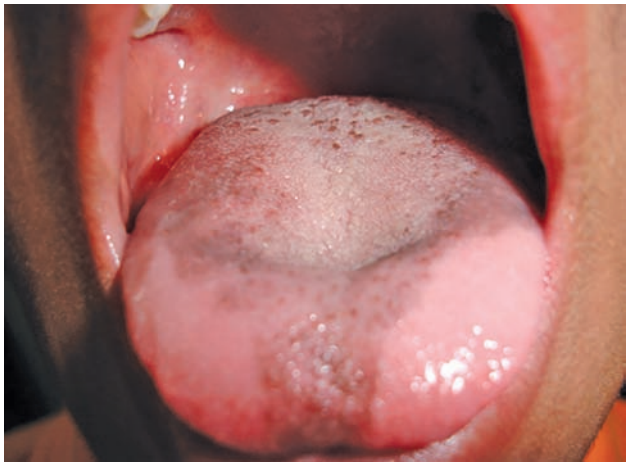

Fig. 11.20B Same girl, close-up of tongue

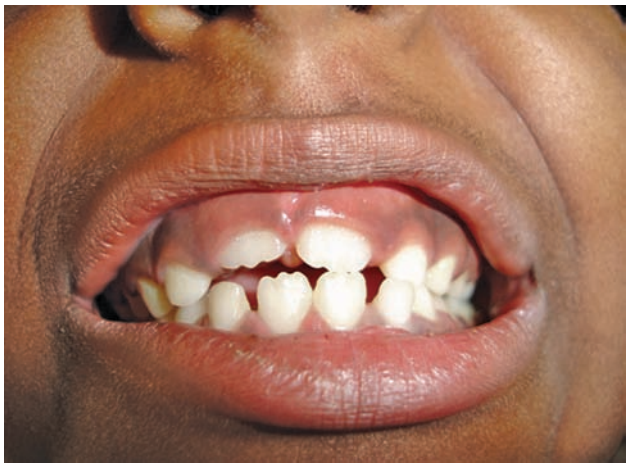

Fig. 11.20C Familial hyperpigmentation over gum in a 4-year-old boy

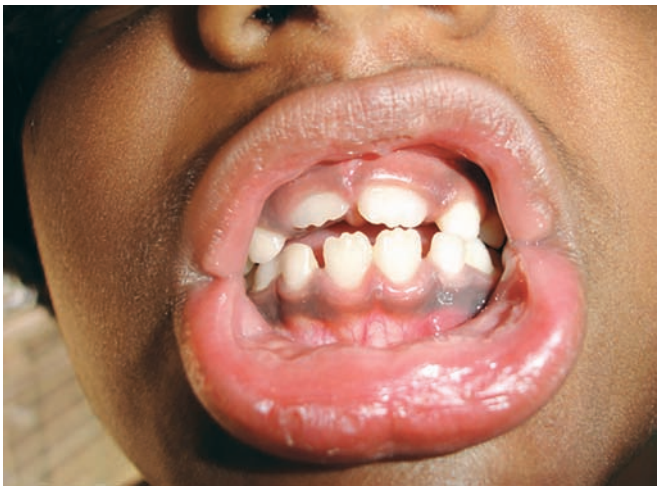

Fig. 11.20D Same boy, close-up of gum

Management

The condition needs to be explained properly to the parents/children and they are to be reassured.

HYPERPIGMENTATION OF KNUCKLE AND DORSAL ASPECT OF INTERPHALANGEAL JOINTS OF FINGERS IN ATOPICS (Figs 11.21 to 11.24)

It is quite commonly seen and usually does not respond to any demelanising creams, etc. Regular application of moisturizers help to an extent.

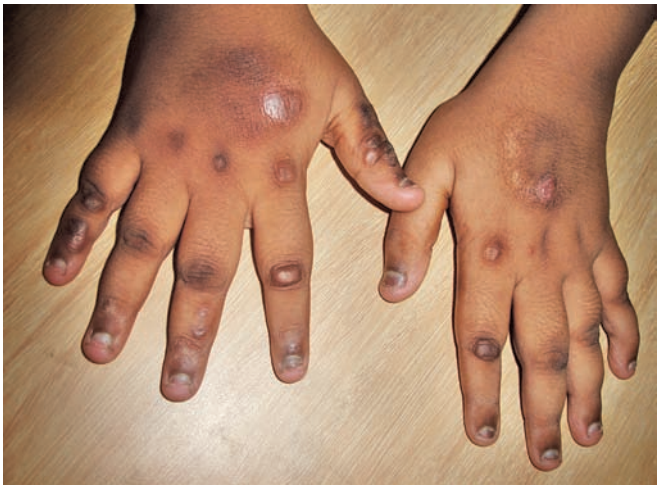

Fig. 11.21 Pigmentation over knuckles in atopics

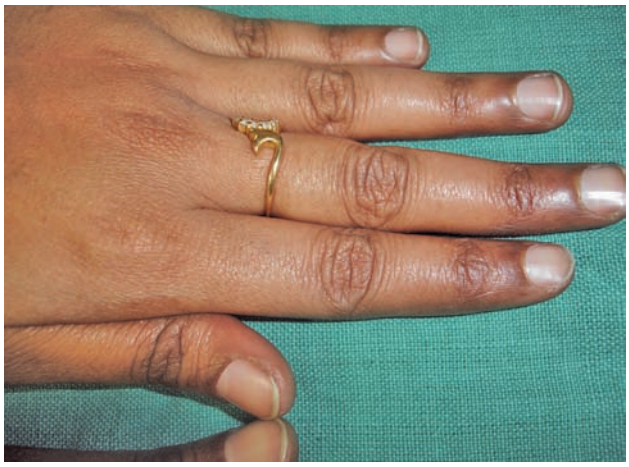

Fig. 11.22 Hyperpigmentation over fingers in atopics

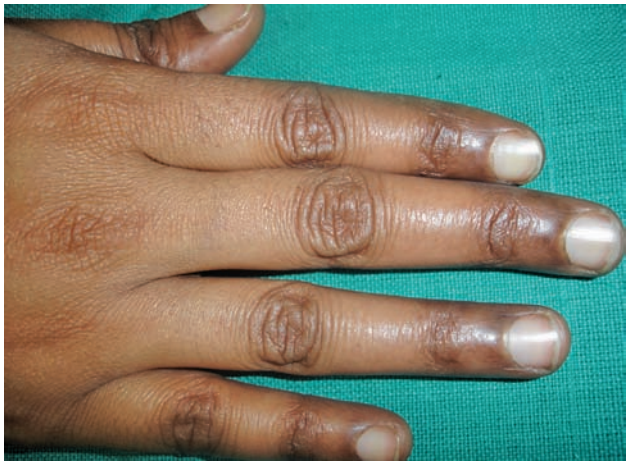

Fig. 11.23 Same patient

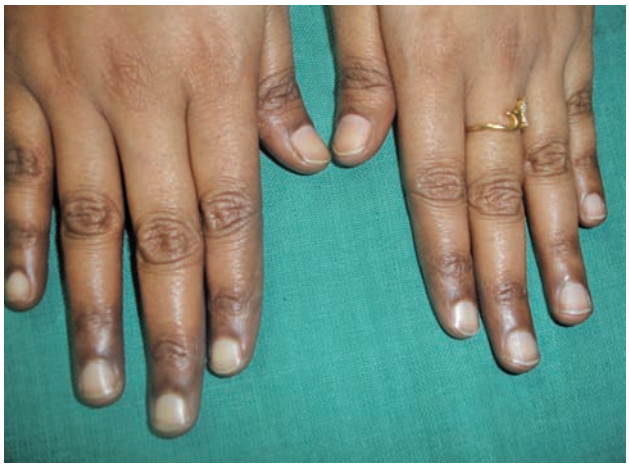

Fig. 11.24 Close-up of finger hyperpigmentation

IDIOPATHIC ERUPTIVE MACULAR HYPERPIGMENTATION (Figs 11.25 to 11.27)

It is characterized by the development of asymptomatic macules over the neck, trunk and proximal limbs. The age group affected is generally between 1 and 31 years. The following criteria should be fulfilled for the diagnosis of this condition.

- Eruption of brown nonconfluent, asymptomatic macules on the trunk, neck and proximal extremities in a child or adolescent patient.
- Absence of preceding inflammatory lesions.
- No history of any drug exposure.
- Histopathology shows basal layer hyperpigmentation of the epidermis and prominent dermal melanophages without visible basal layer damage or lichenoid inflammatory infiltrate.
- Normal mast cell counts.

Differential Diagnoses

- Erythema dyschromicum perstans
- Lichen planus pigmentosus
- Mastocytosis
- Post-inflammatory hyperpigmentation
- Drug induced pigmentary changes

It is important to consider this condition in the differential diagnosis of the pigmentary disorders affecting the pediatric age group as it shows spontaneous resolution and no specific treatment is necessary.

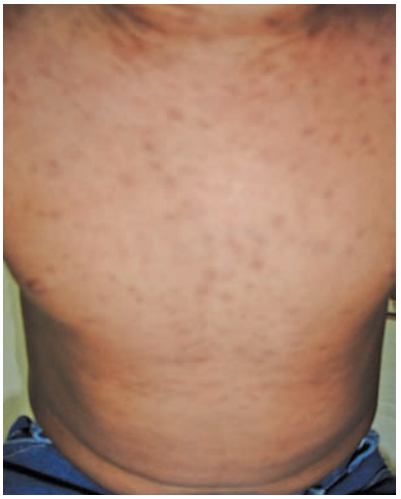

Fig. 11.25 Idiopathic eruptive macular hyperpigmentation (IEMH)

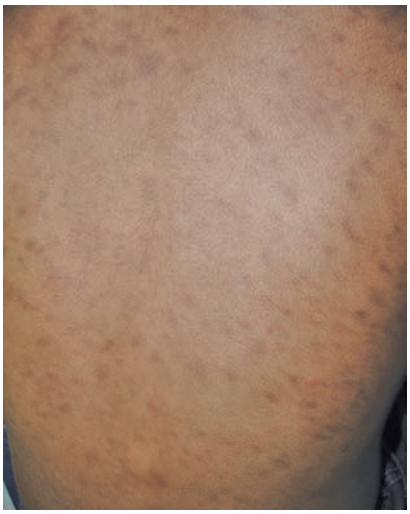

Fig. 11.26 IEMH, note innumerable ill defined mildly hyperpigmented macules

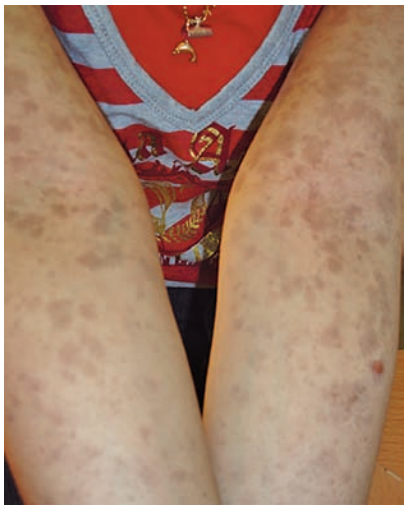

Fig. 11.27 IEMH, close-up

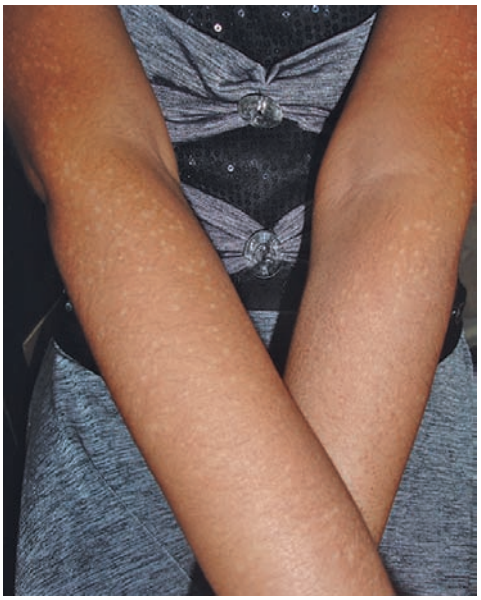

Fig. 11.28 Dyschromatosis hereditaria

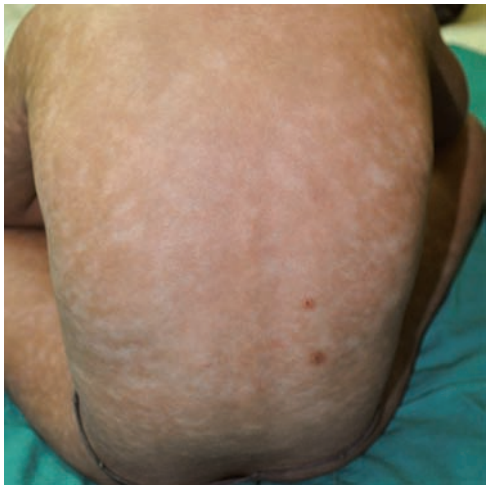

Fig. 11.29 Dyschromatosis hereditaria, lesions over back

DYSCHROMATOSIS HEREDITARIA (Figs 11.28 and 11.29)

The term dyschromatosis denotes presence of both hypo- and hyperpigmentation. In this segment, we are focusing on two classical forms of dyschromatoses; dyschromatosis symmetrica hereditaria and dyschromatosis universalis hereditaria.

DSH, also known as reticulate acropigmentation of Dohi is autosomal dominant in inheritance and prevalent in Japanese. The underlying pathology is mutation of DSRAD gene which encodes double stranded RNA specific enzyme adenosine deaminase, a RNA editing enzyme. The disease usually starts by the age of 6 years and is characterized by small hyper- and hypopigmented macules, often mixed in a reticulate pattern which increase in number and size and stabilize by adolescence. Thereafter lesions persist indefinitely. Hyperpigmented macules darken following sunexposure. Lesions has predilection for distal extremities especially for dorsal hand and feet with sparing of palm, sole and mucous membrane. Histopathological section of hyperpigmented macules demonstrates increase melanin and that of hypo pigmented ones with decreased number of DOPA positive melanocytes. No satisfactory treatment till date. Different modalities that can be tried are topical steroid, PUVA, spilt thickness skin graft and laser.

"It is much more comfortable to be mad and know it, than to be sane and have one's doubts."—GB Burgin

DUH is a rare, autosomal recessive disorder characterized by hyper- and hypopigmented macules in reticulate pattern distributed generally mainly over trunk. Palm, sole, mucous membrane may show pigmentary change. Lesions may become apparent by the age of 1st year. Like DSH, DUH is also prevalent in Japanese. Patient is otherwise healthy, uncommon associations are ocular and auditory defects, developmental delay, short stature and seizure disorders. Mutations of several genes are implicated such as chromosome 6 and 12.

These two disorders are mainly differentiated by the pattern of distribution. Among other important differentials, reticulate acropigmentation of kitamura is characterized by pigmented, angular, freckles like lesions with atrophy with predilection for dorsal hand and feet but hypopigmented lesions are typically absent. Involvement of axilla and groin with break in dermatoglyphics in palm favors the diagnosis of this entity. In Dowling-Degos disease, reticulate pigmentation is chiefly distributed around flexors such as axilla, neck, inframammary and sternal area.

RETICULATE ACROPIGMENTATION OF KITAMURA (Figs 11.30 and 11.31)

Reticulate acropigmentation of kitamura is a rare genetic pigmentary disorder. It is an autosomal dominant condition first described in Japan in 1943 by kitamura and is largely documented in Asian countries. Familial cases are reported. Its onset is usually in infancy, and most commonly develops in the first and second decade of life. Initially it starts as freckle like pigmentation, both hypopigmentation and hyperpigmentation on the dorsum of the hands and feet and later spreads to involve both extensor and flexor aspect

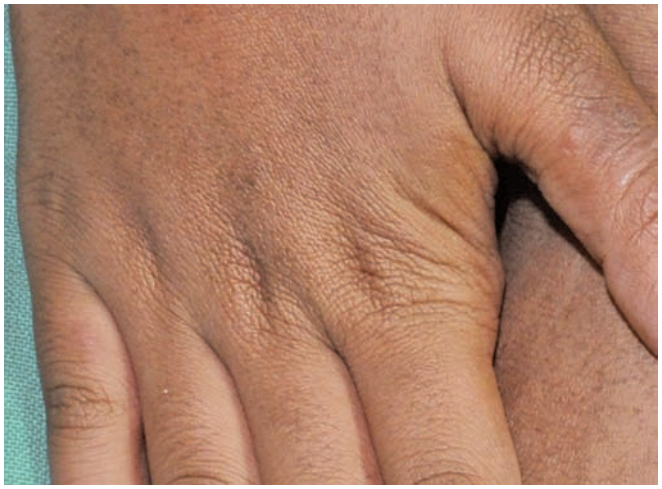

Fig. 11.30 RAPK lesions over dorsum of hand

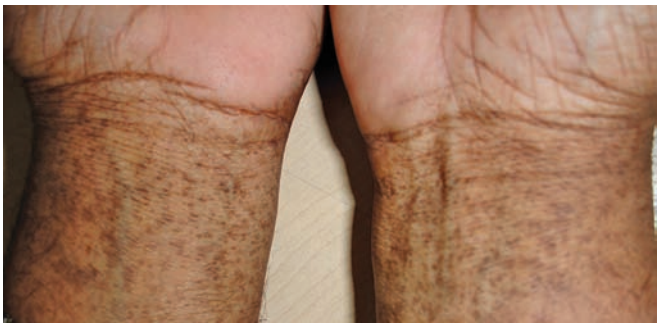

Fig. 11.31 RAPK lesions over front of wrist, note bilateral symmetrical distribution of lesions

of upper and lower limbs including palms and soles. Rarely, it can involve the trunk. These lesions are slightly atrophic. Small pits are present on palms and soles causing break in the epidermal ridge pattern and this feature is diagnostic of reticulate acropigmentation of kitamura.

Histologically shows epidermal atrophy, elongation and increased melanin in the rete ridges. Reticulate acropigmentation of kitamura should be differentiated from acropigmentation of dohi which has similar reticulate pigmentation. The presence of skin atrophy, pits and break in the epidermal ridge pattern differentiates from acropigmentation of dohi. The condition is progressive and the course of the pigmentation cannot be changed.

PIGMENTARY DEMARCATION LINES (Figs 11.32 to 11.37A)

Pigmentary demarcation lines, also referred to as Futcher's or Voight's lines, are abrupt transitions from deeper pigmented skin to lighter pigmented skin and represent natural variation of melaninization. These are commonly seen in blacks and Japanese and are more common in female. 79% of the black females have at least one PDL; on the other hand it is encountered in only 15% of white females.

Eight PDL have been described and labeled as A-H. A-E over trunk and limbs and F-H are facial patterns and are commonly described in Indians. The author and Dr Subrata Malakar described PDL F lines over face for the first time.

A—On the lateral aspect of the upper arm extending over the pectoral area,

B—On the posteromedial portion of the lower limb,

C—Mediosternal line, a vertical hypopigmented line in the pre and parasternal area,

D—On the posteromedial area of the spine, and

E—Bilateral hypopigmented streaks, bands or lanceolate areas over the chest in the zone between the mid-third of the clavicle and the periareolar skin.

F—'V' shaped hyperpigmented lines between the malar prominence and the temple
G—'W' shaped hyperpigmented lines between the malar prominence and the temple
H—Linear bands of hyperpigmentation from the angle of the mouth to the lateral aspects of the chin.

PDLs usually appear around puberty and facial patterns may sometimes get revealed with some triggers like pregnancy, acute ailments like hepatitis, varicella, etc. Genetic predisposition, hormonal influence and cutaneous mosaicism are some of the suggested explanation for the occurrence of the PDLs.

Facial PDLs are esthetic concern and are often misdiagnosed as melasma, post-inflammatory pigmentation, nevus of Ota, or melanocytic nevus. None of the treatment modalities available like chemical peeling, sunscreen, Kligman formulation, intense pulse light give satisfactory and sustained result.

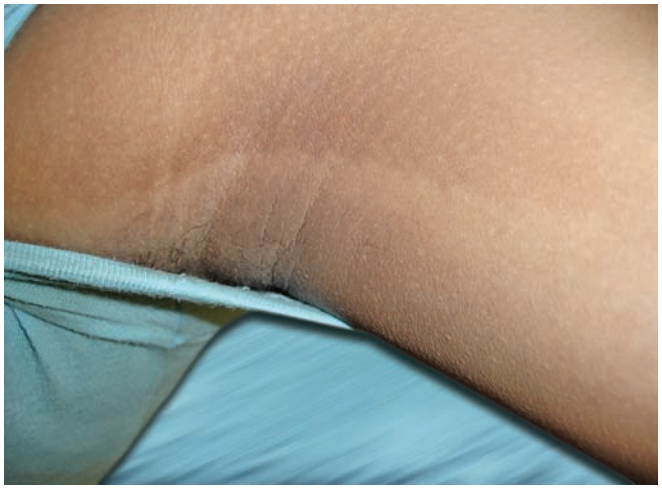

Fig. 11.32 PDL over upper arm adjoining axilla in a 17-year-old girl (PDL A)

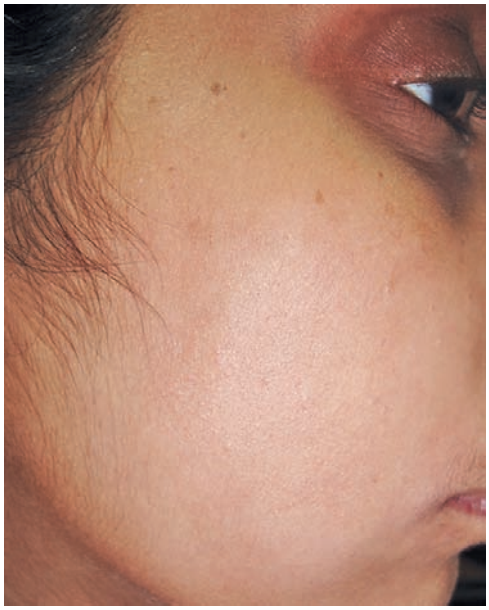

Fig. 11.33 PDL over face, note it merges with periorbital melanosis

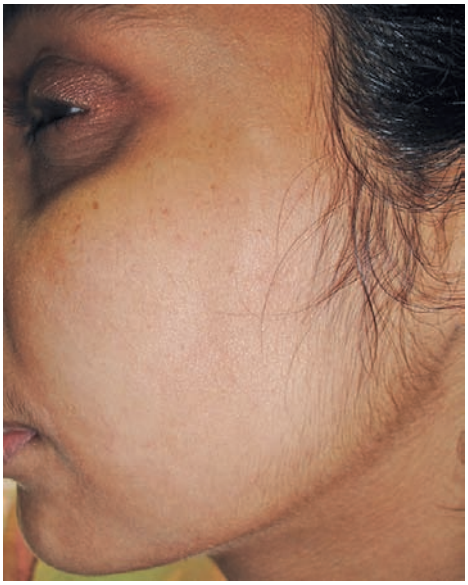

Fig. 11.34 Another view of PDL over face (PDL G)

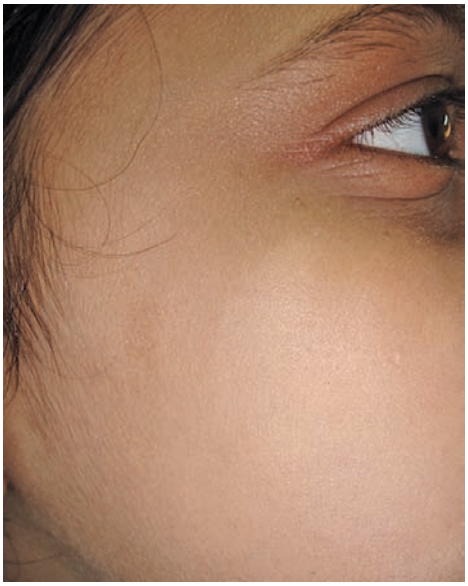

Fig. 11.35 PDL face (PDL F)

Fig. 11.36 PDL-C or mediosternal line (often confused as vitiligo)

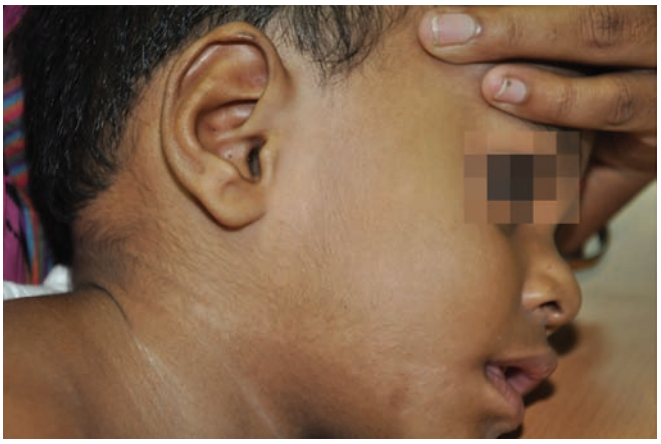

Fig. 11.37 Preauricular hypopigmentation in small children (often confused as vitiligo), is physiological

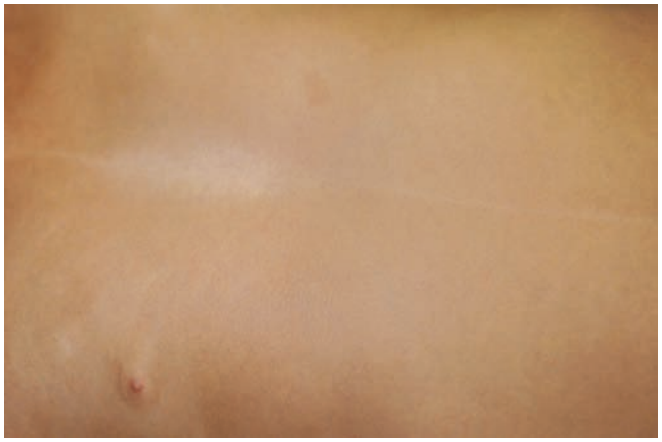

Fig. 11.36A Same line, close-up

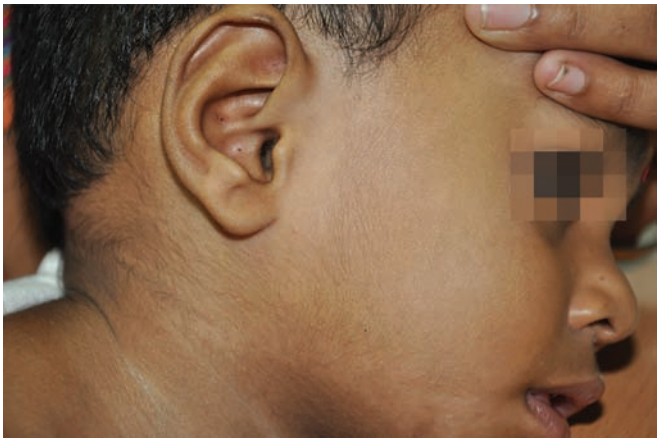

Fig. 11.37A Same child, close-up

12

Nutritional Deficiency Disorders

ACRODERMATITIS ENTEROPATHICA (Figs 12.1 and 12.2H)

It is an autosomal recessive (AR) disorder where male and female babies are affected equally. The disease typically starts 4–6 weeks after weaning or earlier if the infants are not breastfed. However, zinc deficiency has been found in premature babies who are exclusively breastfed. The disease is characterized by acral and periorificial vesiculobullous, pustular and eczematous eruptions, alopecia, nail dystrophy, diarrhea, glossitis, stomatitis and photophobia, secondary infections of skin by bacteria or candida. A low serum zinc level and a rapid response to zinc supplementation suggest the role of zinc malabsorption as the cause of this disease. The etiology of zinc malabsorption could be either because of lack of a zinc binding ligand in the small intestine or by trapping of zinc in the wall of the intestinal lumen.

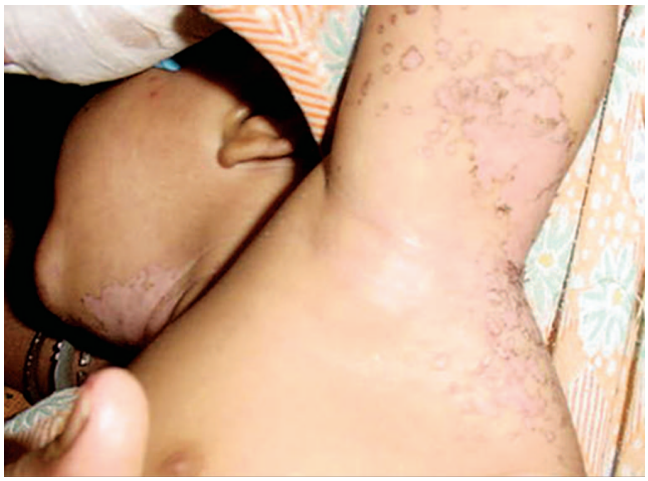

Fig. 12.1 Annular scaly eczematous lesions of AE

Diagnosis

The diagnosis of acrodermatitis enteropathica (AE) is based on the clinical features of dermatitis localized around body orifices, buttocks, extensor surfaces of the major joints, scalp, fingers and toes, recurrent infections, recurrent paronychia and nail dystrophy, diarrhea, photophobia irritability, failure to thrive. Supportive important laboratory findings are low serum zinc levels, low serum alkaline phosphatase and lipid levels.

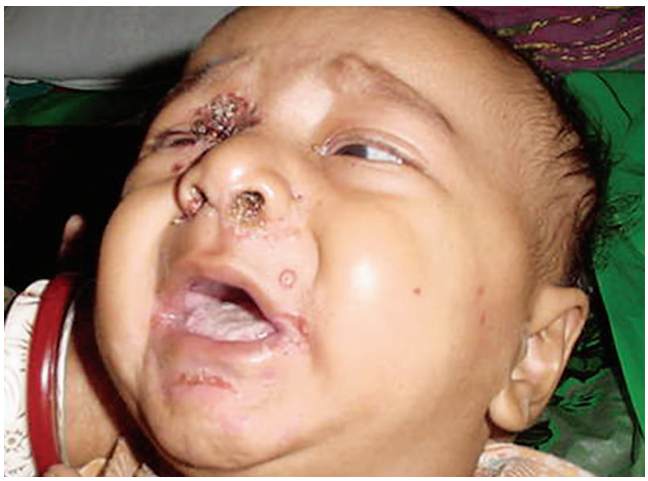

Fig. 12.2 Perioral lesions of AE

Treatment

Treatment of AE is essentially based on supplementation of zinc orally. Supplementation is done by zinc gluconate, acetate or sulfate 5 mg/kg/day is 2–3 divided doses (usually 50 mg/day for infants and 150 mg/day for older children). Improvement in irritability and photophobia is seen in 24-48 hours and diarrhea and skin lesions by 72–96 hours.

"Sleep is an excellent way of listening to an opera."—James Stephens

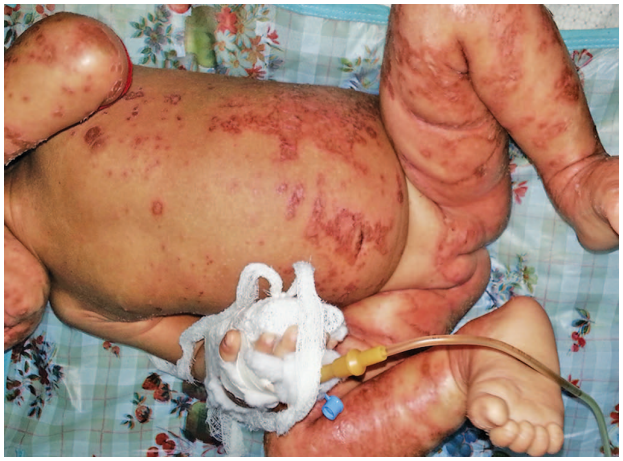

Fig. 12.2A Eczematous brown scales of acrodermatitis enteropathica

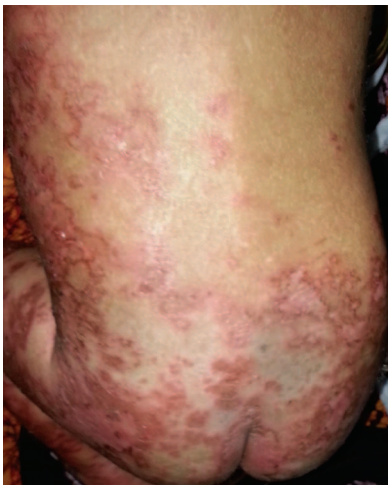

Fig. 12.2D Involvement of back in AE

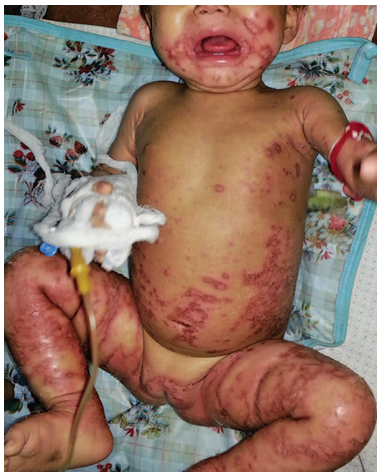

Fig. 12.2B AE, note acral, perioral involvement

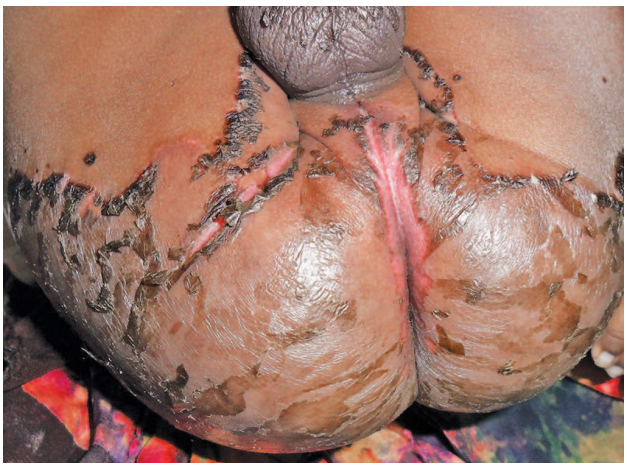

Fig. 12.2E Severe perianal involvement

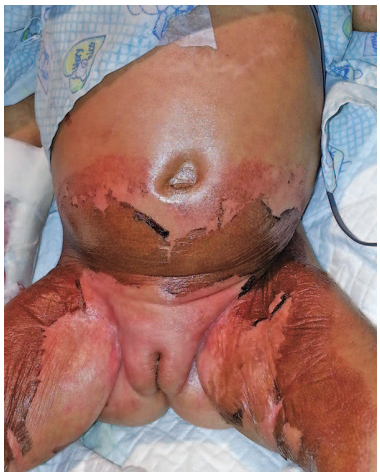

Fig. 12.2C AE, severe involvement of groin and perianal areas

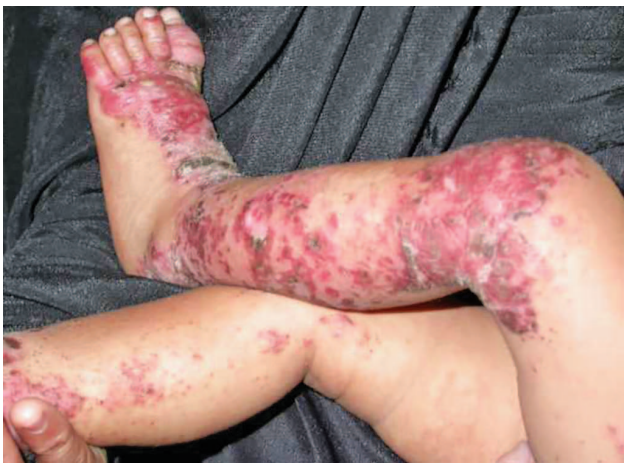

Fig. 12.2F Acral involvement in AE

"The nice thing about being a celebrity is that if you bore people they think it's their fault."—Henry Kissinger

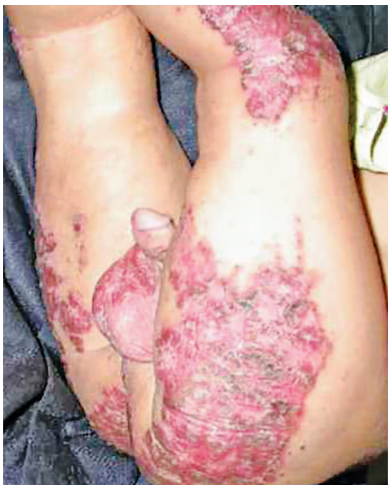

Fig. 12.2G Involvement of buttocks in AE

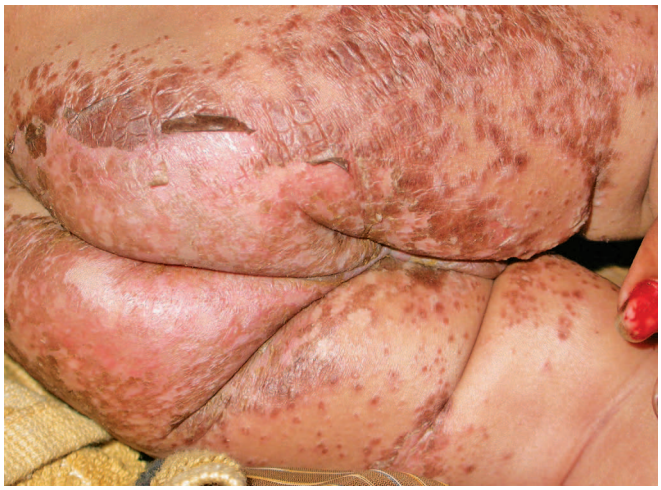

Fig. 12.2H Close-up

Growth of hairs and gain in weight usually starts after 3–4 weeks of therapy. Zinc supplementation is to be maintained lifelong. Various dietary sources of zinc are meat, fish, eggs, poultry and dairy products. These need to be given adequately in later life along with oral zinc supplementation.

Protein-energy malnutrition: PEM, one of the most important causes of childhood mortality in developing countries includes three related conditions; marasmus, kwashiorkor and intermediate form marasmic kwashiorkor. Marasmic babies weigh less than 60% of their ideal body weight and are without hypoproteinemia and edema. Marasmus results from long-term deficiency of protein and calories whereas; kwashiorkor is mainly due to protein deficiency with relatively adequate caloric intake. But the recent hypothesis suggests that the host's ability to cope up with the nutritional stress determines the outcome of PEM. In kwashiorkor, children have 60–80% of their expected body weight with features of hypoproteinemia and edema. Marasmic kwashiorkor, accounting for most of the undiagnosed cases of PEM exhibits features of both the two severe forms of it.

Marasmus means wasting (derived from Greek word marasmus). Cutaneous changes are infrequent, minimal and are not classical. Loss of subcutaneous fat results in dry, wrinkled, thin, lax skin and the characteristic "monkey facies". Hairs are lusterless, fine, rough and brittle. In adults, follicular hyperkeratosis may be a feature. Associated vitamin deficiency may give rise to angular cheilitis and atrophic glossitis. Owing to poor cell mediated immunity the children are susceptible to a number of infections like cutaneous and systemic candidiasis, cancrum oris, abscess which can complicate the condition.

Kwashiorkor, "the sickness of the deposed baby" is mainly a problem of underdeveloped and developing countries, but has also been reported from developed countries too. In developed countries; nutritional ignorance, food allergen avoidance, food faddism are the predisposing factors. The underlying pathophysiology is multifactorial. Protein deficiency is either qualitative or quantitative. The clinical manifestations can be explained by decreased production or production of structurally immature collagen, low cystine content of hair, low zinc level, impaired antioxidant status and hypoproteinemia. Kwashiorkor is characterized by skin and hair changes, growth retardation, potbelly and the hallmark sign pitting edema which may become generalized and thus masking the wasting. Cutaneous lesions seen in 20–40% cases, are hypopigmented in dark skinned individuals and erythematous to purple on fair complexion. Perioral pallor may be the presenting sign. Characteristic cutaneous lesions are sharply demarcated, hyperpigmented patches with slightly raised edges over the areas of friction or pressure. This gradually progresses leading to extensive desquamation and erosion with flexural fissuring which is variously described as flaky paint dermatosis or crazy pavement or enamel paint. Hair changes are more prominent in Kwashiorkor in comparison to marasmus. Hair is hypopigmented with various types of dyschromotrichia, dry, lusterless, soft and curly hair becomes straight. Alternate band of pale and dark hair in a single strand reflecting the period of poor and good nutrition produces the striking flag sign of hair. Other associated skin findings and complications are same as that of marasmus. Anorexia, diarrhea, mental apathy and irritability are other presenting features.

Prognosis is good with optimal treatment which is mainly directed towards correction of nutritional deficiencies according to the degree of malnutrition and treatment of associated infection and infestations. During acute phase skin lesions are treated with emollient, topical zinc oxide paste. Breast feeding should be encouraged as long as possible in developing countries.

KAWASHIORKOR (Figs 12.3 and 12.4ii)

It is a clinical syndrome that results from a severe deficiency of protein and is the most serious form of malnutrition in the world today. Inadequate intake of protein leads to deficiency of phenylalanine and tyrosine amino acids resulting in pellagrous cutaneous changes, hair abnormalities, impaired growth, mental and gastrointestinal features. The syndrome occurs between 6 months and 5 years of age and begins as an erythema that blanches on pressure, rapidly followed by small dusky purple patches that do not blanch. The eruption has a sharply marginated edge raised above the surrounding skin. In contrast to pellagra, the lesions do not appear on sunexposed areas and spare the dorsal aspects of the hands and feet. Photosensitivity, purpura and excessive bruisability may also be seen. Other features are changes in mental behavior, anorexia, apathy, irritability, growth retardation, fatty infiltration of the liver with hypoproteinemia. As a result, edema develops over the face, feet and abdomen with a characteristic potbelly appearance. In mild cases the cutaneous eruption is associated with a superficial desquamation.; in severe cases there are large areas of erosion. As the disease progresses, the entier cutaneous surface develops a reddish hue. Other features include circumoral pallor, loss of pigmentation and depigmentation of the hair from its normal black color to a reddish yellow or straw color. Edema, xerosis, fine branny desquamation, dyschromia, with hypopigmentation along langer's lines that produces a mosaic or cracked appearance of the skin. When periods of malnutritions alternate with intervals of adequate dietary intake, alternating bands of light and dark color (the flag sign) are produced on the skin.

Natural History

Mortality rate of untreated kawashiorkor may be as high as 30%.

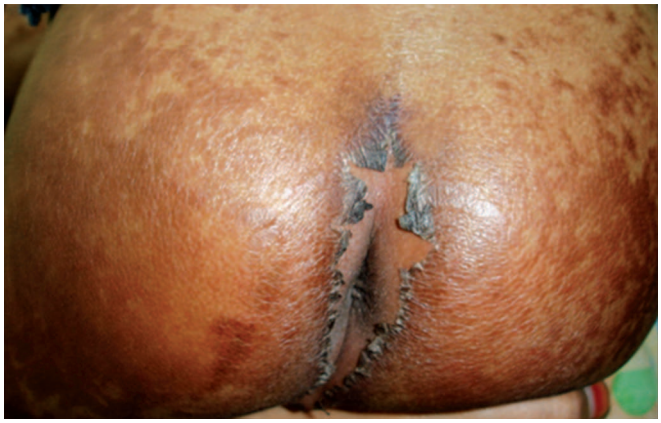

Fig. 12.3 Scaly eczematous lesions of kawashiorkor

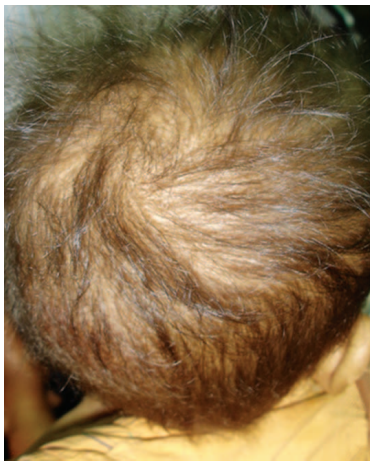

Fig. 12.4 Dry lustureless hairs with alopecia in kawashiorkor

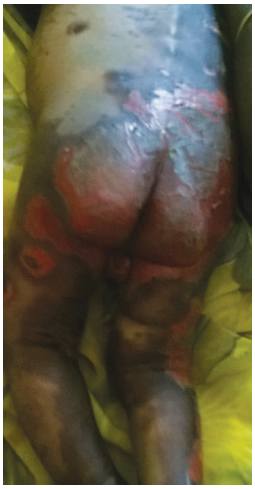

Fig. 12.4i Flaky paint dermatosis of kawashiorkor

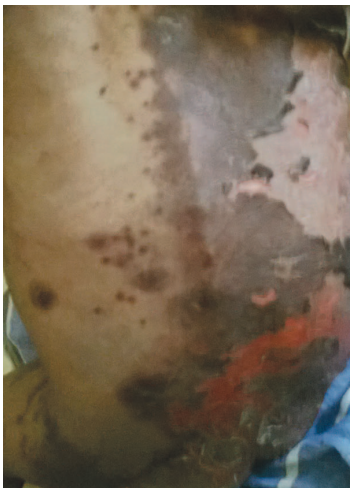

Fig. 12.4ii Same infant, close up

"If everything seems under control, you're just not going fast enough."—Mario Andretti

Management

Since even small amount of milk provide many of the necessary nutrients, breastfeeding should be encouraged and continued for longer periods than is customary where the disorder is common. Treatment consists of administration of a high protein diet, vitamin supplementation and correction of dehydration and electrolyte imbalance.

MARASMUS (Figs 12.4A to E)

Protein energy malnutrition is of two types: marasmus and kwashiorkor. Marasmus is diagnosed in children less than 60% of expected body weight. Children with marasmus have both protein and caloric deficiency. It is characterized by failure to gain weight, loss of subcutaneous fat leading to emaciation resulting in 'monkey facies' or aged appearance. Skin in marasmus is dry, thin, lax and wrinkled. Scaling and hyperpigmentation with follicular hyperkeratosis may occur. Hair is dry and brittle. Nails show ridging. These children are alert and irritable. Marasmus should be differentiated from kwashiorkor. Kwashiorkor children show edematous skin, along with erythema and scaling showing flaky paint dermatosis. Treatment of cutaneous lesions is mainly symptomatic.

PHRYNODERMA (Figs 12.5 to 12.5B)

It develops as a result of vitamin A deficiency and manifests as xerosis or generalized dryness of skin, xerophthalmia or dryness of eyes and phrynoderma characterized by follicular papules. These are seen on the dorsal and lateral areas of the extremities.

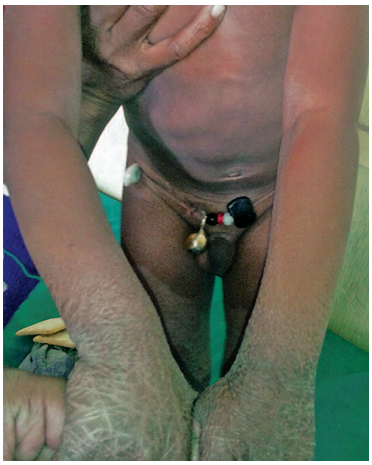

Fig. 12.4B Skin in marasmus

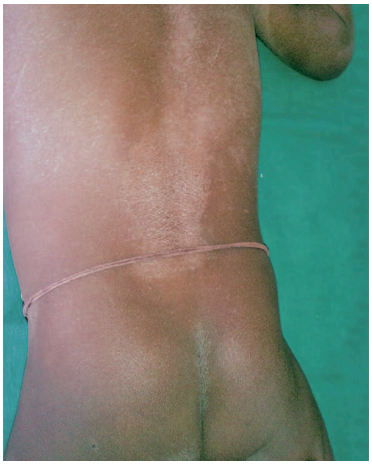

Fig. 12.4C Dry lustureless hyperpigmented skin in marasmus

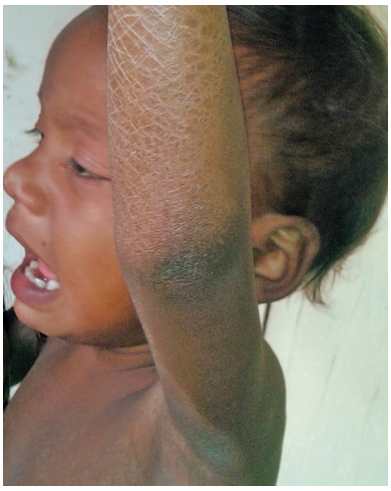

Fig. 12.4A Dry lustureless skin of marasmus

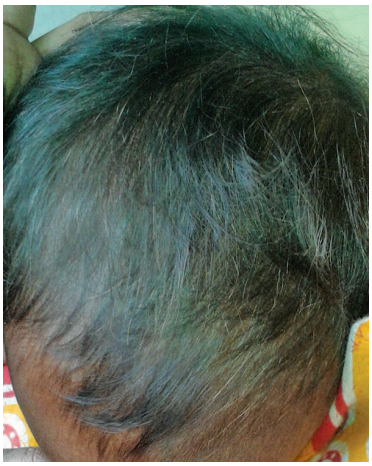

Fig. 12.4D Dry lustureless hairs of marasmus

"Obstacles are those frightful things you see when you take your eyes off your goal."—Henry Ford

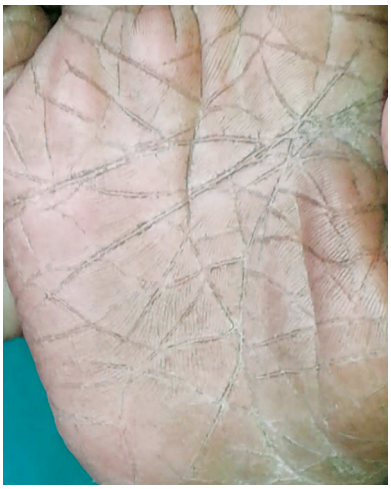

Fig. 12.4E Dry palm of marasmus

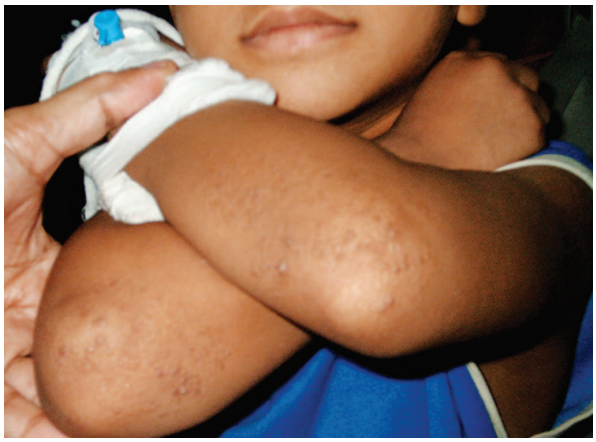

Fig. 12.5 Keratotic papules of phrynoderma over elbows

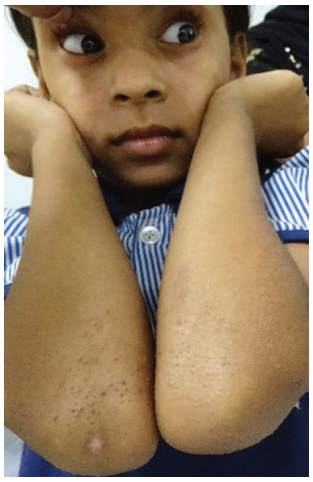

Fig. 12.5A Bitot's spot and phrynoderma

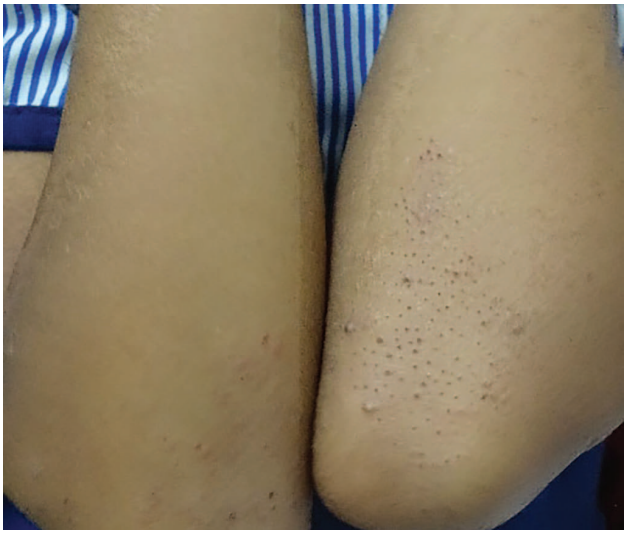

Fig. 12.5B Close-up of phrynoderma

Diagnosis

Diagnosis is confirmed by low serum level of vitamin A and a positive response to vitamin A.

VITAMIN B_2 (RIBOFLAVIN) DEFICIENCY (Figs 12.6 and 12.7)

The characteristic feature is cheilitis which presents as red glossy and slightly scaly lips usually associated with glossitis with loss of tongue papillae and mucositis. Other features are pruritic seborrhea like dermatitis, conjunctivitis, keratitis and photophobia. Riboflavin is a water soluble vitamin abundant in animal products, green leafy vegetables and yeasts. Daily requirement for the children is 1–1.5 mg.

VITAMIN B_{12} (CYANOCOBALAMIN) DEFICIENCY (Figs 12.8 to 12.10)

The deficiency may result from inadequate intake (rare), lack of secretion, inhibition of the intrinsic factor by the stomach or abnormalities in the receptor site in the ileum. The deficiency is manifested by hyperpigmentation of flexural areas, palms, soles, nails and oral mucosa. The tongue may be red and thickened.

Diagnosis

The confirmation is done by estimating serum vitamin B_{12} level.

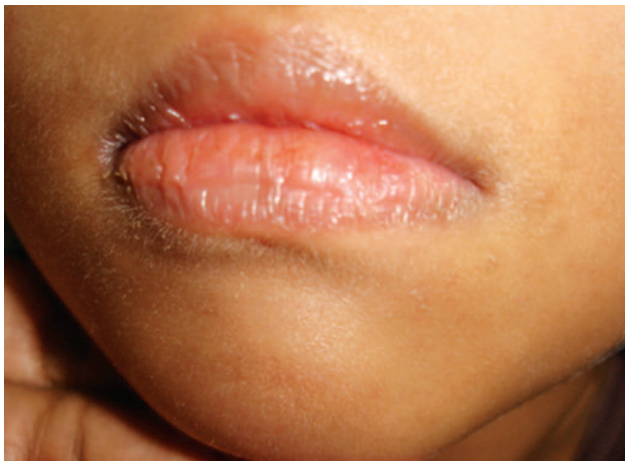

Fig. 12.6 Red lips of riboflavin deficiency

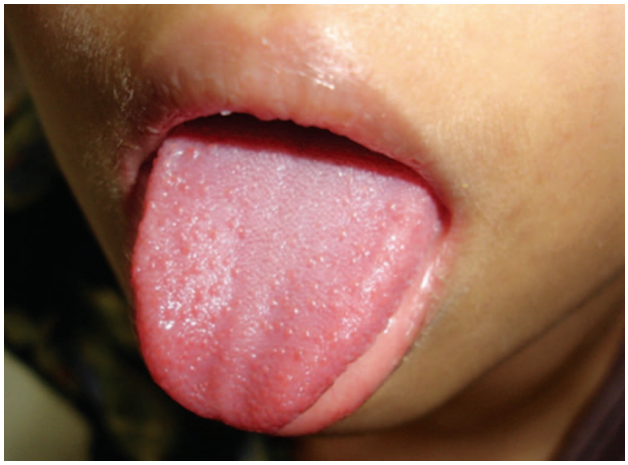

Fig. 12.7 Red tongue of riboflavin deficiency

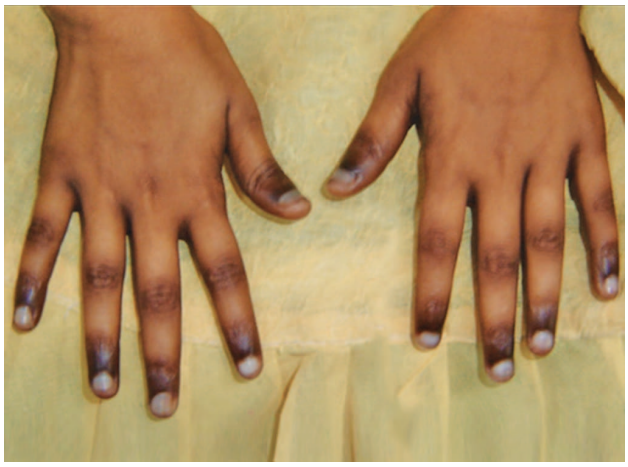

Fig. 12.8 Hyperpigmentation over interphalangeal joints of fingers

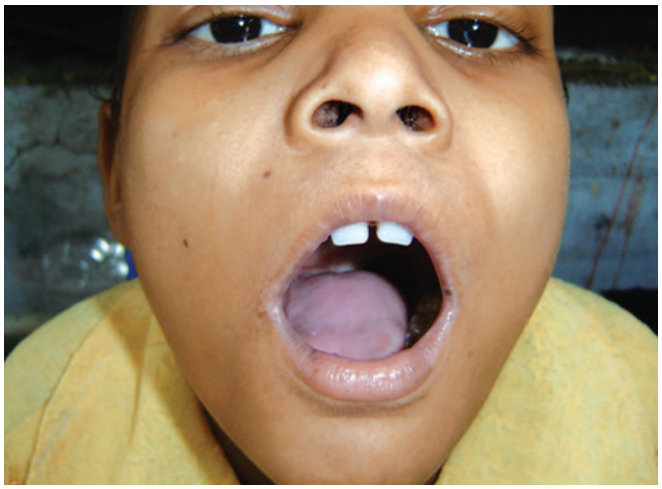

Fig. 12.9 Hyperpigmentation of lips and tongue in cyanocobalamin deficiency

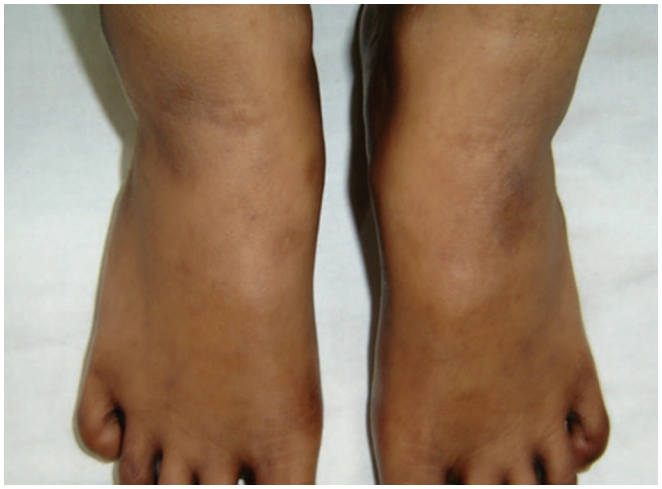

Fig. 12.10 Hyperpigmentation over the interphalangeal joints

Treatment

Treatment is by intramuscular injection of vitamin B_{12} once a month, to be continued according to the serum vitamin levels.

PELLAGRA (Figs 12.11 and 12.12)

Pellagra occurs due to the deficiency of niacin which is due to inadequate intake of nicotinic acid or precursor of tryptophan or ingestion of anti-nicotinic substance like phenytoin and isoniazid.

Pellagra is classically described as a triad of dermatitis, diarrhea and dementia. It is heralded by loss of appetite and

a general feeling of weakness. Abdominal pain, depression and photosensitivity are the other presenting symptoms. In the later stages nervous symptoms predominate. Dementia, delirium, peripheral neuropathy and posterolateral cord degenerative symptoms occur.

Cutaneous manifestations include photosensitivity, symmetrically distributed erythematous, pruritic or asymptomatic scaly macules on areas of sun exposure, heat, friction and pressure. The sites affected generally include face, neck, dorsa of hands, feet, inguinal and diaper areas. These areas present with well demarcated areas of erythema and superficial scaling with or without vesiculation simulating sunburn subsides with a dusky brown discoloration. The appearance when it occurs on the V area of the neck is described as Casal's necklace, whereas on the hands and feet it is described as pellagrous gloves and boots. On the nose it presents as dull erythema with powdery white scales. Acute vesiculation, ulceration, exudation, cracking and secondary infection are the complications encountered in this condition. The lesions resolve with atrophy and dyspigmentation.

Ulcers are noted on the tongue and fissuring noted over the angle of mouth. The tongue appears red swollen and dark, described as black tongue.

Treatment

Nicotinic acid 100–400 mg/day in addition with other vitamin B supplements.

The disease is progressive and fatal if untreated.

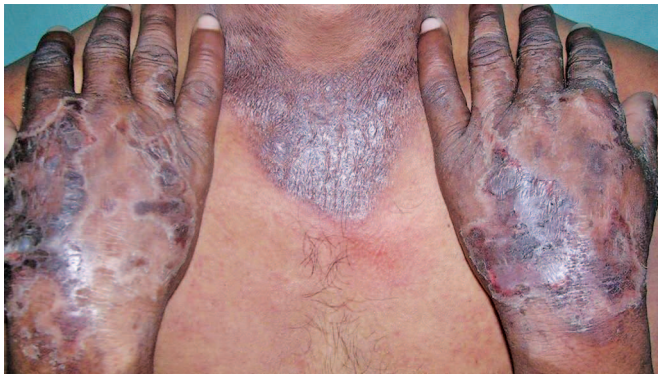

Fig. 12.11 Eczematous hyperpigmented patches of pellagra over fron of neck and dorsum of hands

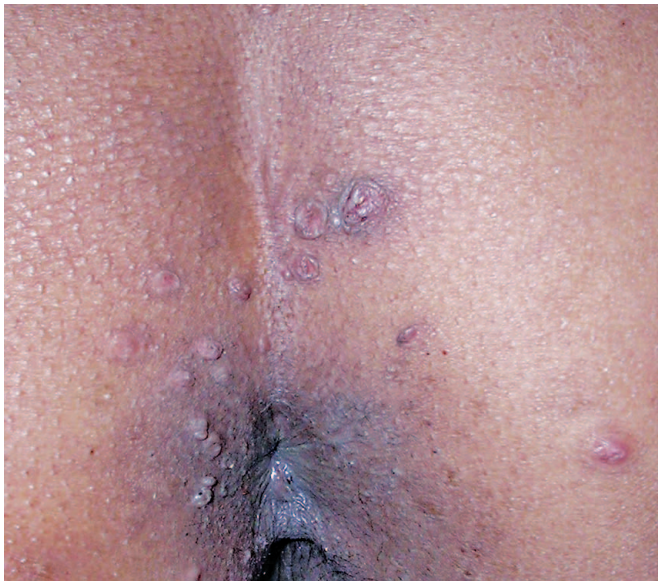

Fig. 12.12 Pellagra skin lesions around perianal area

BIOTINIDASE DEFICIENCY (Figs 12.13 and 12.14)

It is a rare, inherited metabolic disorder in which body is unable to use and recycle vitamin biotin due to deficiency of the enzyme biotinidase. Mode of inheritance is autosomal recessive. Mutation of the culprit BTD gene results in biotinidase deficiency. Biotinidase is responsible for release biotin form protein in the diet such as egg, liver, and milk or recycle biotin during normal protein turnover in cells. Biotin or vitamin B_7 plays important role in processing certain proteins, carbohydrates and fats. Mutation in BTD gene is responsible for elimination or reduction of biotinidase activity leading to impaired separation or recycling of biotin.

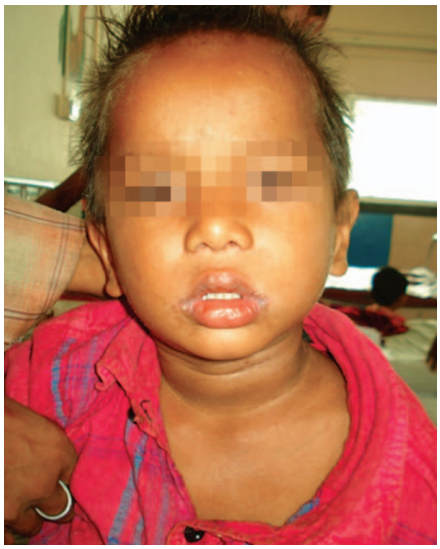

Fig. 12.13 Biotinidase deficiency, note mildly dermatitis and dry skin

Profound biotinidase deficiency is characterized by less than 10% biotinidase activity where as in partial biotinidase deficiency the activity of the enzyme is reduced between 10 to 30%. Profound biotinidase deficiency manifests as seizure, ataxia, hypotonia, breathing problem, delayed development, alopecia, skin rash (seborrheic dermatitis and psoriasis), candidiasis, loss of hearing and vision. Partial biotinidase deficiency is a milder variety of the disease manifests only in presence of any stressor such as infection. Treatment is lifelong supplementation of biotin 5–10 mg on regular basis as symptoms may recur at any time. Certain food such as raw egg should be avoided in these patients; due to high content of avidin egg further aggravates biotin deficiency. Supportive treatment should be offered to the patients with already established problem such as hearing aid for hearing problem.

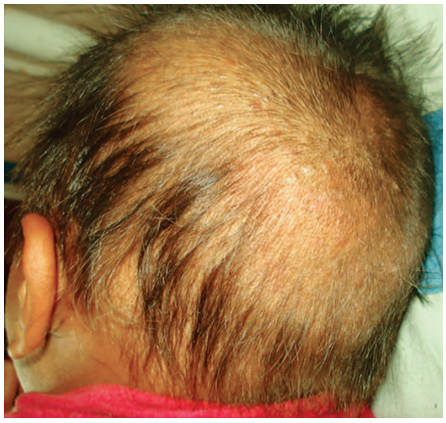

Fig. 12.14 Same girl, note lustureless brownish hairs and alopecia

13

Urticaria, Mast Cell and Histiocytic Disorders

URTICARIA (Figs 13.1 to 13.3D)

Urticaria (hives, nettle rash) manifests as itchy transient erythematous and edematous eruptions over skin which last from few minutes to several hours. It disappears spontaneously leaving behind normal looking skin. Angioedema manifests as localized swelling of the skin and mucosa with stinging sensation. It lasts for 30 minutes to 24 hours. Both urticaria and angioedema can develop as a result of type I, III or IV hypersensitivity reaction. Important causes of urticaria and angioedema in pediatric age group are viral exanthems, insect bites, some food items, drugs and physical factors, e.g. exercise, heat, etc.

Vaccination is by and large safe in children with a history of chronic urticaria. However, it is better to be avoided during acute episode of urticaria.

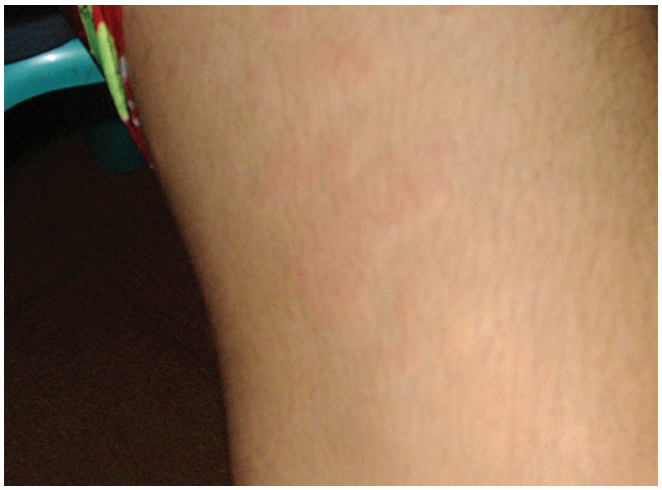

Fig. 13.2 Urticarial wheals

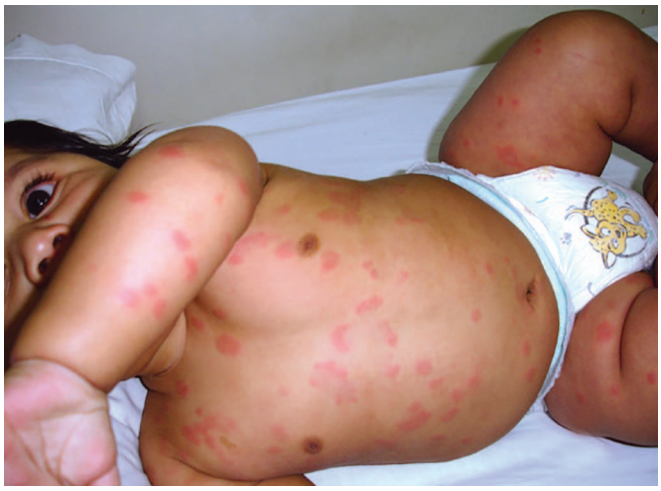

Fig. 13.1 Acute urticarial wheals in an infant

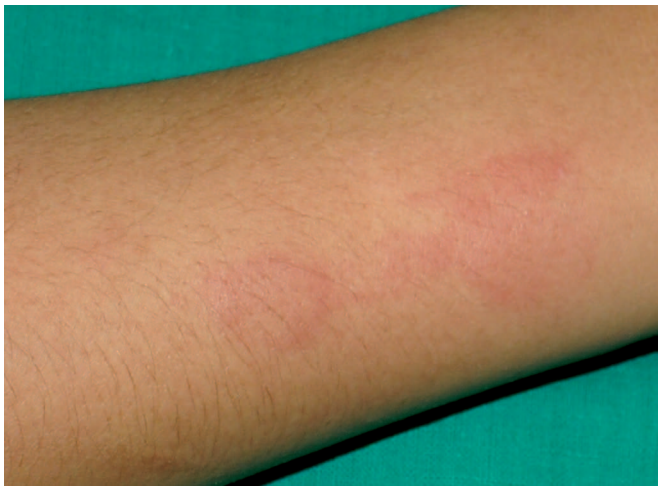

Fig. 13.3 Acute urticarial wheal

"Most people would sooner die than think; in fact, they do so."—Bertrand Russell

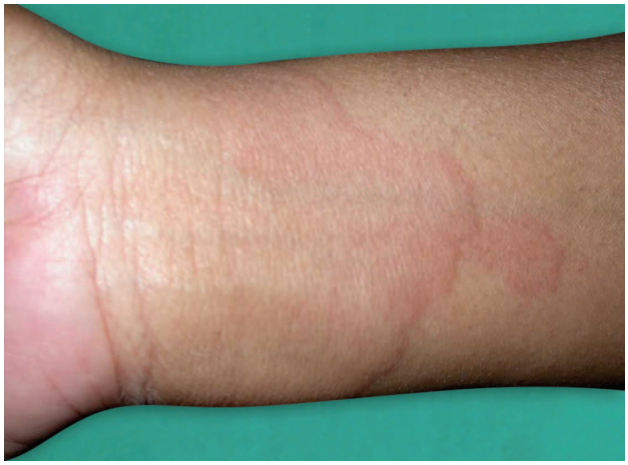

Fig. 13.3A Urticarial hive, note pseudopodia like extensions

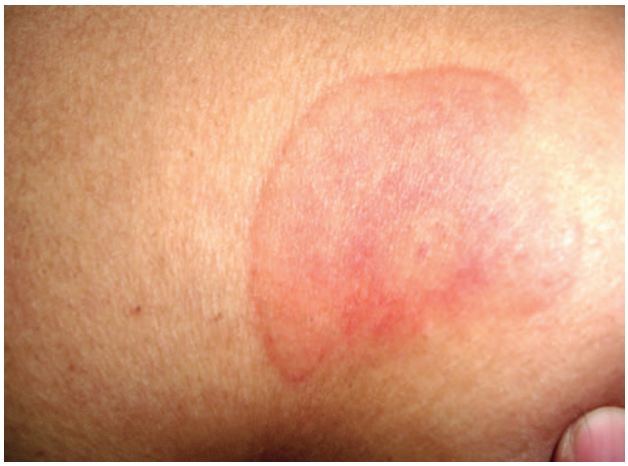

Fig. 13.3B Urticarial hive

ANGIOEDEMA (Figs 13.3E to G)

Angioedema presents as acute, evanescent, circumscribed swelling of the deep dermis/subcutaneous or submucosal tissue or mucus membranes as a result of vascular leakage. It usually affects the distensible tissues like the lips or eyes most commonly though lobes of the ears, external genitalia, or mucosa of mouth, tongue, larynx or gastrointestinal tract can also be involved. Swelling that involves the upper airways is a cause of greater concern due to the potential of airway compromise. Laryngeal edema is a life-threatening condition and should be treated as a medical emergency. Tenderness or pain is absent or mild or can be very severe as in gastrointestinal angioedema where patient can present as an acute abdomen. Various types of angioedema are given in Table 13.1. Angioedema can either be an isolated phenomenon, many a times of idiopathic origin; or it can be a manifestation of a hereditary condition, known as 'hereditary angioedema.'

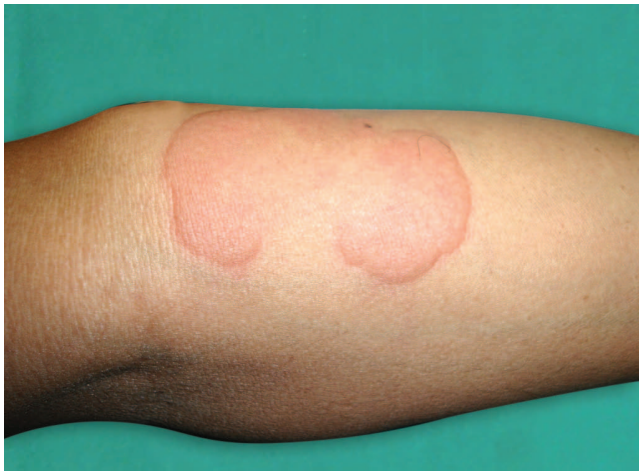

Fig. 13.3C Various shapes and sizes of urticarial hives

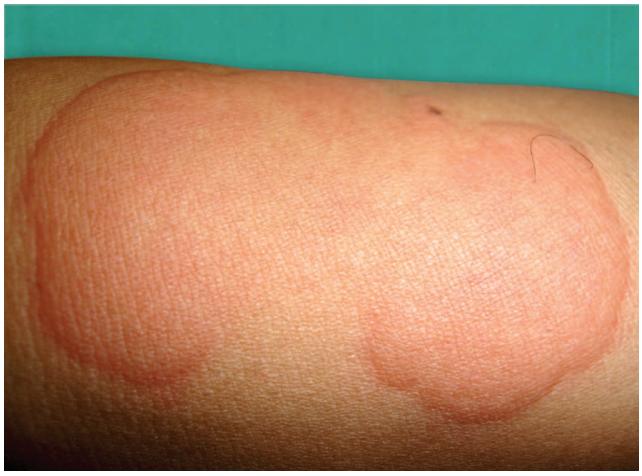

Fig. 13.3D Close-up

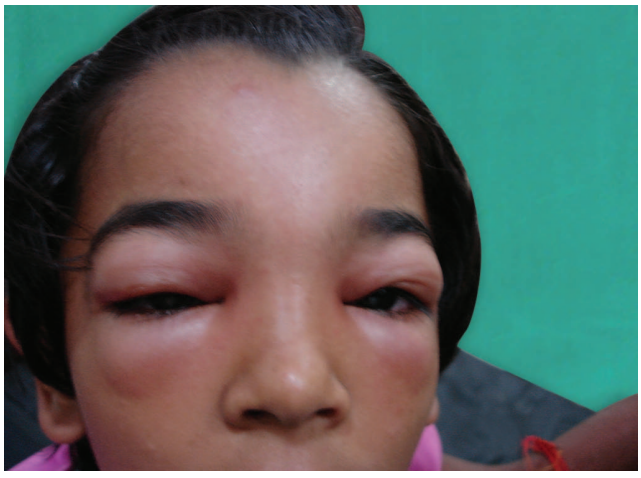

Fig. 13.3E Angioedema of eyelids bilaterally

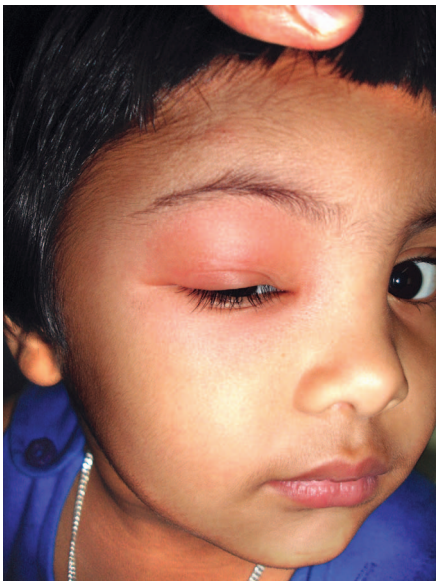

Fig. 13.3F Angioedema of one eyelid

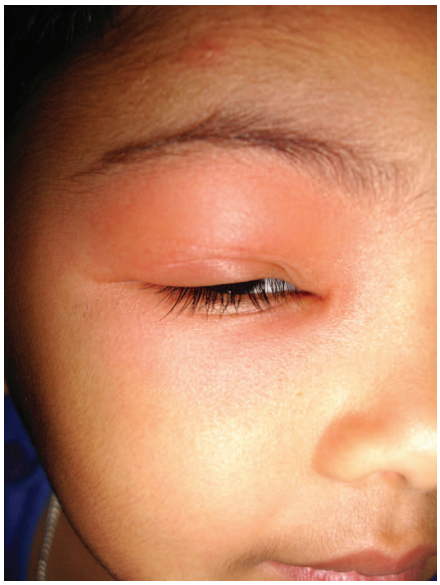

Fig. 13.3G Same child, close-up

Table 13.1 Types of angioedema

Type of angioedema	*Pathophysiology*	*Clinical features*	*Investigations*	*Treatment*
Hereditary angioedema type 1	Low levels of functional C1 INH	• Initial manifestation occurs in children at median age of 4.8 years • Family history positive in 25% cases Sudden attacks of angioedema occur as every two weeks throughout patients life,lasting for 2 to 5 days.No associated urticaria or itching • Mortality rate is high due to laryngeal edema • Factors that trigger attacks are minor trauma, surgery, sudden changes of temperature or sudden emotional stress or sex hormone fluctuations and menses	C1 INH levels low C4 almost always low C1/C3/C1q- WNL	• Replacement therapy with concentrates or fresh frozen plasma • Antifibrinolytic tranexamic acid • Short-term prophylaxis can be obtained from stanazolol
Hereditary angioedema type 2	C1 INH within reference range or even increased levels of antigenic but non-functional C1INH	Same as above	C1INH levels normal or raised but dysfunctional. C4 low. C1/C3/C1q – Normal	Same as above

Contd...

Contd...

Type of angioedema	*Pathophysiology*	*Clinical features*	*Investigations*	*Treatment*
Hereditary angioedema type 3	C1 INH function and complement components are normal	Seen more commonly in females. Criteria for diagnosis include—long history of recurrent attacks of skin swelling, abdominal pain or upper airway obstruction, absence of urticaria, familial occurrence, normal C1-E1 and C4 concentrations and failure of treatment with antihistamines, corticosteroids and C1-E1 concentrate	Complement profile normal	Does not respond to C1-E1 replacement, but may respond to Danazol
Acquired angioedema type 1	Linked to an underlying lymphoproliferative disorder, complement activating factors, idiotype anti-idiotype antibodies or other immune complexes that destroys the function of C1 INH	Presentation is like hereditary angioedema but here it occurs in the fourth decade of life	C1 INH and C4 levels—low C1 qlevels are Normal or Low	• Replacement of C1-E1 through fresh frozen plasma, plasma derived CI inhibitor • Recombinant human C1 inhibitor • Aminocaproic acid or tranexamic acid • Antiandrogens like Danazol
Acquired angioedema type 2	Autoantibodies directly inhibit the C1 INH function		Same as AAE-1. Autoantibody testing positive	Same as above But antiandrogens are ineffective Systemic corticosteroids are temporaily. Immunosuppressive therapy found to be effective. Plasmapheresis, B2 Bradykinin receptor antagonist and the Kallikrein inhibitor are promising therapies for patients refractory to other treatments
Non histaminergic angioedema	Same as angioedema without urticaria	Swelling due to non histaminergic angioedema may occur anywhere including the face, arms, legs, genitalia, throat and abdomen, although abdominal symptoms are far less common	Complement profile is normal	Antifibrinolytics such as tranexamic acid or epsilon aminocaproic acid is used
Idiopathic angioedema	Associated with swelling or hives that persist for longer than 6 weeks. Can be associated with thyroid dysfunction	Swelling can occur anywhere in or on the body and may be accompanied by urticaria	Complement profile is normal	Antihistamines are primarily used
Allergic angioedema	Characterized by hives or swelling or both in reaction to environmental factors such as food, insect bite, cold, heat, latex or drug	Swelling most commonly of the face and throat. Urticaria is often present. If the condition is more than 6 weeks, it is considered chronic idiopathic urticaria	Complement profile is normal	• Antihistamines for mild cases • Diphenhydramine 50 mg IV/IM for moderate cases + INH Hydrocortisone 200 mg IV or methylprednisolone 40–60 mg IV may reduce the possibility of relapse

Contd...

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Type of angioedema	*Pathophysiology*	*Clinical features*	*Investigations*	*Treatment*
				• For laryngeal swelling or airway obstruction, epinephrine (1:1000) should be administered IM at a dose of 0.01mg/kg or 0.3 mg repeated every 10–15 minutes if necessary • Intubation or tracheostomy if necessary
ACEI induced angioedema	Angioedema is caused by ACEI and swelling may occur few hours or years after first starting the medication	Swelling may occur anywhere, including the throat, face, lips and tongue, hands, feet, genitalia and intestines. Urticaria is very rare	Complement profile is normal	Medication is either suspended or changed

DERMOGRAPHISM (Figs 13.4 to 13.4iii)

This phenomenon involves the triple response—(i) local erythema due to capillary vasodilatation (ii) edema and (iii) flare due to axon reflex—induced dilatation of arterioles. It may arise from firm stroking of the skin. The response is normal but in 5 percent of normal people this response is sufficiently exaggerated to warrant the term dermographism. Patients complain of wealing and itching at the sites of trauma, friction with clothing or scratching the skin. The itching is often disproportionately severe compared with wealing and is often most severe at night. Demographism is not increased in chronic idiopathic urticaria nor is there any correlation with systemic disease or food allergy. Demographism is usually idiopathic but sometimes may follow a drug reaction. Demographism is usually demonstrated by using a sharp object and stroking the skin of the forearm. A linear itching weal should develop in 10 minutes.

Fig. 13.4 Dermographism

Management

Oral antihistamines form the mainstay of treatment of urticaria and angioedema. Classical H1 blockers have sedative and anticholinergic effects. There have been few pharmacokinetic studies of antihistamines in children. Most of the prescribing patterns are empirically based upon experience. By and large the onset of action of most antihistamines is 30–60 minutes after ingestion. However, full action is not reached for 2–3 hours. Various antihistamines safe in children for urticaria and angioedema are highlighted in Table 13.1. There is little reason to choose one antihistamine over another except for avoidance of adverse effects including sedation in school going children. However, usually chosen H1 blockers are chlorpheniramine, cetirizine, hydroxyzine and promethazine. They are to be advocated orally twice daily in syrup or tablet form. On an average, for cases of acute urticaria, 5–10 days and for chronic urticaria, 3-6 months' course is required. For resistant cases, H2 blockers viz., ranitidine is combined with H1 blockers. For school going children or older children, a combination of nonsedating antihistamine during daytime and sedating antihistamine at night time is preferred. For cases of anaphylaxis acute urticaria and angioedema, adrenaline is to be given subcutaneously at a dose of 0.05 mg/kg/day in two divided doses. Alternatively hydrocortisone, methylprednisolone or even dexamethasone

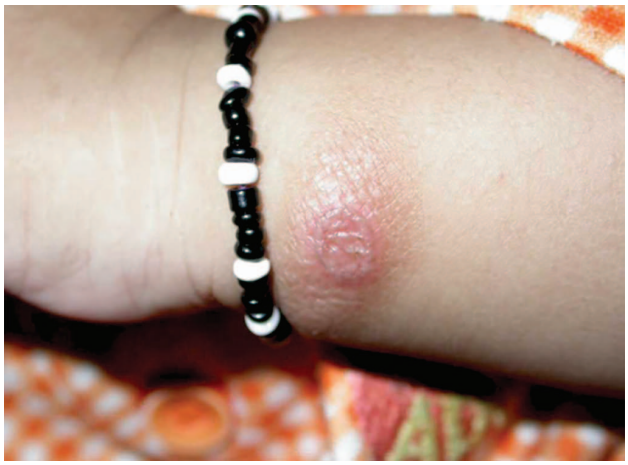

Fig. 13.4A Solitary mastocytoma in an infant

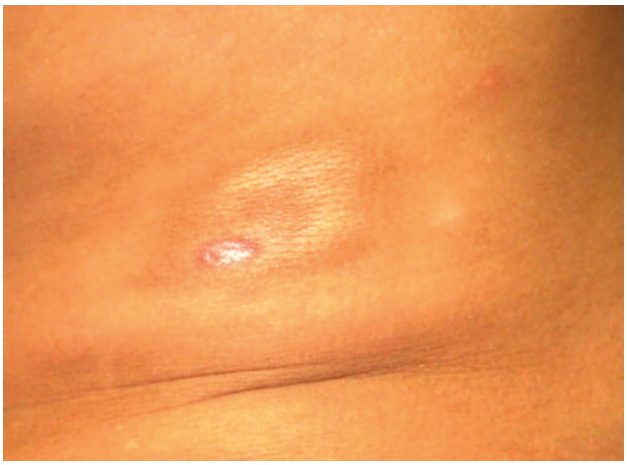

Fig. 13.4D Solitary mastocytoma, xanthomatous variant

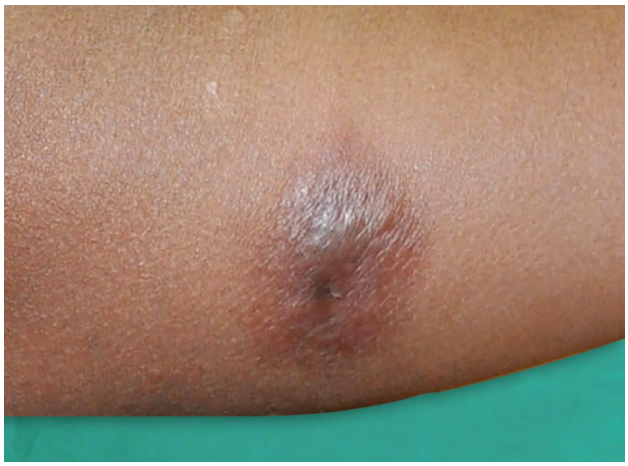

Fig. 13.4B Mastocytoma

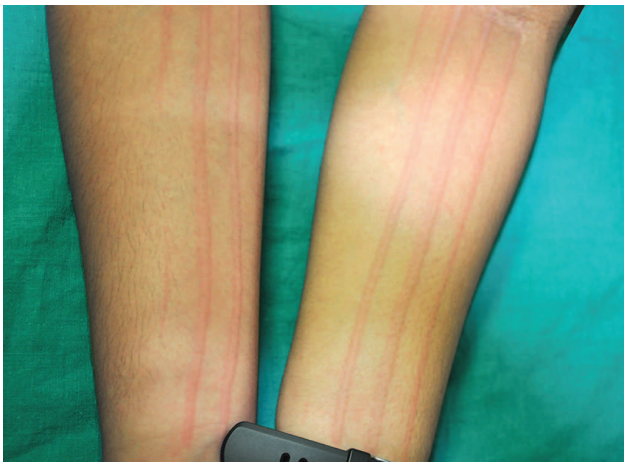

Fig 13.4i Dermographic response

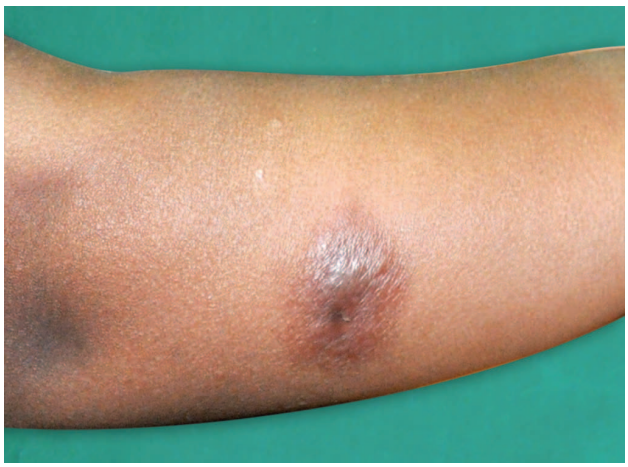

Fig. 13.4C Mastocytoma, note hyperpigmentation in the lesion

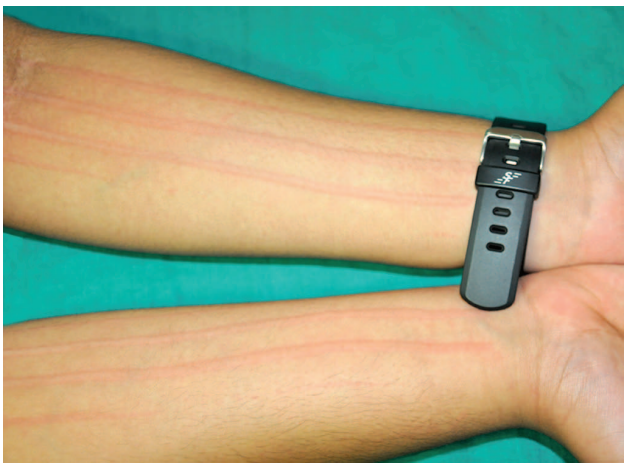

Fig 13.4ii Exaggerated 'triple response' or dermographism

"The opposite of a correct statement is a false statement. The opposite of a profound truth may well be another profound truth."—Niels Bohr

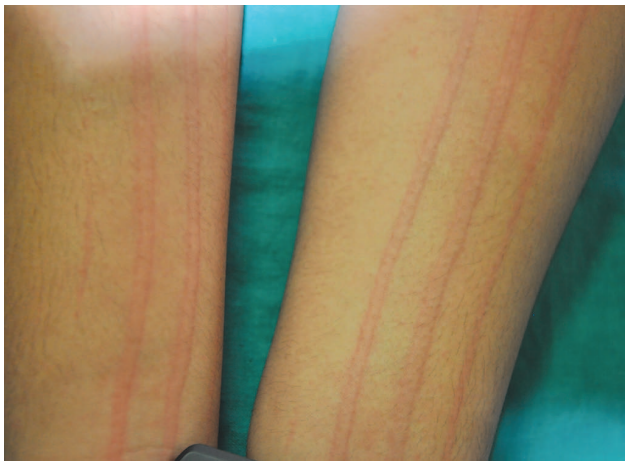

Fig. 13.4iii Close-up

can be used intramuscularly or intravenously. Reassurance and counseling of the parents form the cornerstone of management of urticaria and angioedema in infants and children.

MASTOCYTOSIS

The various clinical forms of mastocytosis are considered to be benign proliferative disorders of mast cells in the skin and/or in internal organs. Almost half of all cases of mastocytosis occur in children. The clinical picture ranges from mastocytoma to diffuse cutaneous mastocytosis but the most common presentation is of urticaria pigmentosa. Half of all childhood cases undergo resolution by puberty.

SOLITARY MASTOCYTOMA (Figs 13.4A to D)

In this disease the lesions generally appear at birth or early in infancy, increase somewhat in size for several months, and eventually regress spontaneously, generally within a period of several years. With this form of mastocytosis, lesions are indeed solitary in most patients. However sometimes many lesions may be seen. Some patients have been reported to develop a generalized form of urticaria pigmentosa.

This disease can occur on any part of the body but are noted most commonly on the arms especially near the wrist, the trunk and the neck. Clinically they are seen as slightly elevated flesh colored to light brown nodules or tan plaques. Sometimes they can display a yellowish or pink hue. Generally lesions are round or oval in shape and measure 1–5 cm in diameter. They may have a thick or rubbery quality with a smooth or pebbly peau d'orange (orange peel like) consistency. Stroking or rubbing of lesions may at times produce symptoms or flushing or colic. Darier's sign is positive. Sometimes bullous lesions may be seen over the lesions of solitary mastocytoma developing as a result of trauma or friction.

Prognosis

Solitary mastocytomas have the most favorable prognosis among all forms of mastocytosis. In this disorder the present symptoms are usually mild and have spontaneous resolution within a period of several years is the rule (almost always before the age of 10). Unless the lesions are symptomatic and troublesome, surgical excision is usually not necessary.

URTICARIA PIGMENTOSA (FIGS 13.5 TO 13.7B)

In majority cases, the onset is between birth and 2 years of age. The most common eruption consists of monomorphic, pigmented, maculopapular or nodular lesions mainly on the trunk and with a widespread symmetrical distribution. The lesions have a characteristic edge which is not absolutely sharp. The diagnosis is established by demonstrating that gentle rubbing of the lesional skin causes local itching, redness and wealing (Darier's sign). Lesions may become confluent to form plaque like areas. The principal symptom of urticaria pigmentosa is intense itching which is aggravated by rubbing and scratching. The pigmentation is due to melanin which is present in increased amounts in the basal layer. It has been estimated that 60 percent of infancy or childhood cases show blister formation. However, blister formation is not associated with a poor prognosis. Blistering usually subsides spontaneously after 2 to 3 years.

DIFFUSE CUTANEOUS MASTOCYTOSIS (Figs 13.8 to 13.9C)

In this rare mast cell disorder there is diffuse mast cell infiltration; the skin has a yellowish thickened appearance and is of doughy consistency. The term pseudoxanthomatous mastocytosis has been given to certain forms of this group. Pigmentation is often absent, cutaneous folds are exaggerated and the changes are most marked in the axillae and groins. In extreme cases, the skin becomes pachydermatous. Nodules and small dermal tumors may also be present. Pruritus is intense. A characteristic feature is the appearance of large blisters following mild trauma or occurring spontaneously. There may be systemic mast cell infiltration with hepatosplenomegaly. The prognosis is not good in such cases, although complete spontaneous recovery may take place.

"In science one tries to tell people, in such a way as to be understood by everyone, something that no one ever knew before. But in poetry, it's the exact opposite."—Paul Dirac

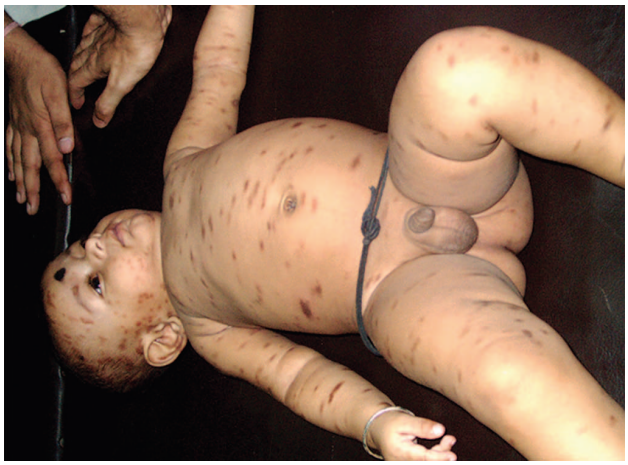

Fig. 13.5 Hyperpigmented infiltrated papules of mastocytosis

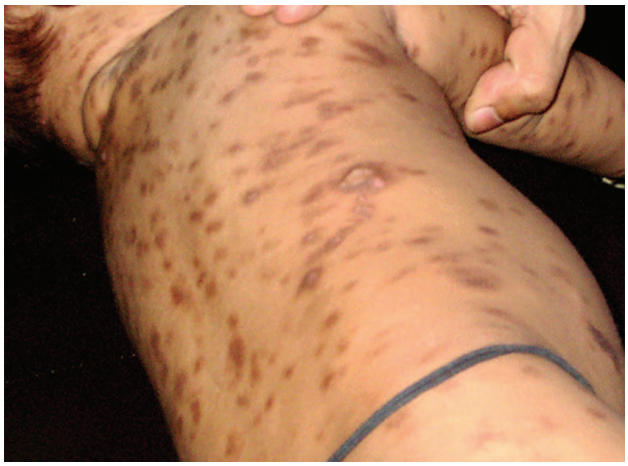

Fig. 13.6 Close-up of mastocytosis lesions

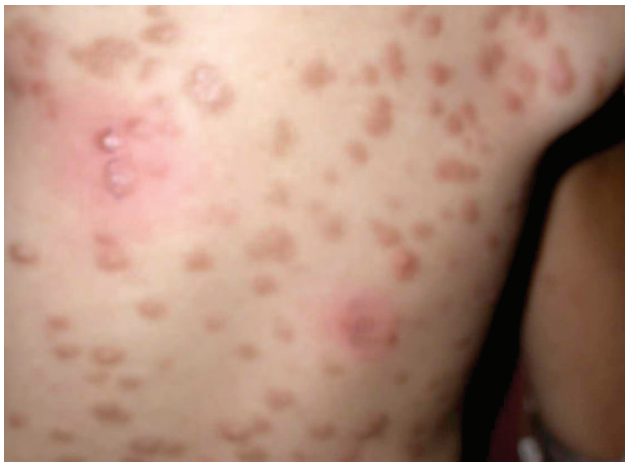

Fig. 13.6A Darier's sign demonstrated

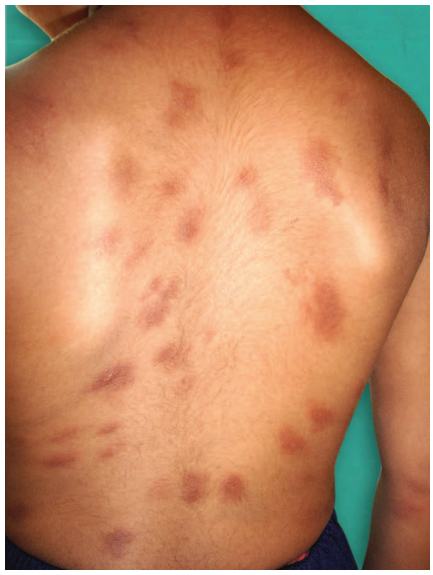

Fig. 13.6B Multiple lesions of urticaria pigmentosa

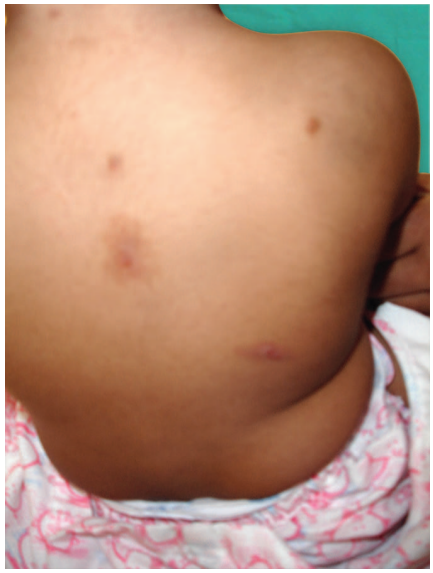

Fig. 13.6C Few lesions of urticaria pigmentosa

Diagnosis

Diagnosis of all types of mastocytoses is confirmed by histopathological examination of skin biopsy specimen. Special precautions must be taken while sending a skin biopsy for confirmation of diagnosis. The tissue must be preserved in alcohol and not formalin as it is routinely done. Special staining for mast cell is to be done by stains like toluidine blue or Giemsa.

"In any contest between power and patience, bet on patience."—W.B. Prescott

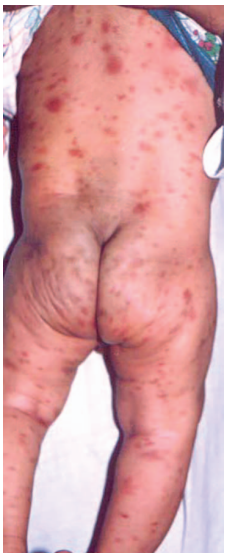

Fig. 13.6D Mastocytosis in a 1-year-old infant

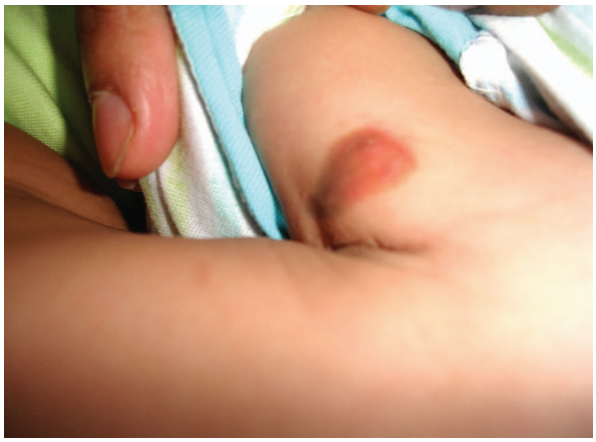

Fig. 13.7 Urticaria pigmentosa, another small child

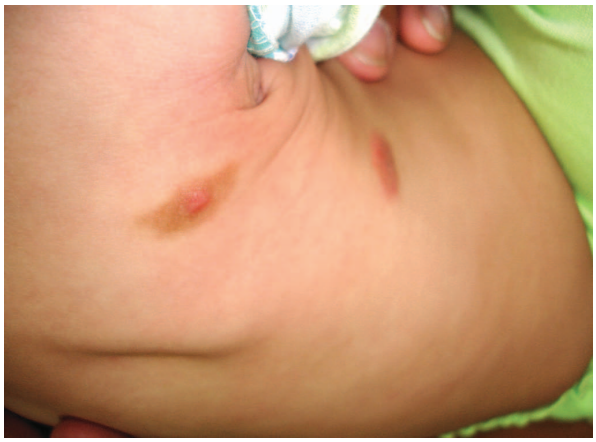

Fig. 13.7A Close-up of lesions

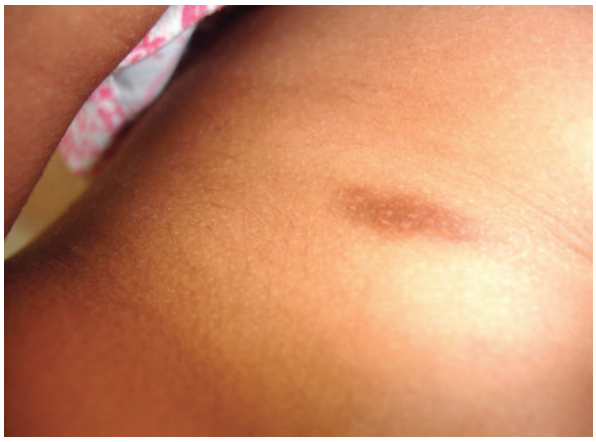

Fig. 13.7B Close-up

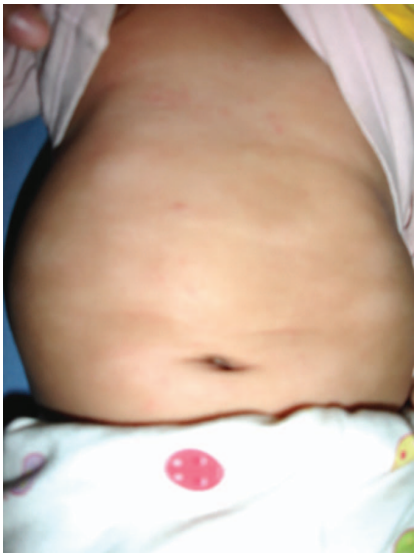

Fig. 13.8 Orange peel like skin in diffuse cutaneous mastocytosis

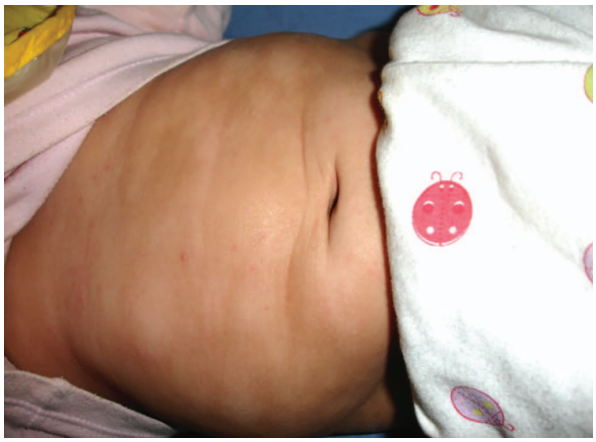

Fig. 13.9 Same child,
note infiltrated skin with leathery appearance

"Reality is merely an illusion, albeit a very persistent one."—Albert Einstein

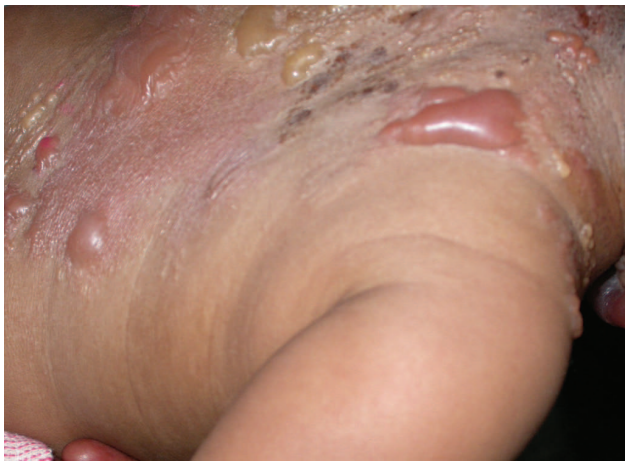

Fig. 13.9A Diffuse cutaneous mastocytosis with bullous lesions

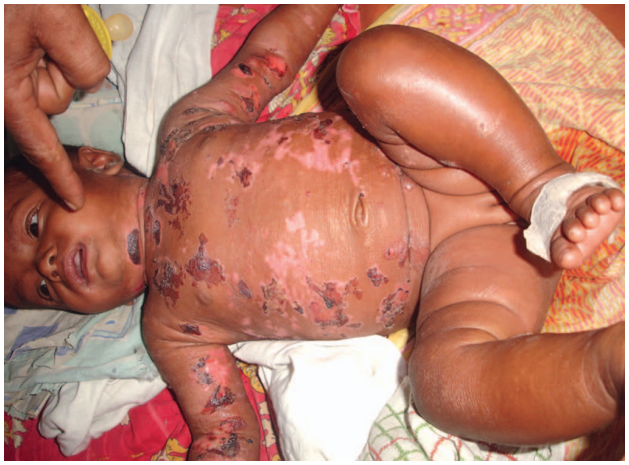

Fig. 13.9B DCM with bullous lesions

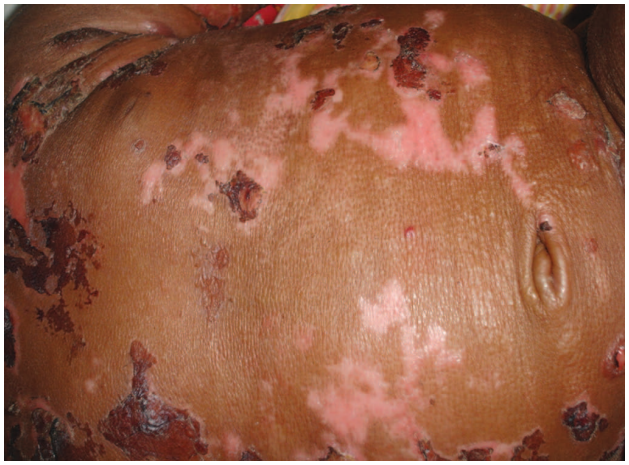

Fig. 13.9C DCM, note infiltrated skin

Treatment

Treatment is usually symptomatic. Antihistamines form the backbone of treatment and must be given according to the age and body weight of the affected child. Conventional H1 blockers, e.g. chlorpheniramine, promethazine or hydroxyzine are of great help to control itching and urticarial response; cetirizine is also effective. Application of moderately potent topical steroids intralesional triamcinolone acetonide help in resolution of these lesions. Maintenance therapy over a long period of time and regular follow-up of these children is necessary. UV therapy may be used in adult and children above 6 years of age.

LANGERHANS CELL HISTIOCYTOSIS

The term histiocytosis-X is used to identify three related clinical entities of unknown etiology, characterized by histiocytic proliferation and comprises the triad of Letterer-Siwe disease, Hand-Schüller-Christian disease and eosinophilic granulmoma.

LETTERER-SIWE DISEASE (Figs 13.10 to 13.12C)

Letterer-Siwe disease is seen as the severe fulminating end of the histiocytosis spectrum and represents the acute disseminated form. It usually occurs in the first year of life and skin manifestations represent the first recognizable clinical sign. It begins with a scaly, erythematous seborrhea like eruption on the scalp, behind the ears and in the axillary, inguinal or perineal areas. In infants vesicular or crusted papules may predominate. Purpuric nodules on the palms and soles are a bad prognostic sign. Buccal and gingival ulcerations, chronic otitis media and ulceration of the postauricular, inguinal or perineal regions are also present. The infant may appear healthy for many months before fever, anemia, thrombocytopenia, adenopathy, hepatosplenomegaly or skeletal tumors become apparent.

Treatment

Prognosis depends upon the age of onset, duration of symptoms and the degree of systemic involvement. Death may result from hemorrhage, anemia or infection.

HAND-SCHÜLLER-CHRISTIAN DISEASE

This syndrome compromise a triad of osteolytic defects, diabetes insipidus and exophthalmos. However, bony lesions are the most common manifestations, revealed on X-ray as sharply defined lytic areas chiefly in the skull. Chronic otitis media, ulcers, necrosis and tumors of the gums and oral

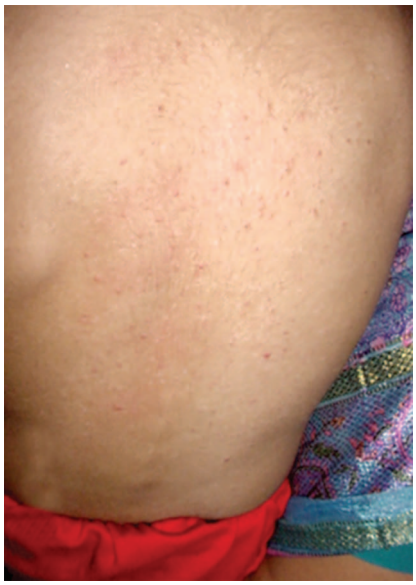

Fig. 13.10 Infiltrated papules of Letterer-Siwe disease over back

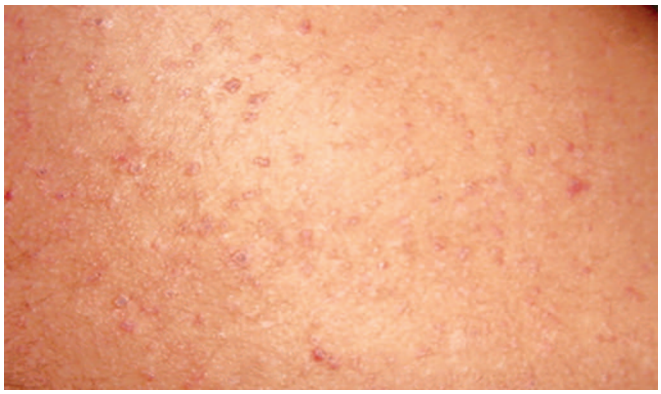

Fig. 13.11 Close-up of the lesions

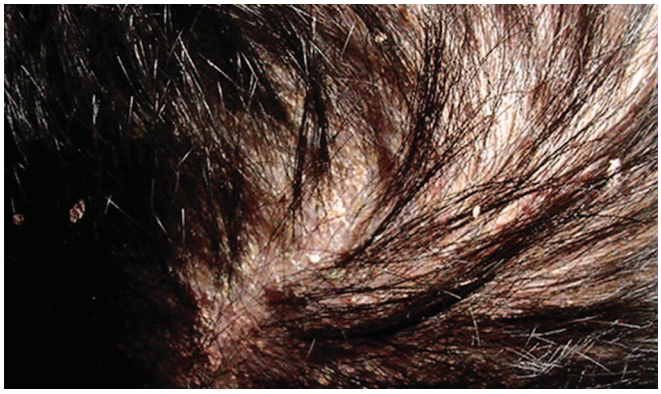

Fig. 13.12 Infiltrated lesions of histiocytosis over scalp

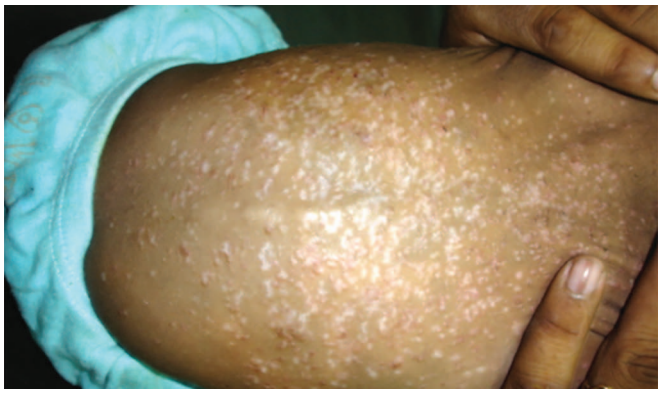

Fig. 13.12A Infiltrated papules and postinflammatory depigmentation over back in a child with Letterer-Siwe disease

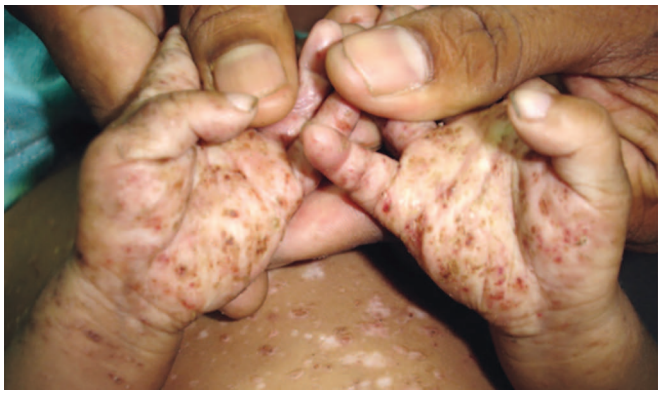

Fig. 13.12B Purpuric lesions over palms in an infant with LCH

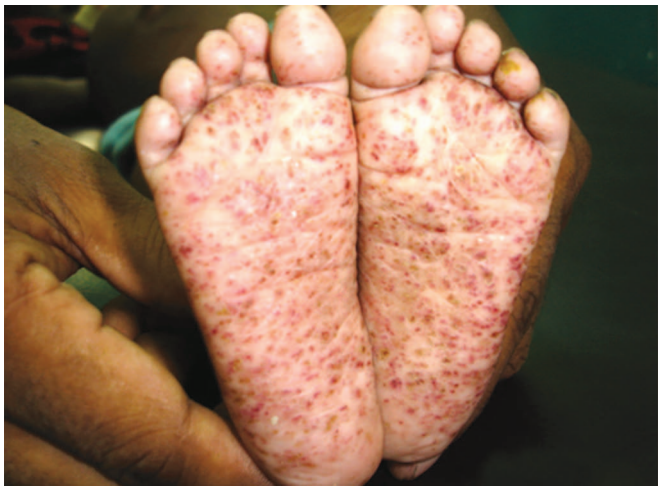

Fig. 13.12C Same infant, purpuric lesions over the soles

"A little inaccuracy sometimes saves a ton of explanation."—H. H. Munro (Saki)

mucosa due to histiocytic proliferations are common. Death may result from pulmonary fibrosis, associated ventricular hypertrophy and right sided heart failure. Skin lesions affect 30–50% of cases and manifest in less severe form than Letterer-Siwe syndrome. They are seen as scaling or crusting with brown to flesh colored papules. Granulomatous infiltrates with ulceration are found in the axillary or anogenital areas.

EOSINOPHILIC GRANULOMA (Fig. 13.13)

This is the third and most benign form of histiocytosis-X. It is seen in children above 6 years and young adults with an insidious onset. The patient is generally free of symptoms until headaches, localized pain, tenderness or swelling of soft tissues suggest the diagnosis. The disorder may present as single or multiple skeletal lesions that often go undetected until a spontaneous fracture or an incidental X-ray suggests the diagnosis. Skin lesions are rare and consist of crusting of the scalp, reddish brown papules or nodules in the retroauricular and perineal areas, or ulcerated granulomatous lesions of the buccal mucous membranes or inguinal, perineal or vulvar regions.

Natural History

The course is characteristically chronic.

Management

Therapeutic regimens for histiocytosis-X vary widely. Patients with diffuse systemic disease of the reticulohistiocytic system suffer impaired immunity and are susceptible to recurrent infections. Blood transfusions and antibiotics improve the long-term outlook for such patients. Immunosuppressive drugs in proper combination may give long-term remissions. Prednisolone at a dose of 2–4 mg/kg/day may result in complete clearing of lesions or long-term remissions for 1–2.5 years. Alkylating agents viz., nitrogen mustard, chlorambucil and cyclophosphamide appear to be highly effective. Methotrexate, either alone or in combination with oral corticosteroids, is also an effective modality of treatment. In general, patients with Hand-Schüller-Christian disease and eosinophilic granuloma responds better to therapy than patients with Letterer-Siwe disease. Radiotherapy is effective for localized skeletal lesions. The overall prognosis of histiocytosis-X had been so far depicted as 'poor.' However, the current data suggest that it may not be as unfavorable as it had been believed to be. Aggressive chemotherapy and good supportive care may not only provide long-term remissions but may even render complete cure.

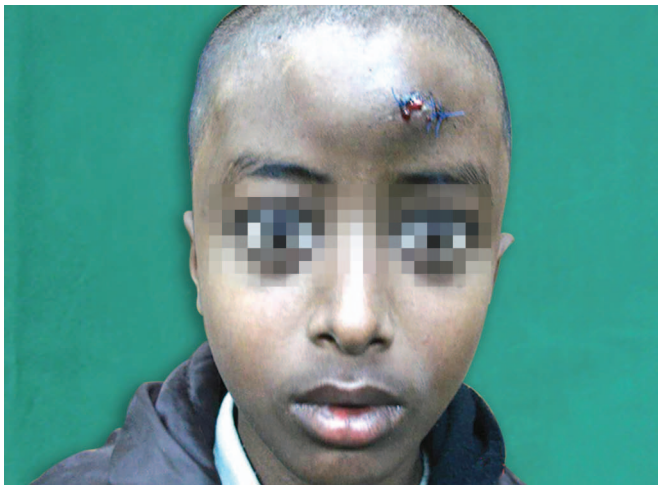

Fig. 13.13 Eosinophilic granuloma over the forehead

BENIGN CEPHALIC HISTIOCYTOSIS (Fig. 13.14)

This is a self healing cutaneous non Langerhans cell histiocytosis involving the head, neck and face region. It is most common in children about 15 months of age with almost 45% of cases occurring under 6 months of age.

Clinically it manifests as yellow brown macules and minimally elevated papules in a reticulate pattern. The less common affected sites include trunk, extremities, buttocks and pubis.

Differential Diagnoses

1. Flat warts
2. Juvenile xanthogranuloma-micronodular type
3. Langerhans cell histiocytosis
4. Multiple melanocytic nevi
5. Urticaria pigmentosa

The diagnosis is established by biopsy and using special stains.

Internal involvement may occur when the condition leads to infiltration of the pituitary gland, and bones including spine, tibia and skull.

Management

This condition is generally characterized by a benign course with spontaneous healing and residual atrophic pigmented scars. Treatment is unnecessary however close monitoring is warranted and follow-up is necessary to look for progression and internal involvement.

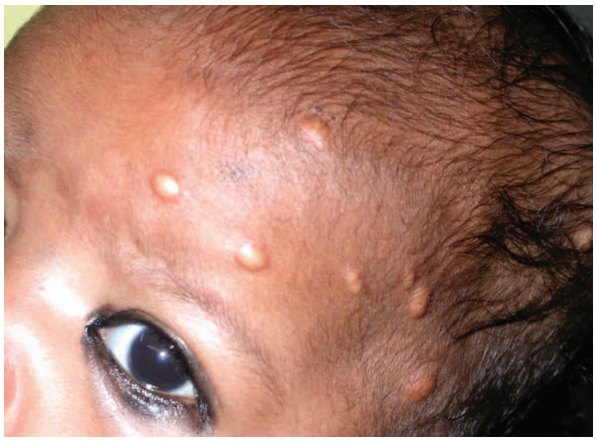

Fig. 13.14 Benign cephalic histiocytosis

DERMATOFIBROMA (Fig. 13.15 to 13.16A)

Dermatofibroma also known as benign fibrous histiocytoma is a circumscribed fibrous growth of the skin. It occurs more commonly in adolescence and rare in younger children. Trauma (insect bite reactions) acts as a predisposing factor. There is proliferation of fibroblastic spindle cells and histiocytic cells in dermis. Clinically presents as asymptomatic to painful slow growing, firm, indolent, red to brown nodules. The lesions measure 2–5 mm, rarely more than 15 mm occurring as giant lesion. They occur as single or multiple lesions, distributed more commonly on the extremities. Lateral pressure on the lesion produces dimpling on the surface known as 'dimple sign'. Clustering, eruptive and atypical variants have been described. Congenital type of dermatofibroma has been reported in literature. Multiple eruptive dermatofibroma has been associated with autoimmune diseases, immunosuppressants drugs, HIV, hematological malignancies and pregnancy. Diagnosis is mainly clinical but histopathological examination is confirmatory. There are numerous fibroblasts with increased collagen in dermis with proliferation of epidermis. Dermatofibroma persists for many years. Treatment is symptomatic. Painful lesions may be excised.

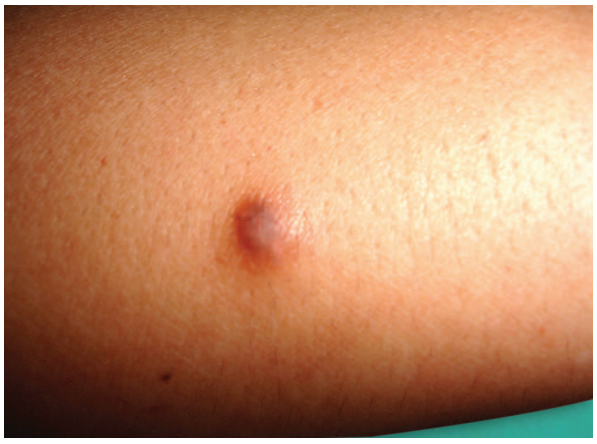

Fig. 13.15 Dermatofibroma

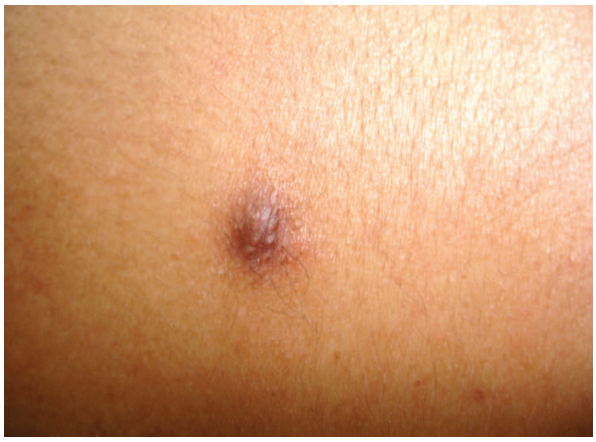

Fig. 13.15A Indurated hard hyperpigmented nodule of dermatofibroma

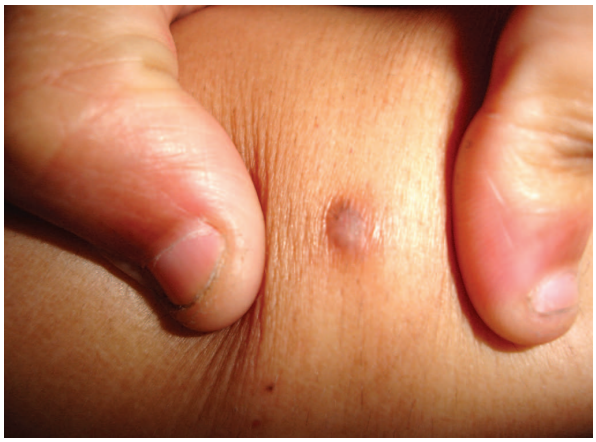

Fig. 13.16 Demonstration of 'Dimple sign'

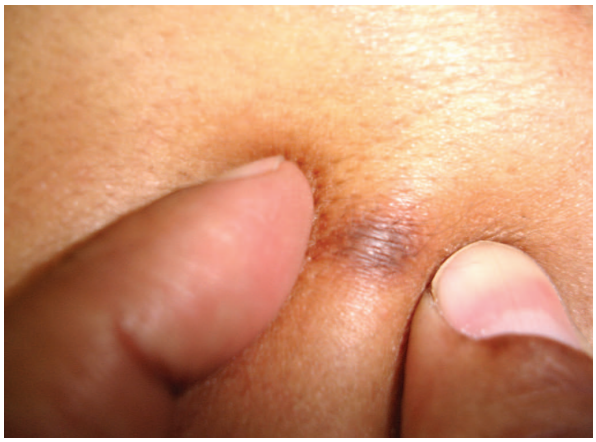

Fig. 13.16A Close-up of 'Dimple sign'

"Forgive your enemies, but never forget their names."—John F. Kennedy

14

Metabolic Disorders

ALKAPTONURIA (Figs 14.1 and 14.2)

Alkaptonuria is a rare, autosomal recessive disorder of homogentisic acid metabolism, an intermediate product of phenylalanine and tyrosine metabolism. The basic defect is in the mutation of homogentisic acid oxidase gene located on chromosome 3q21-q23 which leads to excessive urinary excretion of homogentisic acid (HGA) and deposition of the same in connective tissue all over the body including cartilage, tendon, heart valve and urinary tract.

Clinical Features

Dark urine, which turns black on standing in alkaline pH may be initial presentation in many cases but not always. Urinary pH due to ascorbic acid is the major determinant of oxidation. Some patient with acidic urine never present with dark urine on standing. Other initial presentations may be black cerumen and pigmentation of axillary skin along with staining of undergarments due to ochronotic pigment deposition in sweat gland.

Adult patients present with evident ochronotic discoloration of sclera, conjunctiva, cartilage of ear, tympanic membrane and cartilage of nose and hand. Variable degree of deafness and tinnitus are attributed to HGA induced inhibition of lysyl oxidase, enzyme responsible for collagen cross linking. Involvement of larynx and trachea remain asymptomatic. Blue-gray pigmentation of skin affects ear, tip of the nose, extensor tendons of hands, palmoplantar and mucosal surface.

Ochronotic axial arthopathy, radiologically characterized by early calcification of intervertebral disk followed by decreased joint space is most disabling late manifestation. Among other system aortic valve, prostate and kidney are worth mentioning.

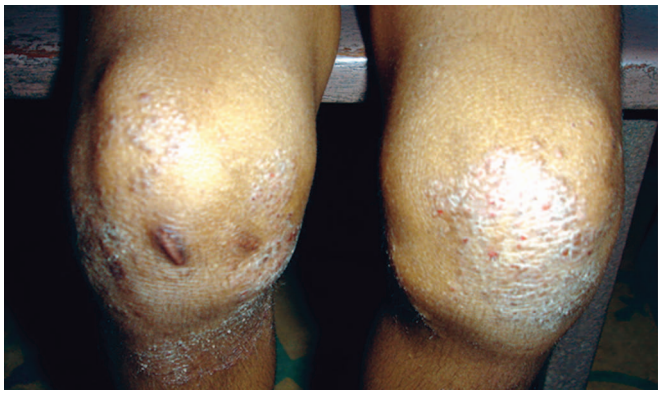

Fig. 14.1 Scaly eczematous lesions of alkaptonuria over knees

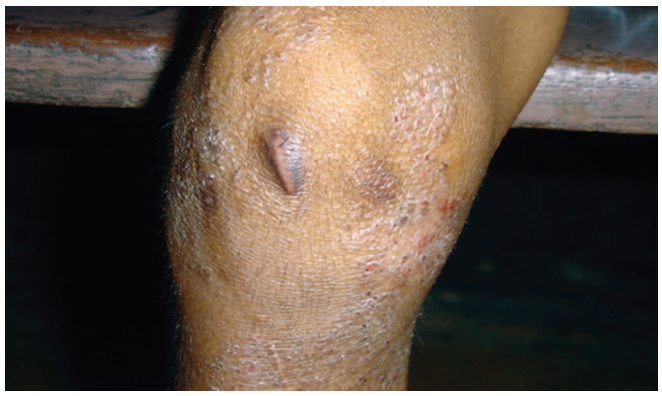

Fig. 14.2 Close-up of lesions

Investigations

Histopathology is characterized by deposition of yellow-brown, large, irregular ochre bodies composed of degenerated collagen and ochronotic pigment in reticular dermis.

"Logic is in the eye of the logician."—Gloria Steinem

Treatment

Treatment is mainly supportive with restriction of high protein, high phenylalanine and high tyrosine containing diet, supplementation of large amount of dietary vitamin C and proper follow up for articular and cardiac involvement in future.

Differential Diagnoses

Friction blisters, bullous fixed drug reactions, bullous pemphigoid, bullous SLE, and epidermolysis bullosa acquisita.

Routine histopathological investigations of diabetic bullae show nonspecific features including an intraepidermal or subepidermal bulla; the inflammatory element is absent or trivial. Direct immunofluorescence reveals no primary immunological abnormality and hence, is noncontributory.

Management

Monitoring for secondary infection and differentiation from other blistering dermatoses are very important. The over all prognosis is generally favorable although the condition may be recurrent.

ADDISON'S DISEASE (Figs 14.2A and B)

It is a condition when the adrenal glands fail to produce the hormone cortisol adequately and sometimes also the production of aldosterone is affected. It affects males and females equally. It is also referred to as adrenal insufficiency or hypocortisolism.

Deficiency of cortisol can occur in one of the following ways:

- *Primary adrenal insufficiency:* Most cases are caused by gradual destruction of the outer layer of the adrenal glands by the body's own immune mechanism. Adrenal insufficiency occurs when at least 90% of the adrenal cortex has been destroyed. As a result, often both glucocorticoid (cortisol) and mineralocorticoid (aldosterone) hormones are lacking.
- *Polyendocrine deficiency syndrome type 1:* It occurs in children, and adrenal insufficiency may be accompanied by:
  - underactive parathyroid glands
  - slow sexual development
  - pernicious anemia
  - chronic candida (yeast) infections
  - chronic active hepatitis
  - hair loss (in very rare cases)

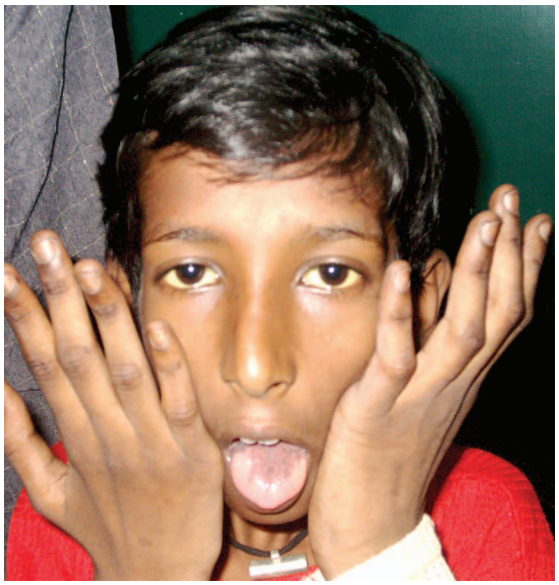

Fig. 14.2A Hyperpigmentation of Addison's disease

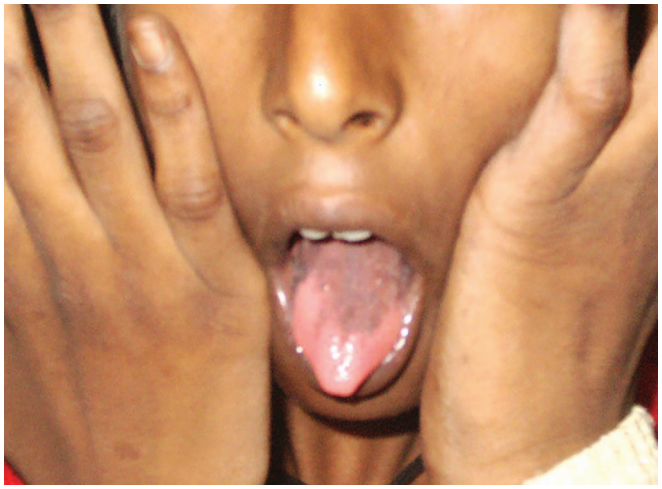

Fig. 14.2B Close-up

- *Polyendocrine deficiency syndrome type 2:* It is often called Schmidt's syndrome, usually afflicts young adults and is characterized by:
  - an underactive thyroid gland
  - slow sexual development
  - diabetes
  - vitiligo (skin condition resulting in loss of brown pigmentation)
  - loss of pigment on areas of the skin
- *Tuberculosis:* In this infection the adrenal glands can be completely destroyed resulting in deficiency of cortisol.

- Secondary adrenal insufficiency can occur in case of exogenous corticosteroid administration leading to HPA axis suppression, surgical removal of the adrenal glands, surgical removal of hypothalamus or pituitary and radiation therapy in cases of pituitary gland tumors.

Clinical Features

The symptoms of adrenal insufficiency usually begin gradually. Characteristics of the disease are:

- Chronic, worsening fatigue (tiredness)
- Muscle weakness
- Loss of appetite
- Weight loss
- Nausea
- Vomiting
- Diarrhea
- Low blood pressure that falls further when standing, causing dizziness or fainting (orthostatic hypotension)
- Hypoglycemia, or low blood glucose, is more severe in children than in adults.

Symptoms of a crisis include:

- Sudden penetrating pain in the lower back, abdomen, or legs
- Severe vomiting and diarrhea
- Dehydration
- Low blood pressure
- Loss of consciousness (fainting).

Left untreated, an addisonian crisis can be fatal.

Cutaneous Manifestations

Hyperpigmentation—diffuse hyperpigmentation with accentuation of the sun exposed areas, sites of trauma, axilla, perineum, nipples, palmar creases, melanocytic nevi, mucous membranes, hair and nails.

Loss of ambisexual hair can occur in postpubertal women.

Rarely, there can be fibrosis and calcification of cartilage including ear.

There can be associated findings of mucocutaneous candidiasis and vitiligo.

Diagnosis

A diagnosis of Addison's disease is made by laboratory tests like ACTH stimulation test and CRH stimulation test. The aim of these tests is first to determine whether levels of cortisol are insufficient and then to establish the cause. X-ray examination of the adrenal and pituitary glands also are useful in helping to establish the cause. CT scan, tuberculin testing and assay of pituitary hormones may also helpful in diagnosing the condition.

Treatment

Cortisol is replaced orally with hydrocortisone tablets, a synthetic glucocorticoid, taken once or twice a day. If aldosterone is also deficient, it is replaced with oral doses of a mineralocorticoid called fludrocortisone acetate, which is taken once a day. Patients receiving aldosterone replacement therapy are usually advised to increase their salt intake. Because patients with secondary adrenal insufficiency normally maintain aldosterone production, they do not require aldosterone replacement therapy. The doses of each of these medications are adjusted to meet the needs of individual patients.

During an addisonian crisis, low blood pressure, low blood glucose, and high levels of potassium can be life threatening. Standard therapy involves intravenous injections of hydrocortisone, saline, and dextrose. This treatment usually brings rapid improvement. When the patient can take fluids and medications by mouth, the amount of hydrocortisone is decreased until a maintenance dose is achieved. If aldosterone is deficient, maintenance therapy also includes oral doses of fludrocortisone acetate.

DIABETIC DERMOPATHY (Fig. 14.2C)

This condition is extremely uncommon in the pediatric age group.

It is characterized by the presence of red brown papules less than 1–2 cm in size which regress slowly to produce slightly depressed atrophic macules. These may persist or may clear to leave normal skin. The pretibial skin is the most commonly affected site. The other sites affected include arms, thighs and trunk. Generally, no treatment is effective in this condition.

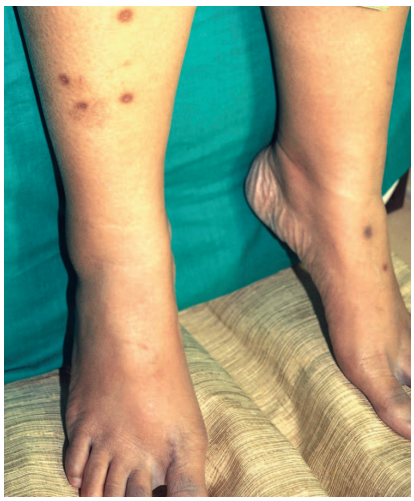

Fig. 14.2C Diabetic dermopathy

NECROBIOTIC LIPOIDICA DIABETICORUM (NLD) (Fig. 14.2D and E)

This is a condition which follows but sometimes may precede the diagnosis of diabetes in children. It is generally located in the pretibial area, trunk, upper limb, face and scalp in a decreasing order of occurrence at these sites. It presents as an asymptomatic erythematous papule or nodule or plaque with a raised rim and a depressed center which has a waxy atrophic appearance. The color may vary from brown to yellowish orange with a peau de orange like appearance of the overlying skin. The center may sometimes show ulceration.

Treatment is generally required when there is ulceration or an expanding edge is present. High potency topical steroids and intralesional steroids have been tried. Skin grafting may also be another option.

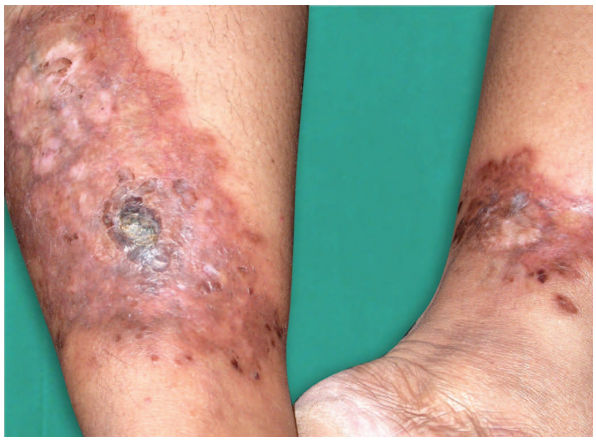

Fig. 14.2D Necrobiosis lipoidica diabeticorum

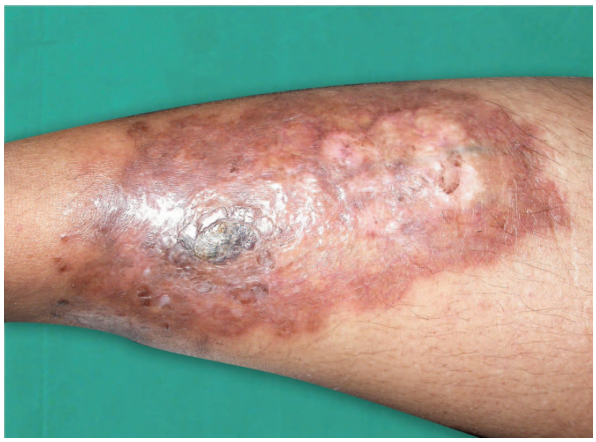

Fig. 14.2E NLD, close-up

CUSHING'S DISEASE (Fig. 14.2F to H)

This condition occurs due to excess glucocorticosteroid production. Increased production can be due to increased adrenocorticotropic hormone (ACTH) production from pituitary adenoma. It can also result from micronodular adrenal hyperplasia, adrenal carcinoma, adrenal adenoma and ectopic ACTH secretion. Cushing's disease may also occur due to the exogenous administration of steroids.

Clinical Features

It is characterized by weight gain, growth retardation, delayed sexual maturation, fatigue and weakness, menstrual irregularities and emotional labilities. Hypertension and osteopenia can also be a manifestation. Nodular adrenal hyperplasia can be associated with myxomatous tumors of heart, skin and breast. It can also be a part of the CARNEY complex.

Cutaneous features include moon facies and buffalo hump with truncal obesity. Plethoric facies and broad purple striae are seen most commonly. Striae may be present at the sites of skin tension with skin fragility and poor wound healing. Purpura with minimal trauma is noted. Hyperpigmentation, hypertrichosis, acneiform eruption and acanthosis nigricans are the other cutaneous manifestations.

Investigations

Twenty-four hour urine cortisol levels, plasma cortisol levels, low dose DEXA suppression test, salivary cortisol levels, ACTH, corticotropin releasing hormone (CRH) levels help in aiding the diagnosis.

Differential Diagnosis

Obesity and polycystic ovary syndrome.

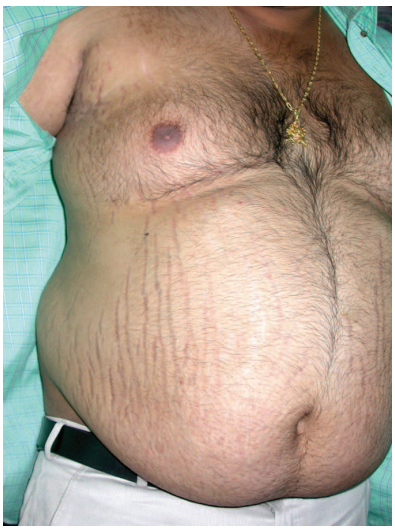

Fig. 14.2F Cushing's disease

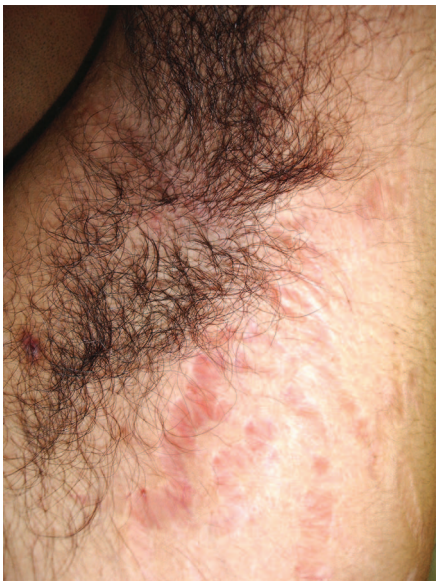

Fig. 14.2G Same patient, note atrophic scars over axilla

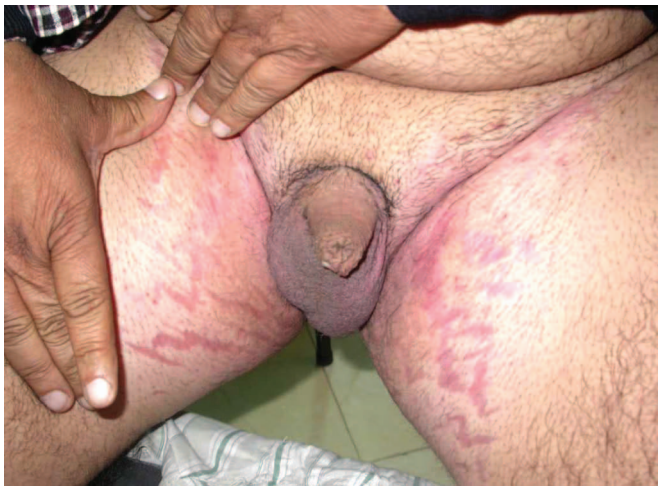

Fig 14.2H Same patient, atrophic scars over thighs

Treatment

Treatment of the underlying etiology leading to increased ACTH production is important in the management of Cushing's disease.

DIABETIC BULLA (Fig. 14.2I and J)

Bullosis diabeticorum, also known as bullous disease of diabetes and diabetic bullae, is a rare, distinct, spontaneous, noninflammatory, blistering condition of unknown etiology

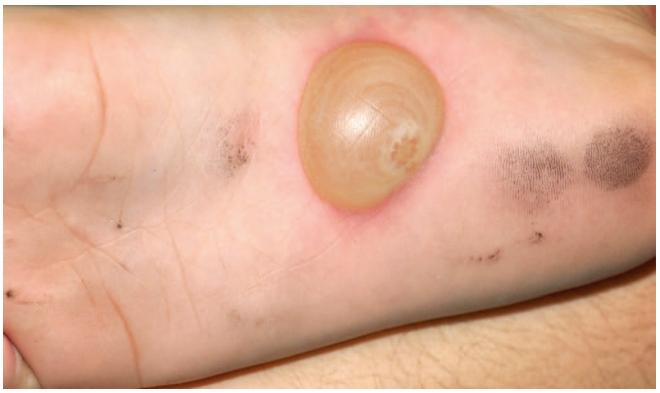

Fig. 14.2I Diabetic bulla over sole

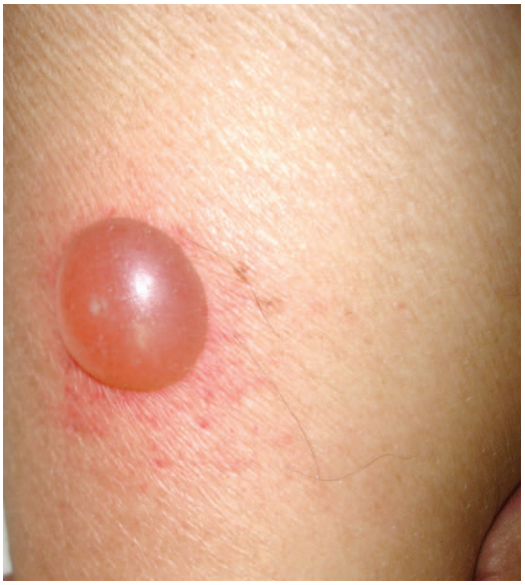

Fig. 14.2J Diabetic bulla

occurring in the setting of diabetes mellitus. Cantwell, and Martz named the condition in 1967, Krane first reported this condition in 1930. The exact etiology of bullosis diabeticorum is unknown but it is thought to be multifactorial in origin. It has been reported to involve approximately 0.5% of diabetic patients of the adult US population and one recent Indian study showed involvement of 2% of the diabetic population, however the data on its occurrence in children is lacking. There is a male preponderance of the disease with a male-to-female ratio of 2:1 and the age range varies from 17 to 84 years.

The blisters have a propensity to be large and often have an asymmetrical shape. Although, they are much more common over the acral areas and are more common on the lower extremities, nonacral sites (e.g., the trunk) may also be involved.

"In the end, everything is a gag."—Charlie Chaplin

XANTHOMA (Figs 14.3 to 14.5)

Xanthomas are yellowish tumors of the skin which contain lipid laden histiocytes. They are usually associated with an abnormality of lipid metabolism, and detection of such abnormality helps to rule out any systemic involvement in such cases. Poorly soluble lipids are transported in serum by lipoproteins. Abnormalities in lipid transport and metabolism may result in elevations in serum triglyceride and/or cholesterol. The deposition of these lipids in skin and soft tissue results in development of xanthomas. Various primary dyslipoproteinemias have been enlisted in Table 14.1. Various systemic diseases which may trigger hyperlipoproteinemia are poorly controlled diabetes mellitus, hypothyroidism, fulminant hepatic necrosis, etc.

Various types of xanthoma may point toward a particular type of hyperlipidemia. Plane xanthomas present as soft yellowish plaques on any site but with special predilection for old scars or traumatized areas in the past. Xanthelasma is basically a plane xanthoma over the eyelids. It is usually associated with hypercholesterolemia in about half of the cases. Diffuse lesions may be seen on the trunk, face, neck, etc. Tuberous xanthomas arise as yellow nodules on the extensor surfaces of the extremities and buttocks. They may coalesce to cover large areas. However, they never get adhered

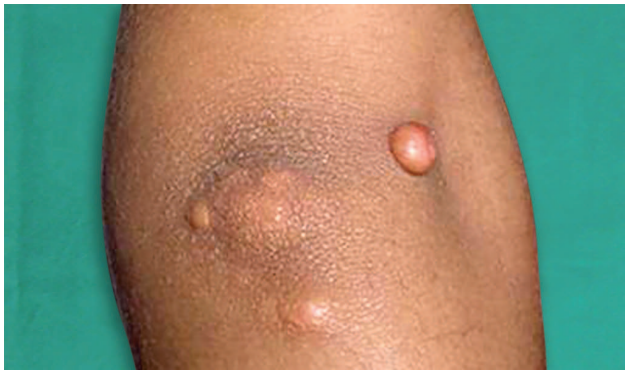

Fig. 14.3 Tuberous xanthoma over elbows

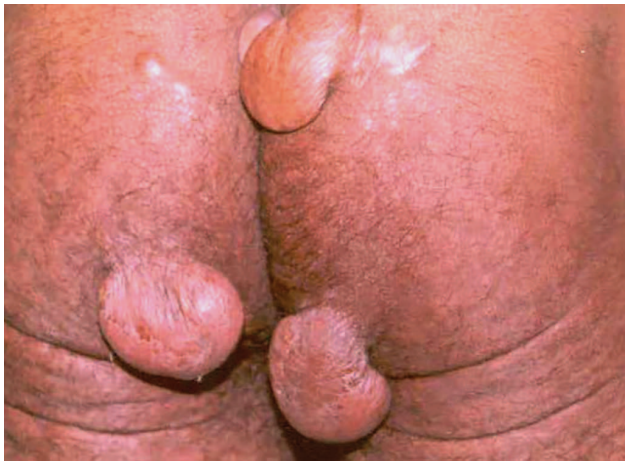

Fig. 14.3A Close up of tuberous xanthoma

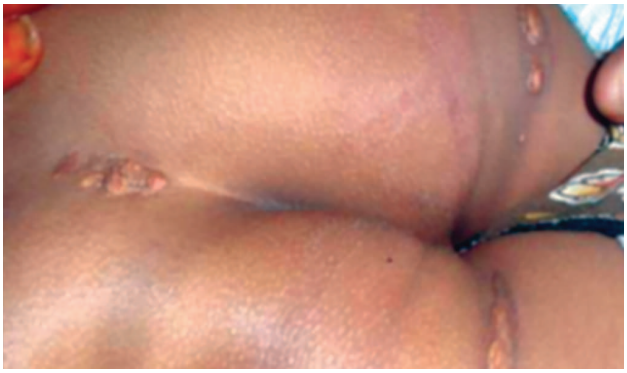

Fig. 14.4 Plane xanthoma over the natal cleft

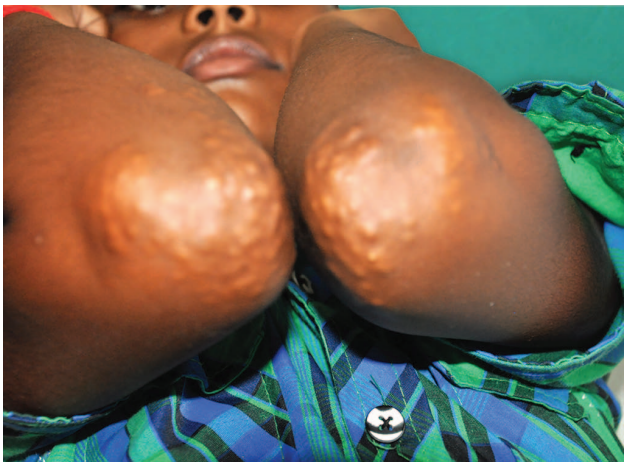

Fig. 14.4A Xanthoma over elbows in a 7-year-old boy

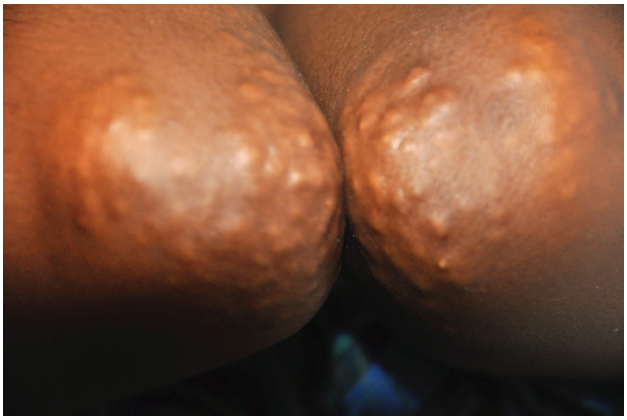

Fig. 14.4B Close-up

"I love Mickey Mouse more than any woman I have ever known."—Walt Disney

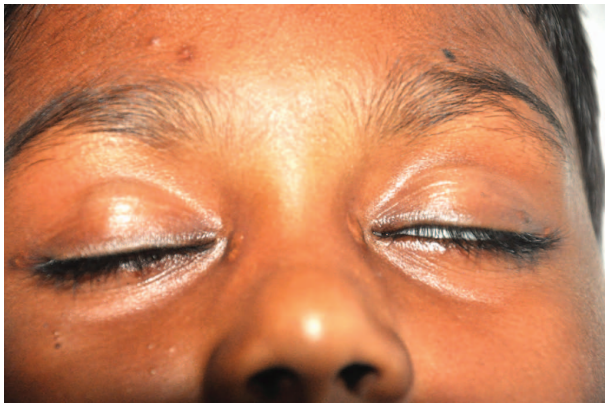

Fig. 14.4C Xanthelasma over eyelids

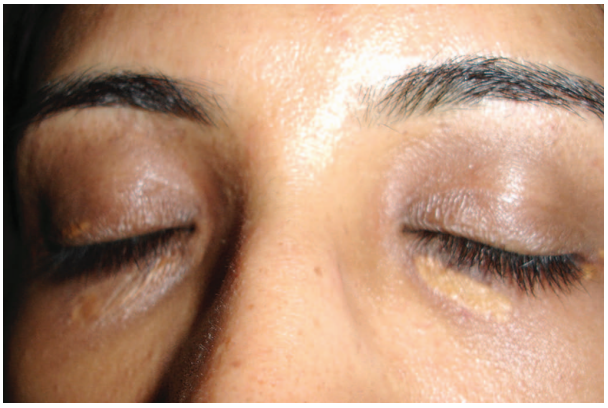

Fig. 14.4F Xanthelasma in a 18-year-old girl

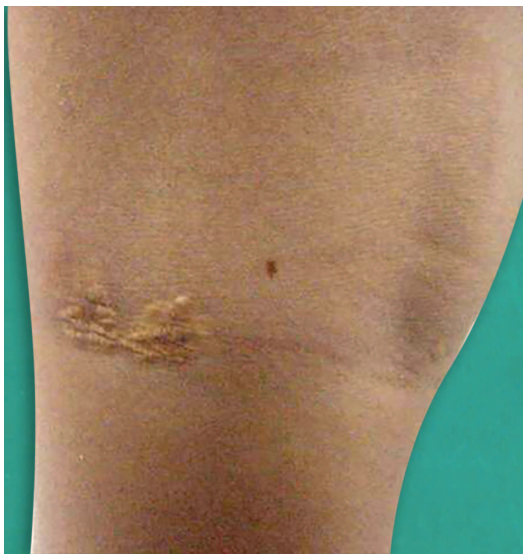

Fig. 14.4D Xanthoma over popliteal fossa

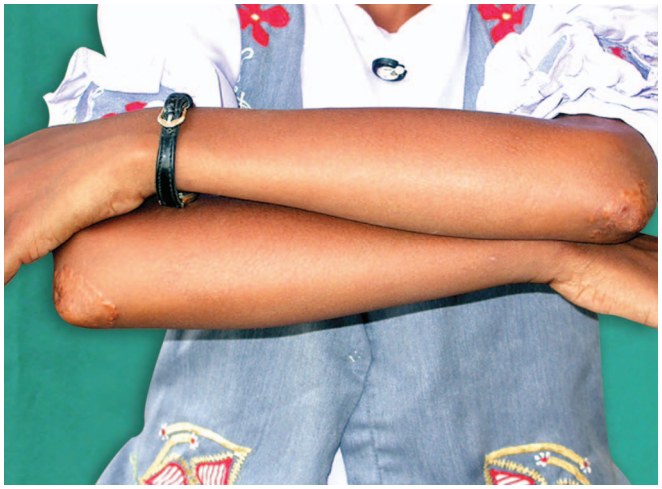

Fig. 14.5 Plane xanthoma over the elbows of a 5-year-old girl

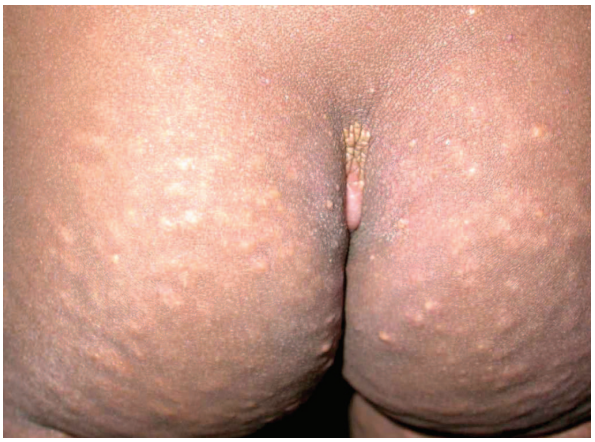

Fig. 14.4E Xanthoma over buttocks in a 7-year-old boy

to underlying soft tissue structures as in cases of tendinous xanthoma. Eruptive xanthomas develop suddenly as 1–4 mm diameter yellow-red papules over extensor surfaces of the extremities, buttocks and bony prominences. They appear in crops or showers and are usually associated with markedly elevated triglycerides. Tendinous xanthomas present as smooth asymptomatic nodules on ligaments, tendons and other deep soft tissue structures. They are usually several centimeters in size and occur most commonly on the ankles, knees and elbows.

Differential Diagnosis

Xanthomas must be differentiated from xanthogranulomas which are not associated with derangement of lipid metabolism.

"Good teaching is one-fourth preparation and three-fourths theater."—Gail Godwin

Table 14.1 Correlations of lipoprotein defects, inheritance and clinical presentations of xanthomas

Type (Prevalence)	*Pattern*	*Chol*	*TG*	*Inheritance*	*Possible mechanism*	*Clinical presentation*	*Age of detection*	*Secondary diseases*
I (rarest)	Chyl	+	+++	AR	LDL defect of deficiency	Eruptive xanthomas (60–70%), abdominal pain, hepatosplenomegaly, lipemia retinalis, creamy plasma, pancreatitis	Early childhood	Pancreatitis, diabetes
IIa (common)	LDL	+++	+ or N	AD	LDL receptors nonfunctional	Tendinous xanthomas (40–50%), xanthelasmas (20–25%), corneal arcus (10–15%), tuberous, xanthomas, atherosclerosis	Early childhood in homozygotes	Hypothyroidism, nephrotic syndrome
IIb (common)	LDL, VLDL	+++	+ or N	AD	VLDL overproduction	Same, abnormal GTT		Hepatic disease
III (relatively common)	IDL	++ (variable)	+ (variable)	AR	Homozygous apoprotein E2, decreased remnant clearance, overproduction of VLDL	Xanthomas (75–80%; tuberous, palmar, tendinous, eruptive), abnormal GTT, hyperuricemia, atherosclerosis, obesity	Adult	Hepatic disease, dysglobulinemia, uncontrolled diabetes
IV (most common)	VLDL	+	++	AD	Carbohydrate induced	Atherosclerosis, abnormal GTT, eruptive or tuberous xanthomas	Adult	Hypothyroidism diabetes, pancreatitis, glycogen storage disease, nephrotic syndrome, multiple myeloma
V (uncommon)	Chyl, VLDL	+	++	AR	Overproduction of VLDL, defect in metabolism of VLDL	Abdominal pain, obesity, xanthomas (eruptive), hepatosplenomegaly	Young adult	Insulin dependent diabetes, pancreatitis; alcoholism

Abbreviation: Chol—cholesterol; TG—triglycerides; Chyl—chylomicrons; LDL—low density lipoproteins; VLDL—very low density lipoproteins; IDL—intermediate density lipoproteins; AR—autosomal recessive; AD—autosomal dominant; GTT—glucose tolerance test; N—normal.

"When one door closes, another opens; but we often look so long and so regretfully upon the closed door that we do not see the one that has opened for us."—Alexander Graham Bell

Treatment

Xanthoma is treated by chemical cautery with 40–60% trichloracetic acid or silver nitrate solution. The other modalities are electrodesiccation or laser therapy. Very big tuberous or tendinous xanthomas can be excised under local anesthesia. Control of hyperlipidemia is done by judicious use of various lipid lowering agents, correction of associated systemic diseases if any and by strict dietary regimens.

Natural History

The vast majority (90% or more) of patients with juvenile xanthogranuloma have a self-limiting cutaneous, rare cases lasting until adulthood have been reported. Generally those that have their onset after the first year of life manifest complete healing usually within 1–5 years. Lesions may also occur in the lung pericardium, central nervous system, liver, spleen, and testes.

JUVENILE XANTHOGRANULOMA (Figs 14.5A to D)

Juvenile xanthogranuloma represents a benign, self-limiting disease of non-Langerhans cell histiocytosis characterized by accumulation of lipid laden macrophages. It mostly occurs in infants, children and occasionally adults, and it is characterized by one or several (occasionally numerous) red to yellow nodules located on the skin and other organs.

Typically the lesions are present at birth (20%) or during the first 6–9 months of life, and may persist or continue to erupt for years. They run a benign course, often increasing in number until about 1–1½ years of age and then involute spontaneously. They may be several hundred in number. They may range from several millimeters to 1 cm or more in diameter, and frequently they have a discrete, firm or rubbery consistency. On occasion, large juvenile xanthogranulomas may measure from 4 to 10 cm in diameter.

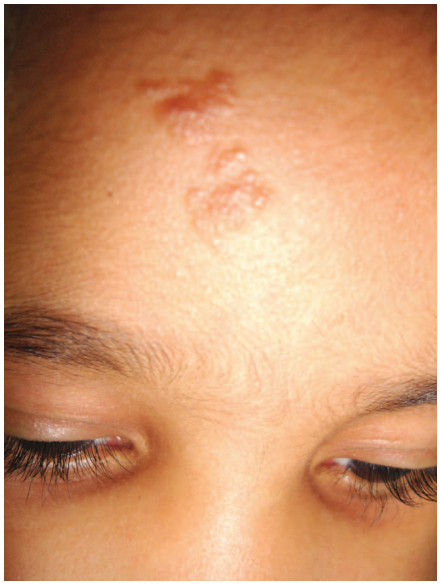

Fig. 14.5B JXG, close-up

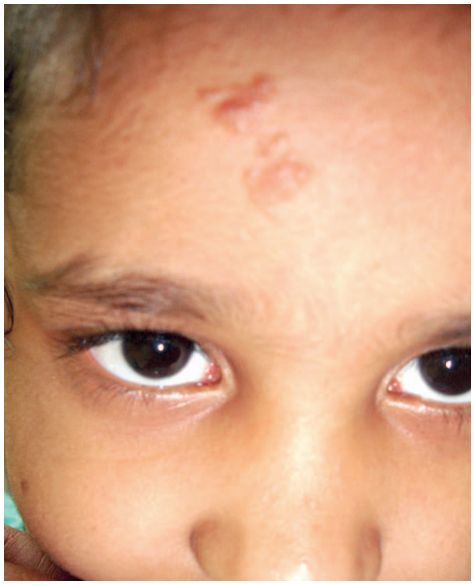

Fig. 14.5A Juvenile xanthogranuloma

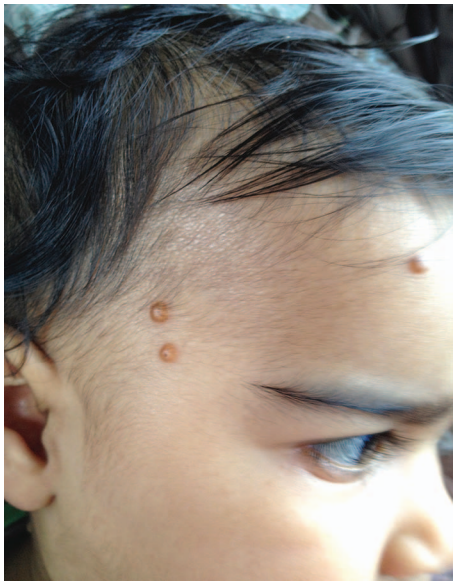

Fig. 14.5C JXG, classical lesions

"You can pretend to be serious; you can't pretend to be witty."—SachaGuitry

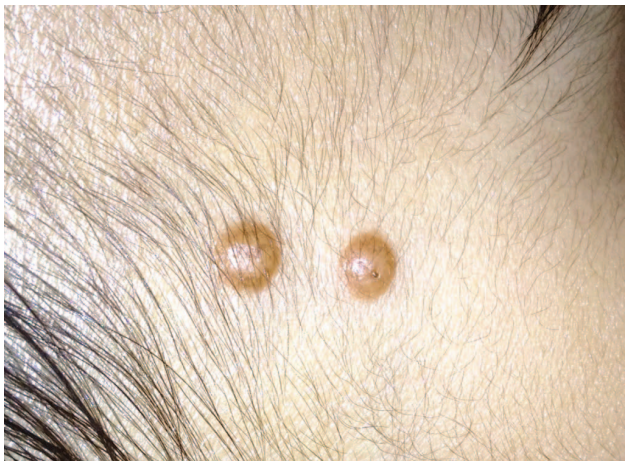

Fig. 14.5D JXG, close-up

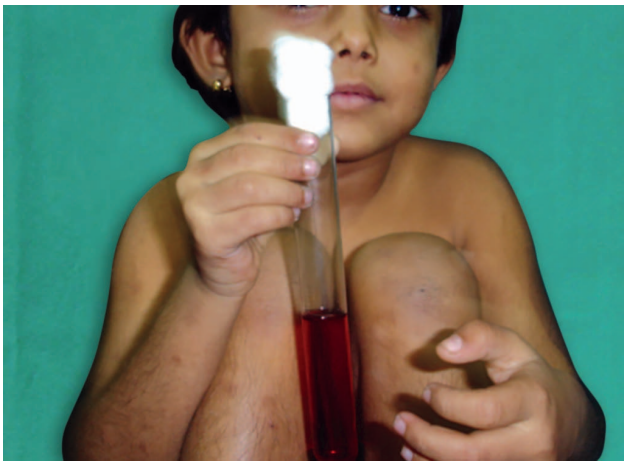

Fig. 14.6 Scarring, hypertrichosis and red urine in a 4-year-old girl

Systemic Associations

There have been patients with a combination of juvenile xanthogranulomas and café au lait spots or neurofibromatosis who developed chronic myelogenous leukemia or acute monomyelocytic leukemia. Patients with this combinations, therefore, should be checked periodically for the possibility of an associated leukemia.

Treatment

Explaining the condition and counseling of the parents is that is necessary for such infants and children.

CONGENITAL ERYTHROPOIETIC PORPHYRIA (GUNTHER'S DISEASE) (Figs 14.6 to 14.9)

It is an extremely rare disease characterized by appearance of red urine during infancy, severe photosensitivity, hemolytic anemia and splenomegaly. Photosensitivity is frequently absent in the neonatal period but generally becomes apparent during the first few years of life. Recurrent vesiculobullous eruptions on sunexposed areas of the skin eventually results in mutilating ulcerations, scarring, and loss of acral tissue, such as ears, tip of the nose, distal phalanges, and nails. Other common clinical features include hypertrichosis, conjunctivitis, keratitis, brown stained teeth that fluoresce under exposure to Wood's light, hyperpigmentation, hemolytic anemia, growth retardation and bone fragility. The biochemical disturbance in this disorder is due to the deficiency of an enzyme uroporphyrinogen cosynthetase III, resulting in marked overproduction of uroporphyrin I and coproporphyrin I in circulating erythrocytes and bone marrow cells. Prenatal

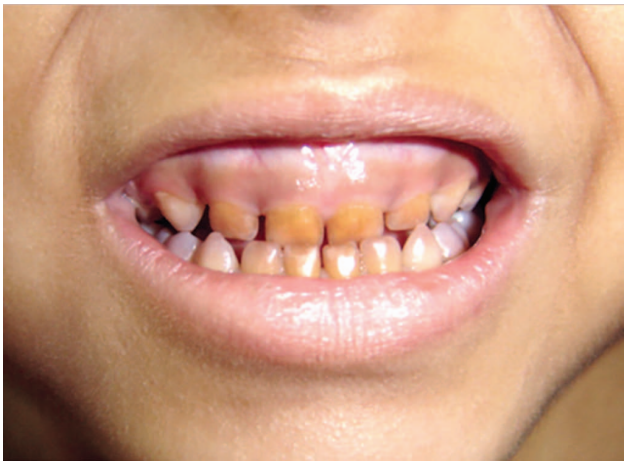

Fig. 14.7 Red teeth in congenital erythropoietic porphyria

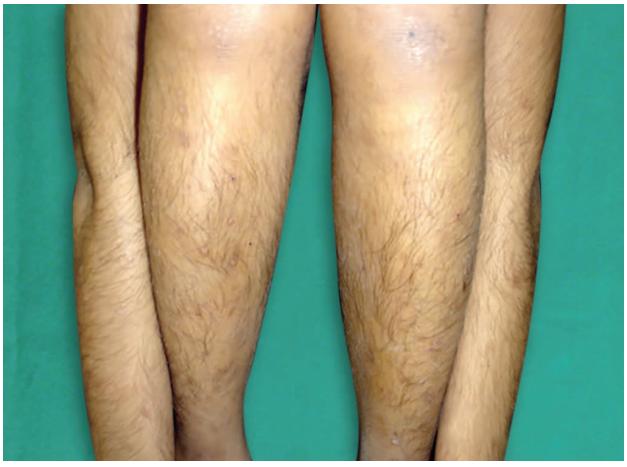

Fig. 14.8 Hypertrichosis over forearms and legs in CEP

"There is no sincerer love than the love of food."—George Bernard Shaw

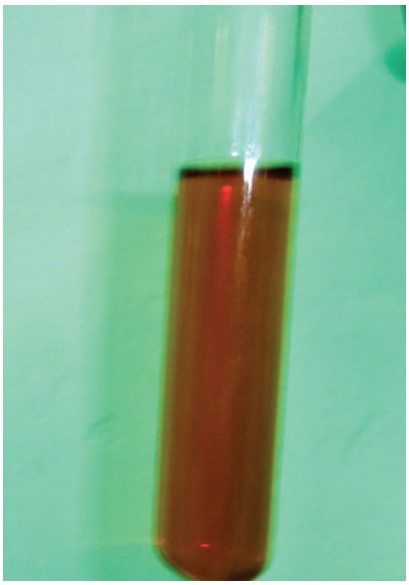

Fig. 14.9 Red urine in CEP

diagnosis is possible by means of analysis of amniotic fluid and cells. Splenomegaly is the constant feature of this entity. Hemolytic anemia is also a very important feature. The color of the urine may vary from faint pink to burgundy or port-wine, depending on the concentration of uroporphyrin derived from the oxidation of uroporphyrin derived from the oxidation of uroporphyrinogen.

Prognosis

The prognosis of erythropoietic porphyria is poor, with few patients surviving to the fourth or fifth decade. Death is frequently associated with hemolytic anemia.

Treatment

Treatment consists avoidance of sunexposure or trauma, with resolution of cutaneous manifestations, anemia, and splenomegaly often occurring with protection from sunlight. Oral betacarotene, in doses of 30–150 mg/day has been an effective photoprotective agent. Counseling of the parents is of paramount importance.

FABRY'S DISEASE (Fig. 14.10)

This is an X-linked recessive (XR) disorder where the primary metabolic defect is deficiency of a α-galactosidase which normally catabolizes the accumulated glycosphingolipid. The characteristic cutaneous lesions of Fabry's disease or angiokeratoma corporis diffusum appear between 5 and 13 years of age, as symmetrical clusters of punctate macules or papuler

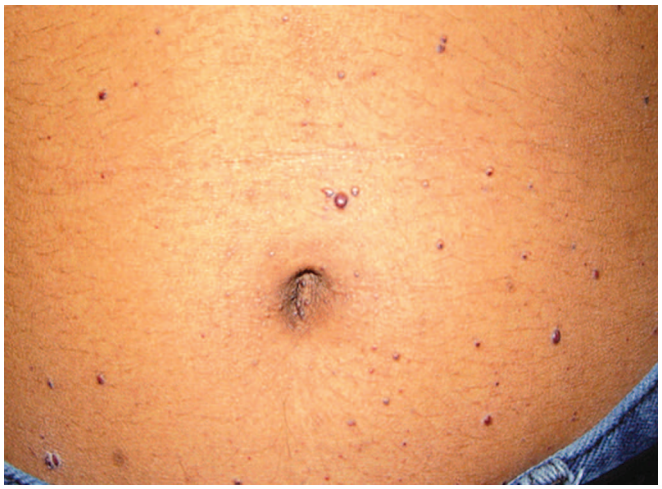

Fig. 14.10 Angiokeratoma lesions in Fabry's disease

dark red angiectases which do not blanch with pressure. They usually appear in the area between the umbilicus and knees, number in thousands and tend to cluster in the iliosacral areas, around the umbilicus and over the scrotum, buttocks, posterior thorax and thighs. They become little hyperkeratotic with time. Hands and feet are usually spared. Majority of patients will also have pinpoint macular purplish spots on the lips, particularly near the vermilion border of the lower lip. Heterozygote females show clinical manifestations in 20% cases but have wilder form of the disease. In childhood, the eruption is accompanied by recurrent episodes of fever, pain and paresthesias of hands and feet. Paralysis, scant body hair, hypohidrosis, ankle and pedal edema are common.

Systemic Associations

Patients are often hypertensive and susceptible to cerebrovascular accidents, coronary artery disease and renal disease. Neurological complications, diarrhea, colitis, proctitis, arthritis, cataracts and corneal opacities are other manifestations. Corneal opacities result from deposit of sphingolipid in a peculiar spoke like fashion and is known as cornea verticillata.

Treatment

Treatment is generally supportive. Laser therapy may be helpful for angiokeratoma. Painful crises may be managed with phenytoin or carbamazepine. Enzyme replacement therapy using human recombinant α-galactosidase has resulted in symptomatic improvement. However, best hope in future lies in gene therapy.

"I don't even butter my bread; I consider that cooking."—Katherine Cebrian

FARBER'S DISEASE (Fig. 14.11)

Farber's disease is an autosomal recessive disease of lipid metabolism associated with a deficiency of a lysosomal acid ceramidase and tissue accumulation of ceramide. The disease clinically manifests as subcutaneous nodules near the joints and over pressure points, and progressive painful and deformed joints are the main clinical manifestations. Hoarseness due to laryngeal involvement can lead to aphonia, feeding and respiratory difficulties, failure to thrive and intermittent fever. Symptoms usually appear between the age of 2 weeks to 4 months.

Diagnosis

The diagnosis can be established by demonstration of the deficiency of an enzyme acid ceramidase in cultured skin fibroblast or in white blood cells. Prenatal diagnosis can be done by measurement of the enzyme in cultured amniotic cells.

Prognosis

The disease often leads to death within the first few years.

Treatment

There is no specific treatment. Systemic corticosteroids may provide some relief in childhood onset cases.

LESCH-NYHAN SYNDROME (Figs 14.12 and 14.13)

This is a X-linked recessive (XR) disorder, caused by deficiency of hypoxanthine-guanine phosphoribosyl transferase (HG-PRTase) which leads to an overproduction of uric acid. Mental retardation, choreoathetotic movements, self mutilation and gout like manifestations of hyperuricemia are the chief clinical features. Self mutilation is characterized by loss of tissue around the mouth and fingers as a result of compulsive self destructive biting of these areas.

Management

Treatment is with allopurinol (in dosages of 100–300 mg/day in divided doses) to control uric acid levels, tophaceous deposits, nephropathy and gouty arthritis. Hand bandages and elbow splints are used to control the self mutilating

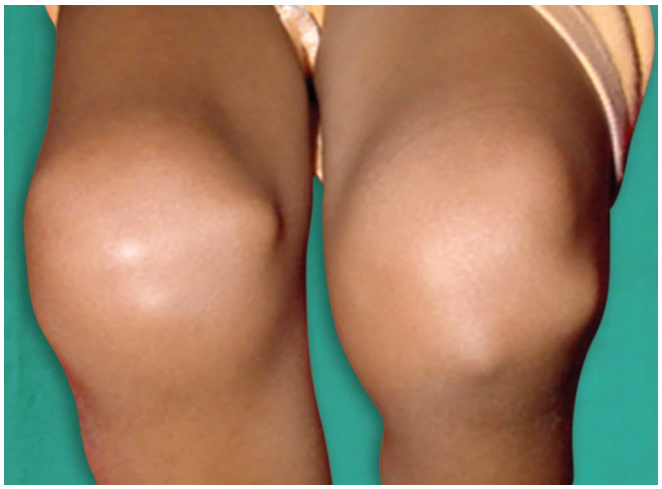

Fig. 14.11 Subcutaneous nodules around knees in Farber's disease

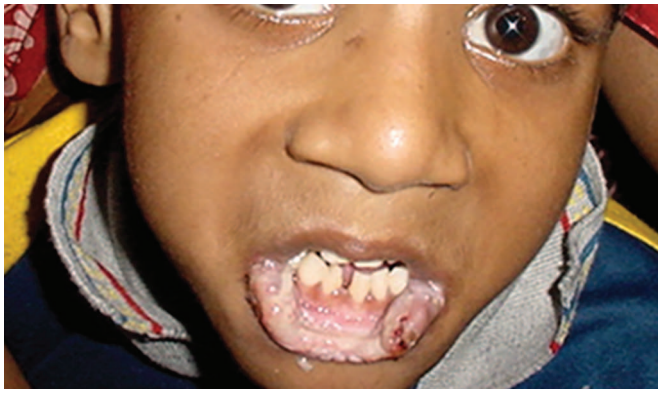

Fig. 14.12 Mutilated lower lip in Lesch-Nyhan syndrome

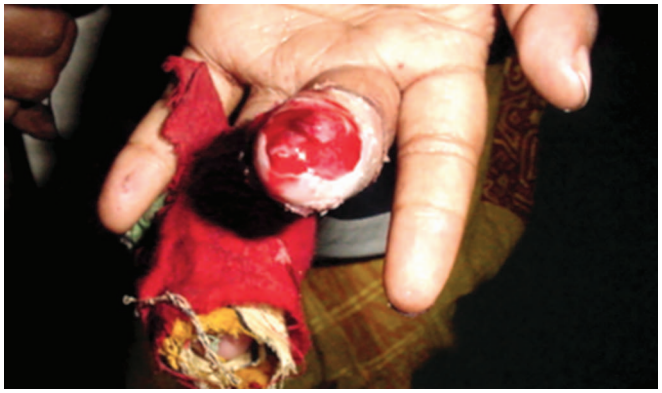

Fig. 14.13 Mutilated fingers in Lesch-Nyhan syndrome

"Manuscript: something submitted in haste and returned at leisure."—Oliver Herford

behavior of the patients. Lip biting may require extraction of deciduous teeth but permanent teeth should be spared as lip biting diminishes with age.

CALCIPHYLAXIS (Figs 14.14 to 14.16)

Calciphylaxis also known as calcifying panniculitis is a rare syndrome characterized by vascular calcification of small and medium sized arteries with resultant thrombosis and ischaemic necrosis of skin and subcutaneous tissue. The cause of calciphylaxis is mutifactorial. The pathogenesis is still not clear. It is seen more commonly in the background of secondary hyperparathyroidism, end stage renal disease on dialysis and hyperphosphatemia. It is associated with elevated parathyroid harmone levels and dysregulation of calcium and phosphate metabolism. End result is endovascular fibroblastic intimal proliferation, luminal thrombosis and calcific obliteration of the affected vessels

Clinically it manifests as firm, painful, well-demarcated violaceous plaques surrounded by livedo reticularis like pattern. It gradually progress to nonhealing ulcers with underlying tissue necrosis and superadded infection. Commonly affected sites are lower limbs, breast, abdomen and gluteal region. Complications include digital gangrene, sepsis, pancreatitis and multisystem organ failure. Histopathologically, there is deposition of calcium in small and medium sized venules and arterioles, extravascular soft tissues and viscera. Differential diagnosis includes atheroembolism, antiphospholipid syndrome and isolated protein C or S deficiency. Prognosis in calciphylaxis is poor with a high mortality rate of 60%. Timely diagnosis and effective therapeutic interventions may prevent complications. Treatment includes local wound care, metabolic corrections and management of infections. Recently sodium thiosulfate has been used as an effective therapy for calciphylaxis.

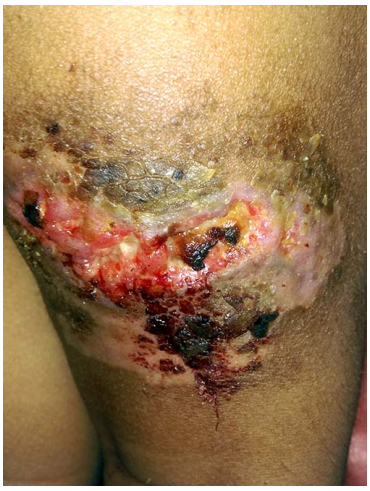

Fig. 14.14 Calciphylaxis, note infiltrated necrosed skin

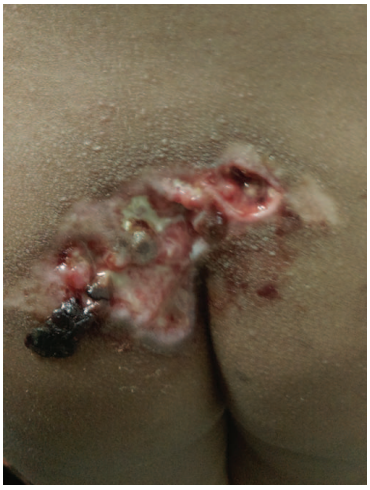

Fig. 14.15 Calciphylaxis, note thrombosis

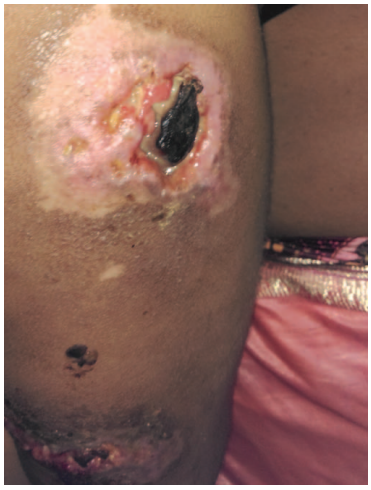

Fig. 14.16 Cutaneous necrosis of calciphylaxis

15

Collagen Vascular Diseases and Vasculitis

DISCOID LUPUS ERYTHEMATOSUS (Figs 15.1 to 15.7A)

It presents as erythematous indurated plaques with adherent scales on removal of which patulous follicular openings are exposed. The lesions are mostly distributed over head and neck area with most of the lesions being on face. The lesions are usually bordered by hyperpigmented margins. On healing the lesions produce hypo- or depigmented scars. An important sanctuary site for the lesions is scaphoid fossae of the external ears. Ultraviolet light is understood to play a significant role in perpetuation of the lesions and the distribution of the lesions over the photoexposed areas.

Discoid lupus lesions are the most common skin lesions of childhood SLE. However, discoid lupus erythematosus (DLE) lesions may occur without SLE as well. About 15–20% of patients with DLE eventually go on to develop SLE. DLE lesions may progress and heal with scarring.

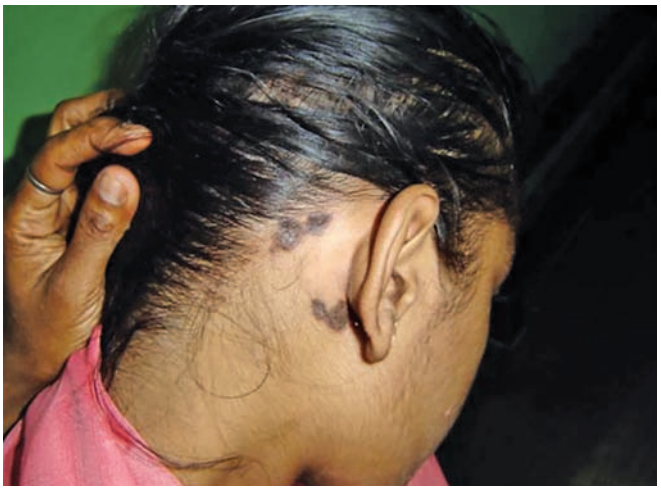

Fig. 15.2 DLE lesions over retroauricular area

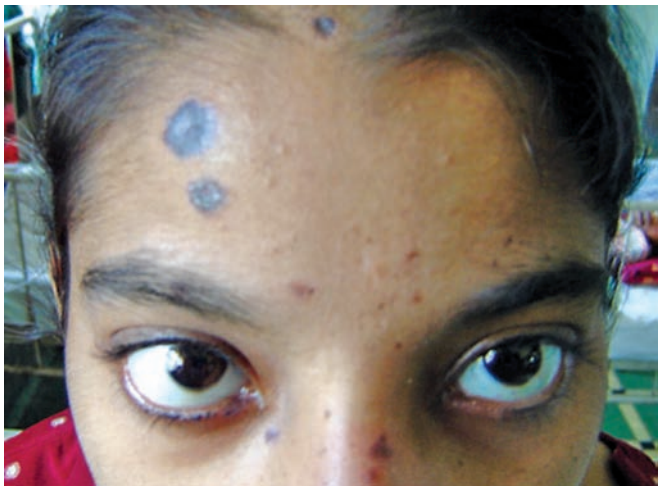

Fig. 15.1 DLE lesions over forehead

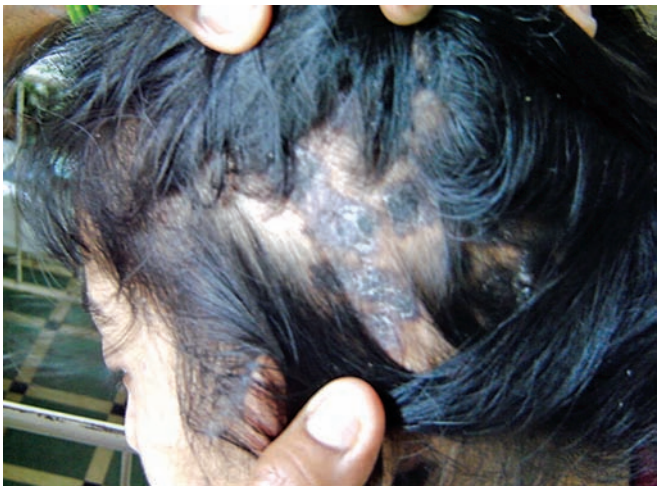

Fig. 15.3 DLE lesions over scalp

"Hell is a half-filled auditorium."—Robert Frost

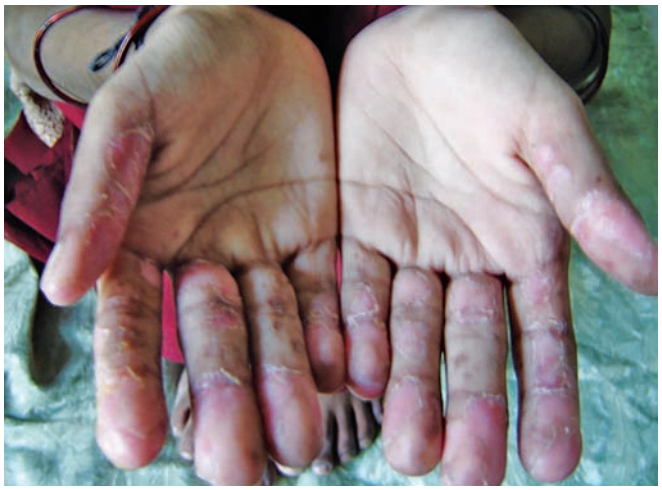

Fig. 15.4 DLE lesions over the palms

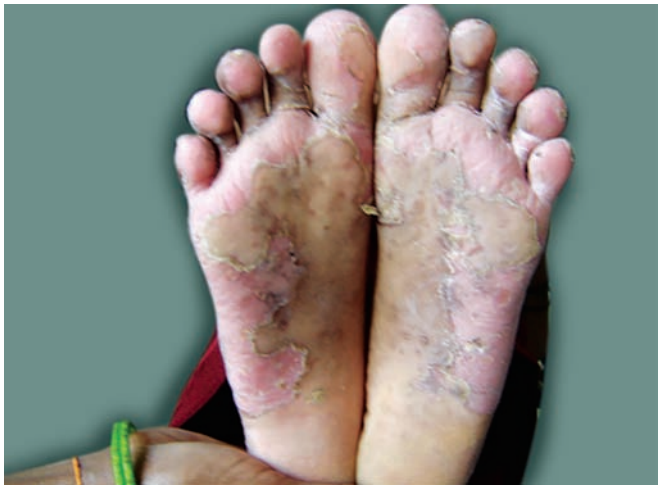

Fig. 15.5 DLE lesions over the soles

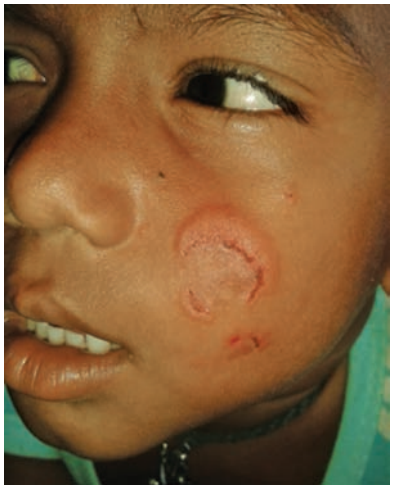

Fig. 15.6 DLE lesion over face in a 4-year-old boy

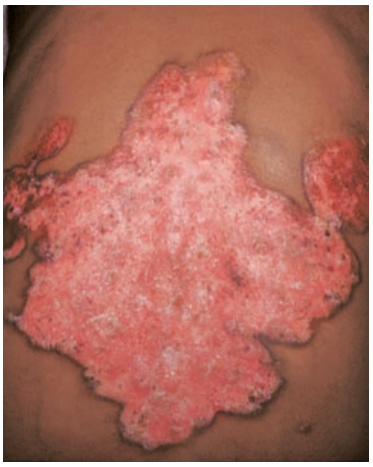

Fig. 15.7 Huge sized DLE lesion over back, note hyperpigmented border

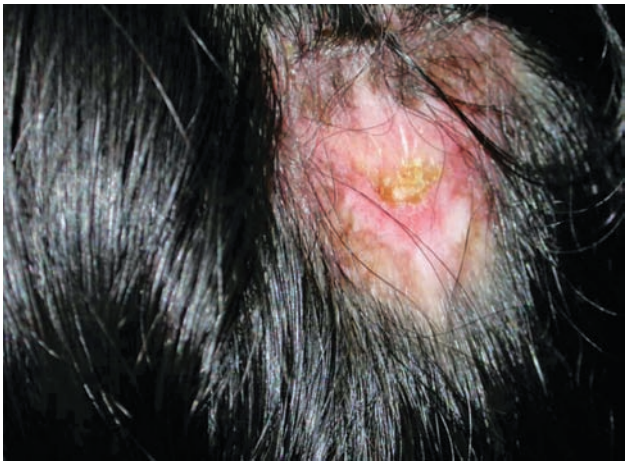

Fig. 15.7A DLE over scalp with scarring alopecia

Management

Topical corticosteroids, chloroquine or hydroxychloroquine and sunscreens are the main treatment modalities for discoid LE. Moderately potent steroids, e.g. fluticasone, mometasone are prescribed for lesions over face, head, neck. Potent steroids, e.g. clobetasol propionate or betamethasone dipropionate cream/ointments are used for lesions over trunk and extremities. The average dose of hydroxychloroquine for children is 5–10 mg/kg/day. Various sunscreens with SPF 15 or more are useful for preventing the sun induced aggravation of DLE lesions.

LUPUS ERYTHEMATOSUS (Figs 15.7B to D)

Lupus erythematosus is an autoimmune condition that has a wide range of manifestations including the mild form involving

"If I were two-faced, would I be wearing this one?."—Abraham Lincoln

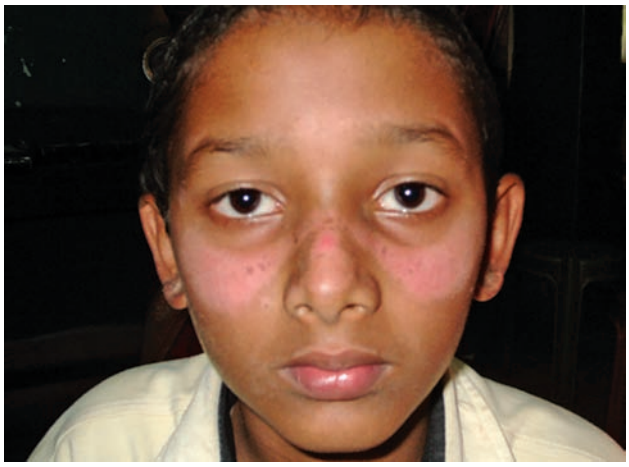

Fig. 15.7B Butterfly erythema over the face

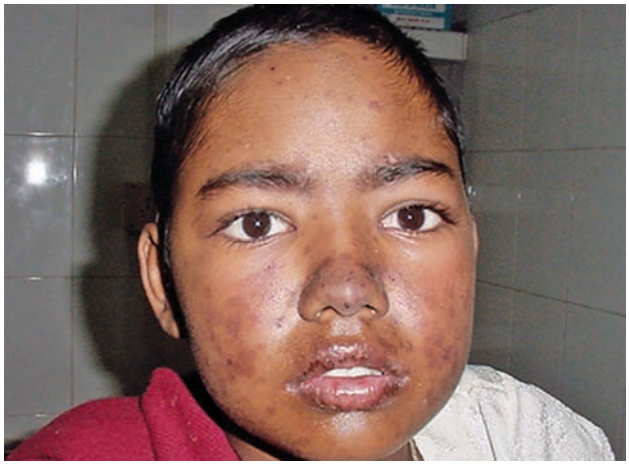

Fig. 15.7C Erythematous scaly papules and scars over the face and lips

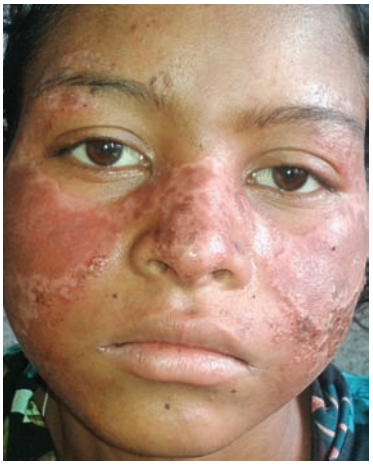

Fig. 15.7D Butterfly malar rash of SLE in a 7-year-old girl

the skin to the devastating multisystem involvement. The manifestations of lupus erythematosus can be divided into specific type showing interface dermatitis and nonspecific lesions which do not show the characteristic histological findings.

Pediatric SLE is more acute and severe than adult SLE. There is a higher frequency of renal, neurologic, hematologic involvement with fever and lymphadenopathy in pediatric SLE.

The LE-specific lesions include three recognized subtypes:

Acute Cutaneous Lupus Erythematosus (ACLE)

1. Localized, indurated erythematous lesions (malar rash).
2. Widespread indurated erythema.

Subacute Cutaneous Lupus Erythematosus (SCLE)

1. Papulosquamous.
2. Annular- polycyclic forms.

Chronic Cutaneous Lupus Erythematosus (Discoid Lupus Erythematosus)

1. Localized discoid LE (DLE).
2. Generalized DLE.
3. Hypertrophic DLE.

Pathogenesis of Cutaneous Lupus Erythematosus

This condition is postulated to have multifactorial etiology. Briefly, apoptosis, necrosis and chemokine production appear to mediate the recruitment and activation of autoimmune T cells and interferon producing plasmacytoid dendritic cells, which subsequently release more effector chemokines, thus amplifying chemokine production and leukocyte recruitment which in turn mediates an inflammatory process leading to the manifestations of cutaneous lupus. Ultraviolet ray exposure has been accepted as the single most remarkable trigger for the initiation of this inflammatory cascade.

Chronic Cutaneous Lupus Erythematosus

This group has the earliest age of disease onset with a mean age of 9.9 years and the boys to girls ratio is by and large 1:1.1. Also when compared to other patients of cutaneous lupus erythematosus, this group is least likely to have a family history of autoimmune diseases and lowest rates of laboratory abnormalities in hematological, urinary and autoantibody abnormalities.

Discoid Lupus Erythematosus

The common sites affected are the face including the lips, ears, V region of the neck and extensor aspects of arms and forearms. Other areas that can also be affected include the scalp, eyelids, trunk, palmoplantar skin and the inguinal regions. This presents with erythematous plaque with central atrophy and peripheral rim of hyperpigmentation with adherent scaling at the center. Keratotic spikes similar in appearance to carpet-tacks may be seen on the undersurface of the scale removed from classical DLE lesions (carpet-tack sign/ tin tack sign) (Figs 1 to 3). The author has reported the largest series of DLE in India and has seen a good number of such cases in children.The distinction between localized DLE with involvement above the neck and generalized DLE has prognostic implications as the risk of developing SLE is 20% in generalized DLE Vs 5% in the localized type.

Hypertrophic Type

This type clinically resembles hypertrophic lichen planus or keratoacanthoma and may also present as a verrucous papule. This type is marked by its chronicity and poor response to treatment.

Lichenoid Discoid Lupus Erythematosus

This variant has morphological resemblance to lichen planus.

Lupus Erythematosus Telangiectodes

This variant is marked by the abundant telangiectasia along with discoid plaques.

Lupus Erythematosus Linearis

This type has been described mostly in children where there is presence of linear lesions mainly affecting the face and neck area.

Pigmented Lupus Erythematosus

This sub type has been described in Indian patient with asymptomatic slate gray facial pigmentation with ANA positivity and histological features of discoid lupus erythematosus.

LE Panniculitis

It generally presents with a firm depressed painless nodular lesion on the face, trunk and proximal extremities. As the name suggest there is involvement of the deeper dermis and subcutaneous tissue leading to lipoatrophy, scarring and disfigurement.

Chillblain Lupus Erythematosus

It is characterized by edema, redness and tenderness of the tips of the fingers, toes, nose and earlobes. The familial form has been associated with TREX1 gene mutation.

Lupus Erythematosus Tumidus

This presents more often as a solitary than multiple tumid, succulent skin colored to erythematous plaque with patulous follicular openings predominantly affecting the face. This variant is the most photosensitive and most responsive to treatment.

Rowell Syndrome

Rowell and coworkers described the occurrence of erythema multiforme in association with LE. Zeitoni et al, proposed 3 major and 3 minor criteria to diagnose the condition. The major criteria consist of the presence of LE (systemic, discoid or subacute), EM-like lesions and speckled pattern of antinuclear antibody. The minor criteria include chilblains, anti -Ro and/or anti-La antibodies and positive RF. All three major criteria and at least one minor criterion are required to establish the diagnosis of Rowell syndrome.

Investigations

The tests include complete blood count, ESR, liver and renal function tests and urine analysis. The serological tests include antinuclear antibody (ANA), anti-dsDNA antibodies and C3 and C4. Biopsy from the skin lesion and direct immunofluorescence from a photoprotected uninvolved skin yields better results.

Treatment

1. *Photoprotection:* A broad spectrum sunscreen forms one of the pillars of management. Strict chemical and physical sunscreens should be propounded for use by the patients.
2. *Topical therapy:* This forms the mainstay of treatment when the lesions are few. Topical calcineurin inhibitors, topical steroids and retinoids have been used with good response. Intralesional triamcinolone acetonide and cryotherapy are the other modalities which can also be used.
3. *Systemic therapy:* Antimalarials are the single most important drug in the systemic management of chronic cutaneous lupus erythematosus. They exert their effect by their photoprotective and anti-inflammatory action. The standard dose range of hydroxychloroquine is 200–400 mg/day (adults: 6–6.5 mg/kg ideal body weight per day, children: ≤ 5 mg/kg ideal body weight per day). Clinical improvement is usually seen in 4–6 weeks. Ocular toxicity is the most dreaded complication and an ophthalmological evaluation before the initiation of therapy is a must.

4. Oral steroids, usually prednisolone is usually prescribed at a dose of 0.5–1 mg/kg/day. The dose may be tapered once clinical improvement is evident.
5. Methotrexate, thalidomide, clofazimine, dapsone and sulfasalazine have been tried at various occasions with variable response.
6. Physical and surgical measures that have been tried include laser therapy, cryotherapy, surgical excision and dermabrasion.

SUBACUTE CUTANEOUS LUPUS ERYTHEMATOSUS (Figs 15.7E and F)

Subacute cutaneous lupus erythematosus (SCLE) differs from chronic cutaneous lupus erythematosus in that, it does not scar and the lesions do not show atrophy. Immunologically it is characterized by the presence of anti Ro/La antibodies. It generally affects women of the middle age group. Rarely it may be seen in children. The author has seen 2 cases of SCLE in children (Fig. 4). Two clinical variants have been described, papulosquamous variant and the annular polycyclic subtype. Patients with SCLE can develop DLE or lesions of ACLE or LE nonspecific lesions like cutaneous vasculitis, Raynaud's phenomenon, or livedo reticularis during the course of their disease. More recently, LE gyratum repens has been described as a rare annular variant of SCLE. SCLE can be induced by drugs like thiazides, anti-epileptics, calcium channel blockers, ACE inhibitors, terbinafine and nonsteroidal anti-inflammatory drugs.

Treatment

It is generally the same as in case of chronic cutaneous lupus erythematosus. If the patient is unresponsive to the use of topical mediations and antimalarials, other drugs in the form of dapsone, clofazimine and thalidomide can be tried.

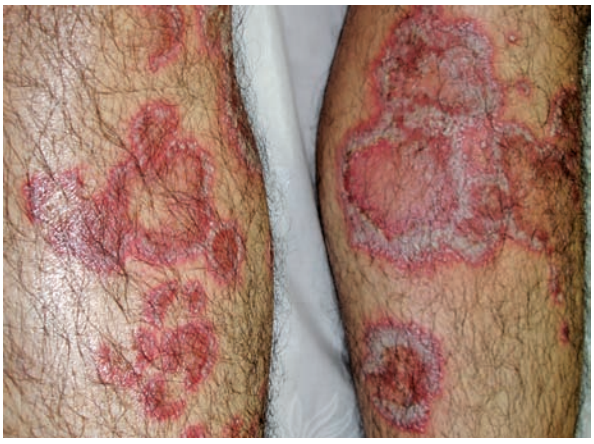

Fig. 15.7E Annular and psoriasiform lesions of subacute LE

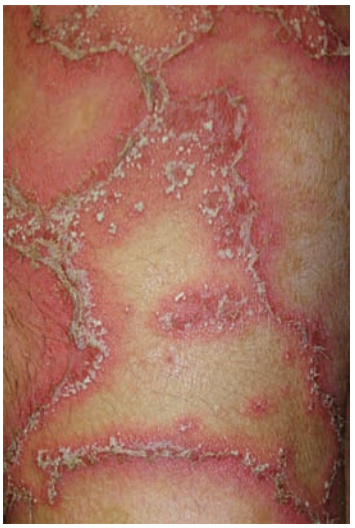

Fig. 15.7F Close-up of SCLE lesions

ACUTE CUTANEOUS LUPUS ERYTHEMATOSUS

It generally presents as a localized or generalized form which is photosensitive and transient. Of all adult and pediatric patients of SLE, malar rash is the most common specific cutaneous manifestation and is seen in approximately 80% of cases.

Localized Acute Cutaneous Lupus Erythematosus

This condition presents with malar rash which is defined as bright erythema involving the malar regions and nose symmetrically in a butterfly distribution (Fig. 5). The rash has a tendency to wax and wane with disease activity.

Generalized Acute Cutaneous Lupus Erythematosus

It presents with a typical morbilliform rash (Fig. 6). TEN-like ACLE presents with bullous lesions and sheets of epidermal detachment without involvement of the oral mucosa, eyes and genitalia. The immunology and biopsy findings help in establishing a diagnosis.

Lupus Erythematosus Nonspecific Lesions

Lupus erythematosus non-specific skin lesions are seen in association with active SLE. The LE non-specific lesions include cutaneous vasculitis, photosensitivity, livedo reticularis, Raynaud's phenomenon, alopecia (nonscarring), sclerodactyly, anetoderma, leg ulcers, papulonodular mucinosis, calcinosis cutis, LE nonspecific bullous lesions and

rheumatoid nodules. Livedo reticularis is associated with the presence of vasculitis and antiphospholipid antibody syndrome. The majority of these lesions do not correspond to vasculitis but to thrombotic vasculopathy. Nonscarring alopecia is a manifestation which presents with thin, dry, lusterless, brittle hair also known as lupus hair. Mucosal involvement in SLE is generally asymptomatic. Oral, nasal, genital and conjunctival mucosa may be involved. Painless ulceration of the hard palate, mucosal erosions, gingivitis and erythema may occur during flare of disease activity.

Bullous LE

Bullous LE occurs in the presence of active SLE and often may be accompanied by lupus nephritis. The bullae are usually seen on the face, neck and upper trunk and heal with milia.

Treatment

The treatment of cutaneous lesions seen in LE has been discussed earlier. Dapsone is effective for the treatment of urticarial vasculitis and bullous LE.

NEONATAL LUPUS ERYTHEMATOSUS (Figs 15.7G to I)

Neonatal lupus erythematosus (NLE) is an autoimmune condition affecting approximately 1–2% of neonates, occurring due to the passive transmission of antibodies to SSA/Ro and SSB/La, seen in mothers suffering from systemic lupus erythematosus and Sjogren's syndrome. The most serious complication of NLE is complete heart block. About 10% have an associated cardiomyopathy at the initial diagnosis or develop it later.

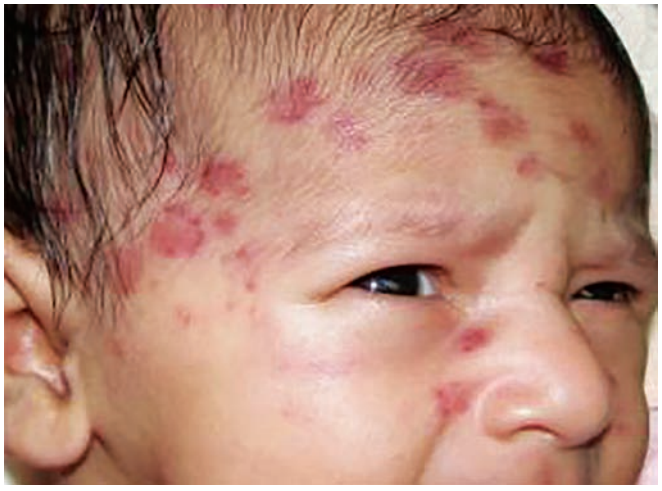

Fig. 15.7G NLE lesions over face

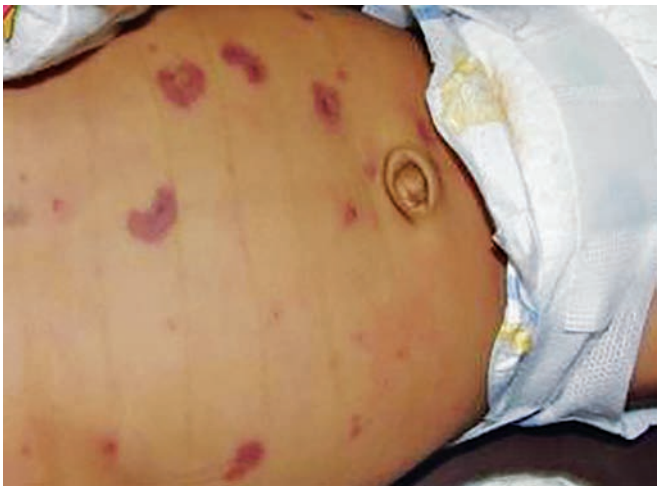

Fig. 15.7H Same child, lesions on trunk

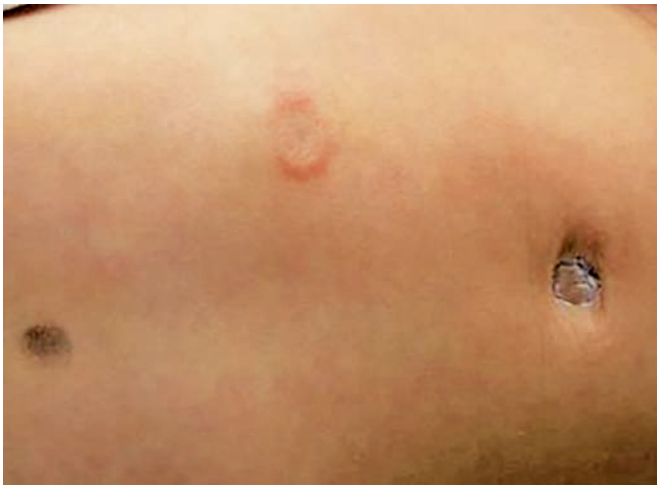

Fig. 15.7I Cutaneous lesion of NLE

Role of Antibodies in the Pathogenesis

The incidence of congenital complete heart block also appears to be more common in offspring of women with high titers of anti-SSA/Ro and anti-SSB/La compared with mothers with low titers. It has also been found that antibodies with a specificity for the 52 kD component of the SSA/Ro protein (Ro52) are more frequently found and are present at higher concentrations in the serum of children with congenital heart block (CHB) and their mothers. The role of antibodies in predicting the cutaneous manifestations of NLE has however been conflicting in various studies. Although the pathogenesis is not fully understood, it has been postulated that heart block results from binding of anti-SSA/Ro and/or anti-SSB/La antibodies to fetal cardiac tissue, leading to autoimmune injury of the atrioventricular (AV) node and its surrounding tissue. In addition to inducing

"The gods too are fond of a joke."—Aristotle

tissue damage, anti-SSA/Ro and/or anti-SSB/La antibodies may inhibit calcium channel activation or the cardiac L- and T-type calcium channels themselves which are crucial for the action potential propagation and conduction in the AV and SA nodes.

Other Factors

There have been reports of development of classical cutaneous manifestations of NLE in the absence of congenital heart block when other antibodies such as U1RNP have been present in the absence of anti-Ro/La. Genetic factors in the infant, in particular the HLA alleles DQB1*02, DRB1*03, and a polymorphism in the promoter region of the gene for tumor necrosis factor alpha may also play a role in the disease manifestation in a neonate. Maternal-fetal microchimerism may contribute to CHB in NL.

Clinical Features

Cutaneous Manifestations

The rash of NLE is that of subacute cutaneous lupus erythematosus presenting as annular erythematous scaly plaques with scaling or psoriasiform lesions. There is a typical erythematous to a dusky rash periorbitally giving rise to Racoon eye appearance. The rash is noted at delivery in some cases, but may not develop until after exposure to UV light. The rash is usually self-limiting and almost always resolves by six to eight months of age because the half-life of IgG antibodies is approximately 21 to 25 days.

Cardiac Manifestations

NLE is responsible for 80–95% of all cases of congenital complete heart block diagnosed *in utero* or in the neonatal period. Second degree block detected *in utero* and first or second degree heart block found in infants at birth, can progress to complete heart block. The involvement of sinoatrial node may occur in 3–4% of fetuses giving rise to dysrhythmias, which is generally not permanent. Other cardiac abnormalities reported include arrhythmias, conduction defects, congestive cardiac failure due to cardiomyopathy and on rare occasions myocarditis. There have also been reports of endocardial fibroelastosis in the absence of anti Ro/La.

Other Systemic Involvement

Hepatic involvement in the form of asymptomatic transaminitis and hepatitis have been noted. Hematological manifestations include anemia, neutropenia, thrombocytopenia and aplastic anemia on rare occasions. Neurologic manifestations in the form of hydrocephalus and neuropsychiatric manifestations have also been reported. An unique radiological finding in NLE is chondrodysplasia punctata, stippling of the epiphyses.

Diagnosis

The diagnosis of NLE is made when a fetus or newborn of a mother with anti-SSA/Ro and/or anti-SSB/La, or possibly anti-RNP, antibodies develops heart block and/or the typical rash or hepatic or hematologic manifestations in the absence of another explanation.

Prenatal Screening

Prenatal screening for anti-SSA/Ro and anti-SSB/La antibodies is warranted for women who are known to be at risk of having a pregnancy complicated by NLE. Performing weekly pulsed Doppler fetal echocardiography from the 18th through the 26th week of pregnancy and then every other week until 32 weeks should be strongly considered. The most vulnerable period for the fetus is reported to be during the period from 18 to 24 weeks gestation. Complete heart block (and usually second degree block) results in fetal bradycardia that can be detected by routine fetal auscultation, ultrasonography (sonogram), or echocardiography.

Differential Diagnoses

1. Urticaria
2. Erythema marginatum
3. Dermatophyte infection
4. Seborrheic dermatitis
5. Annular erythema of infancy.

Treating Fetal Heart Block

Complete heart block is irreversible even with glucocorticoid therapy. Second degree heart block may be reversible, but it also may progress to complete heart block despite therapy. Fluorinated glucocorticoids such as dexamethasone and betamethasone, which are not inactivated by placental 11-beta hydroxysteroid dehydrogenase, may suppress the associated pleuropericardial effusion or hydrops and may improve outcomes. However usage of oral corticosteroids in the mother during pregnancy to reduce the risk of congenital heart blocks increase the chances of cleft palate in the fetus.

Preventive treatment with hydroxychloroquine have been recommended by some authors whereas the treatment with oral corticosteroids and intravenous immunoglobulin has been condemned.

Course and Outcome

The rash of NLE is generally temporary and subsides without any scarring or dyspigmentation in about six to eight months. Infants with noncardiac manifestations of NL should at least have an ECG, and possibly an echocardiogram, since first degree block is clinically silent and can progress postnatally. Most of the surviving infants at a later stage require a pacemaker. These children also run the risk of developing various other autoimmune conditions like pauciarticular and polyarticular onset juvenile idiopathic arthritis, psoriasis, thyroid disease, iritis, type 1 diabetes mellitus, and nephrotic syndrome.

DERMATOMYOSITIS (Figs 15.8 to 15.12i)

Childhood dermatomyositis has some special features apart from the classical ones like heliotrope erythema around the

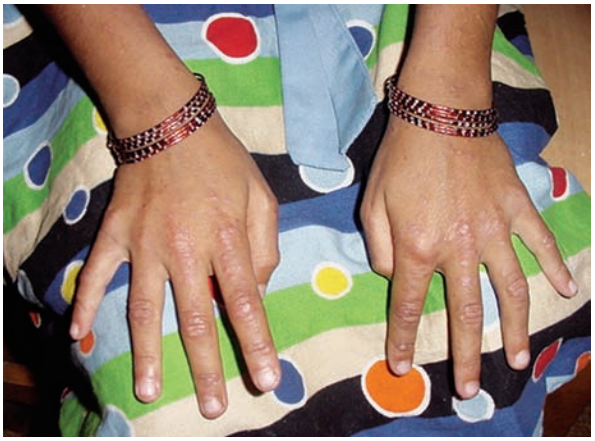

Fig. 15.8 Erythematous Gottron's papules over interphalangeal joints of fingers

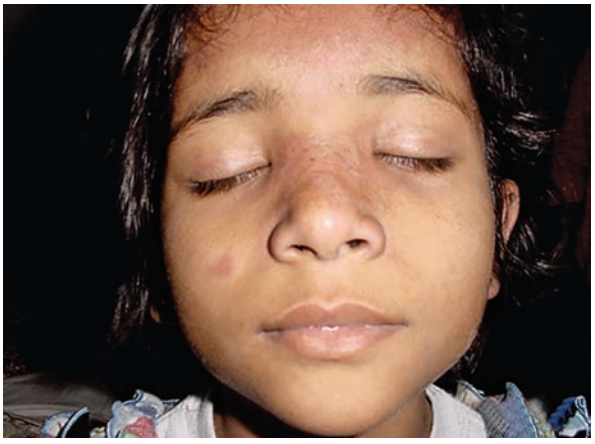

Fig. 15.9 Erythematous popular lesions of dermatomyositis over the face

Fig. 15.10 Resolving Gottron's papules

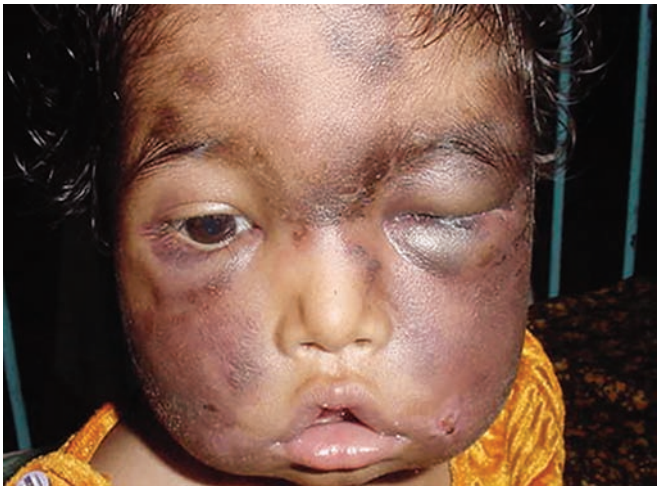

Fig. 15.11 Hyperpigmentation, swelling and scarring in dermatomyositis

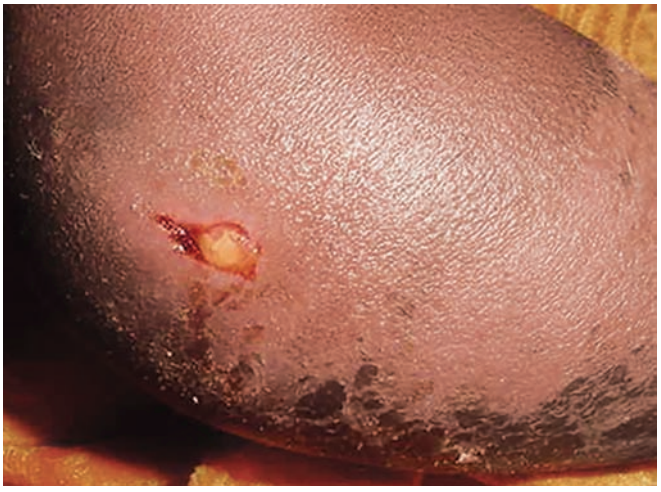

Fig. 15.12 Hyperpigmentation, ulceration and calcinosis of childhood dermatomyositis

"I have never let my schooling interfere with my education."—Mark Twain

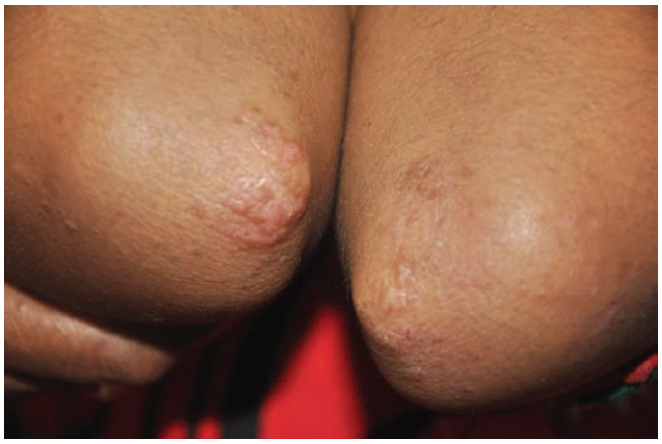

Fig. 15.12i Gottron's papules, close-up

eyes and Gottron's papules over the dorsal aspect of fingers overlying the middle and distal interphalangeal joints. The additional features are widespread cutaneous and extracutaneous vasculitis and calcinosis cutis. Deposition of calcium in the skin is seen over joints mostly. However on chest X-ray one can find extensive calcification in the skin over anterior chest wall.

The course of childhood DM is variable. It can have a very insidious nonspecific onset like fever, anorexia, malaise, abdominal pain and gradual development of rash. In other situations, the onset of the disease can be explosive with fever, profound weakness and severe multisystemic involvement.

Management

Acetyl salicylic acid and other NSAIDs are helpful in reducing muscle tenderness, pain and inflammation. With corticosteroids, the death rate has been reduced to less than 10% from 33%. For acutely ill patients, hospitalization is advised. Most childhood forms of DM require high dosage oral corticosteroids. Prednisolone 2–3 mg/kg/day is the initial dose. The progress of the disease is measured by estimating muscle enzyme levels. Once the disease activity is brought down, gradually over the next 10–12 months various cytotoxics are used as steroid sparing agents while steroids are being tapered. Azathioprine (1–3 mg/kg/day), methotrexate (1 mg/kg/week) or cyclosoprin (2.5–5 mg/kg/day) may be used; oral antimalarial agents have been used in controlling cutaneous manifestations. Localized small plaques of calcinosis frequently disappears spontaneously. In severe and extensive calcinosis, diet low in calcium, phosphorus in conjunction with aluminum hydroxide gel (15–30 mL 4 times/day) may lower serum phosphorus and aid in the subsidence of cutaneous calcification.

PROGRESSIVE SYSTEMIC SCLEROSIS (Figs 15.12A to Diii)

The clinical features are essentially the same as that in adults. However, Raynaud's phenomenon is less frequent and renal disease is rare. The course of systemic sclerosis in childhood is slower and the disability and visceral involvement is usually less severe than in adults.

Scleroderma in small children or infant is extremely rare. Author had the experience to diagnose two such cases.

Management

The management is mainly supportive. Avoidance of factors which can lead to vasospasm viz., tension, fatigue, stress, cold exposure or intake of cold drink/food is important. Rest and limited movements are advised if joint involvement is significant. Nifedipine is often prescribed in doses 5–10 mg 2–3 times/day for few months to reduce Raynand's phenomenon and subsequent sclerosis of fingers and toes. Other drugs like D-penicillamine, colchicine, etc. are reported to be effective but their efficacy is not uniform and toxicities limit their widespread use. For gastrointestinal symptoms like reflux and regurgitation, frequent small feeds, antacids and elevation of head ends are done. Systemic corticosteroids have limited role, as they do not alter the course of the disease. However, they may be used in specific situations, e.g. debilitating arthritis not controlled by NSAIDs, patients with early edematous stage of scleroderma, in severe recurring digital ulcerations and acute toxic phase of the disease.

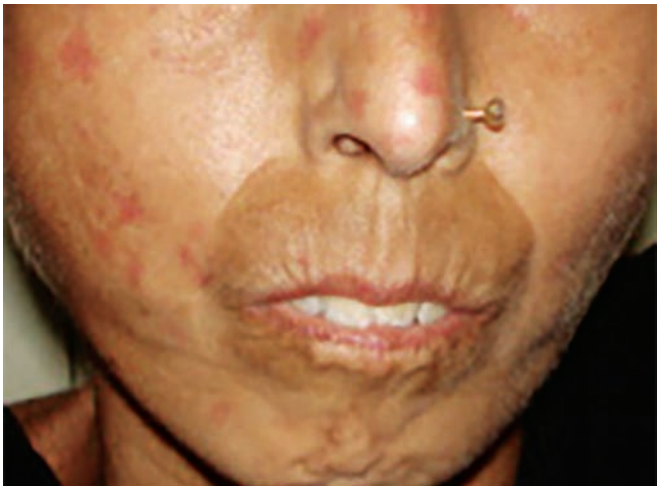

Fig. 15.12A Mask facies, pinched nose telangiectasia and microstomia in an adolescent girl with PSS

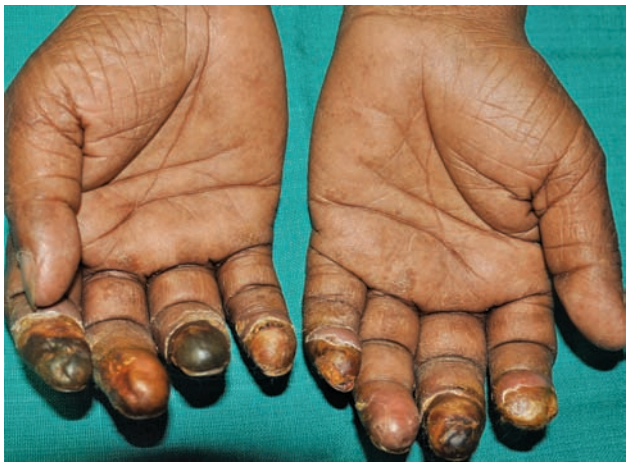

Fig. 15.12B Acrosclerosis and calcinosis over DIP joints in PSS

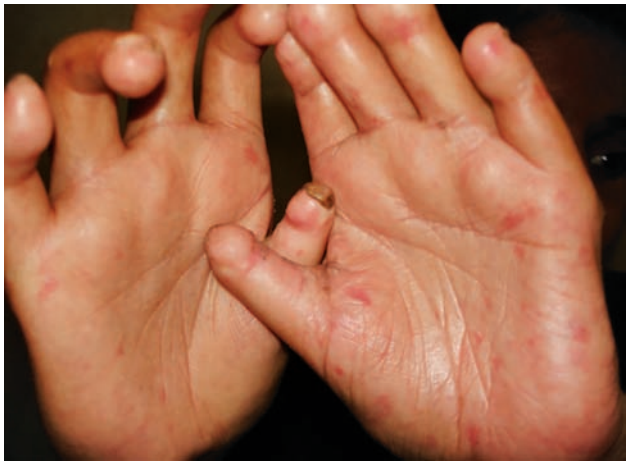

Fig. 15.12C Close-up of acrosclerosis; note palmar telangiectasia and sclerodactylia

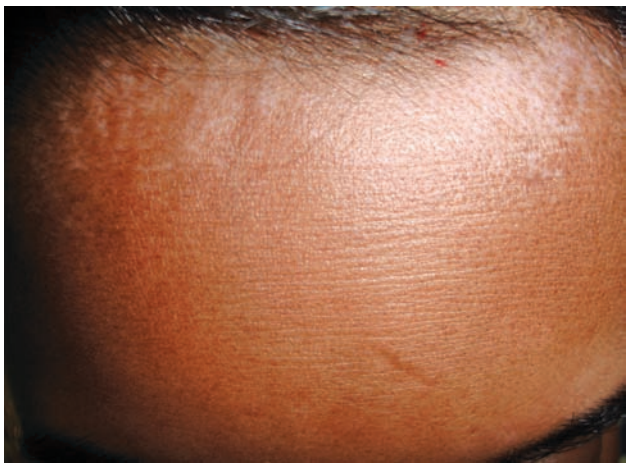

Fig. 15.12D 'Pepper and salt' hypopigmentation in PSS

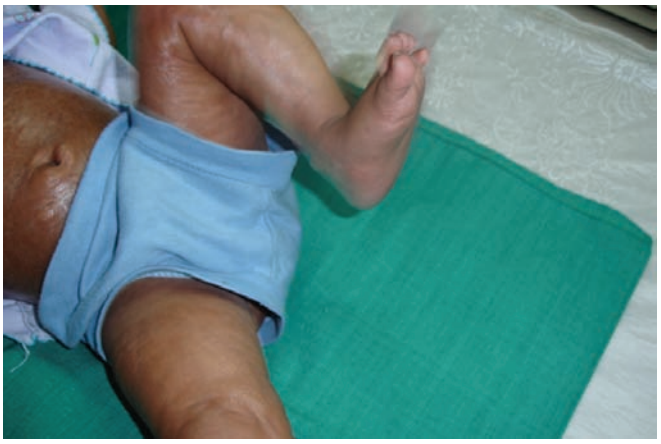

Fig. 15.12Di Scleroderma in an infant

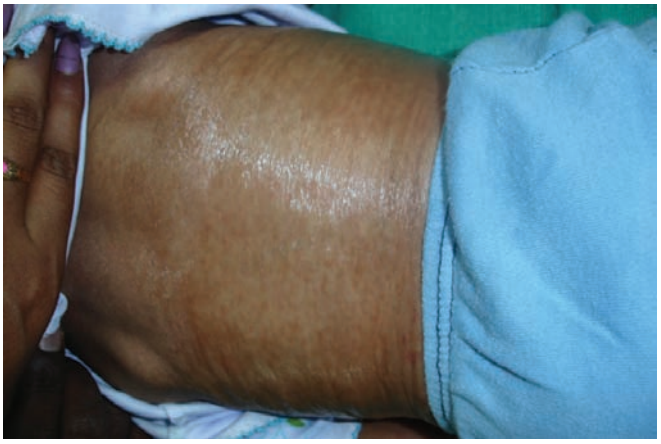

Fig. 15.12Dii Same infant, note woody hardness over back

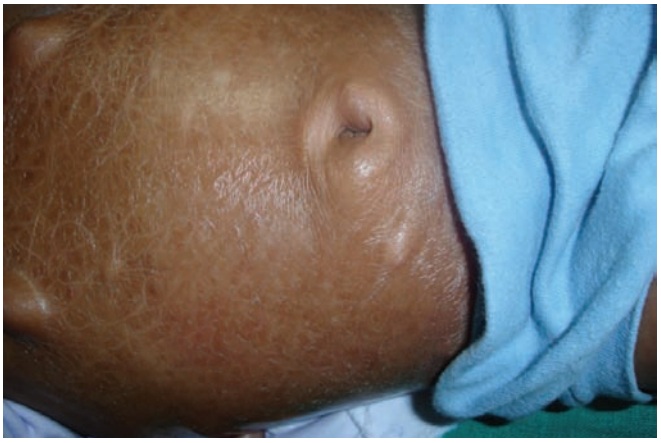

Fig. 15.12Diii Front of chest and abdomen

"A consensus means that everyone agrees to say collectively what no one believes individually."—Abba Eban

MORPHEA (Figs 15.12E to G)

Morphea refers to localized or circumscribed scleroderma. It can be localized or focal, linear morphea, or frontoparietal (en coup de sabre) with or without hemiatrophy of the face. Of total cases, 15% begin below the age of 10 years, in which age group the liner lesions predominate. The lesion usually present as hyperpigmented indurated shiny plaque(s) of variable size(s) and shape(s). Linear lesions are usually seen on the extremities or trunk.

Childhood onset occurs in 3% of all cases of scleroderma, 80% are with morphea and 20% with systemic sclerosis.

A severe mutilating form of morphea involves the dermis, fat, fascia, muscle and even bone, usually starts before the age of 14 years. The condition may develop from liner morphea and is known as pansclerotic morphea.

Natural History

In pediatric age group, morphea tend to regress spontaneously in a good number of patients by 3 to 5 years. The lesions usually tend to subside leaving residual hyperpigmentation. Linear morphea, encoup de sabre and facial hemiatrophy tend to persist for long time.

Treatment

Topical potent corticosteroids, e.g. clobetasol propionate or betamethasone dipropionate once daily for 4–6 weeks may bring about resolution of lesions. Intralesional triamcinolone acetonide 40 mg/mL at every 3–4 weeks' interval for 2–3 sittings is usually able to melt the morphea plaques. However, follow-up of the lesions is important. Other modalities for the treatment of morphea are antimalarials, colchicines, phenytoin sodium, methotrexate, cyclosporin, etc.

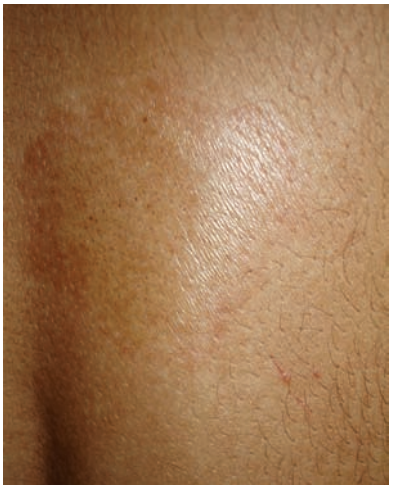

Fig. 15.12E Hyperpigmented indurated plaque of morphea

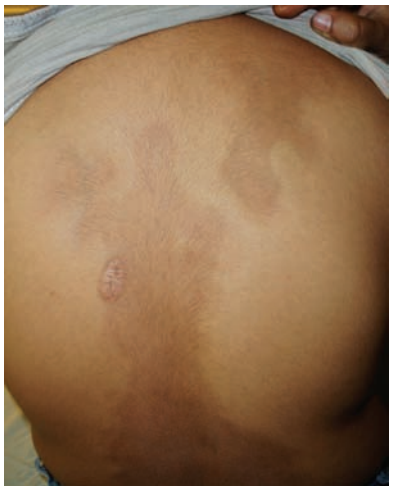

Fig. 15.12F Hyperpigmented indurated plaques of morphea in a 7-year-old boy

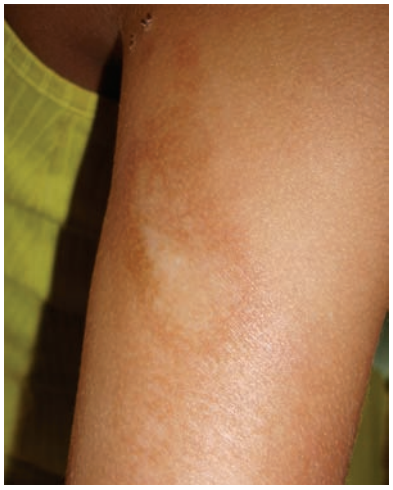

Fig. 15.12G Close-up of morphea lesions

PARRY-ROMBERG SYNDROME AND LINEAR SCLERODERMA (Figs 15.12H to N)

En coup de Sabre or Parry-Romberg syndrome is a condition (according to some, a form of morphea) in which appears specifically on the face and frontoparietal scalp. In this disease a linear depressed groove, is often associated with zone of alopecia and it resembles a saber wound or cut on the frontoparietal scalp. The groove may spread downward into cheek, nose and upper lip and sometimes, it may involve the mouth, gum, chin or neck. The variety of coup de sabre represents a mild form of progressive facial hemiatrophy (the Parry-Romberg syndrome) and a slowly progressive

"Imitation is the sincerest form of television."—Fred Allen

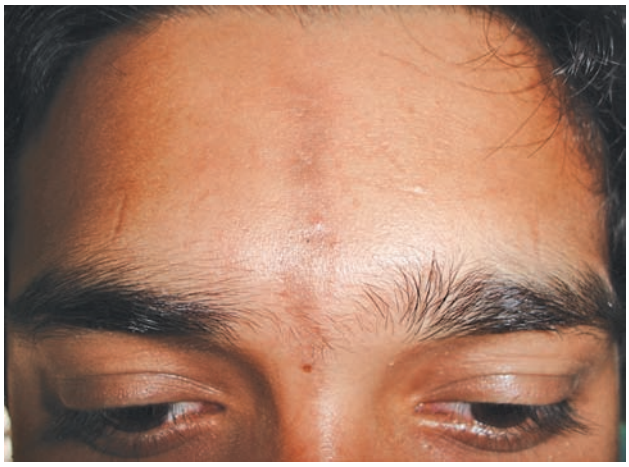

Fig. 15.12H En coup de sabre

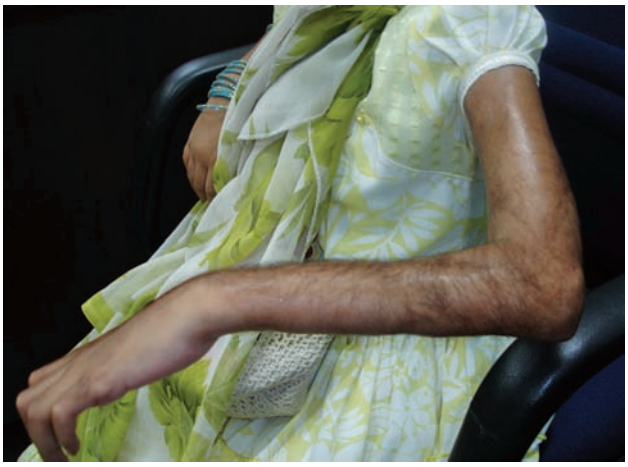

Fig. 15.12K Linear scleroderma

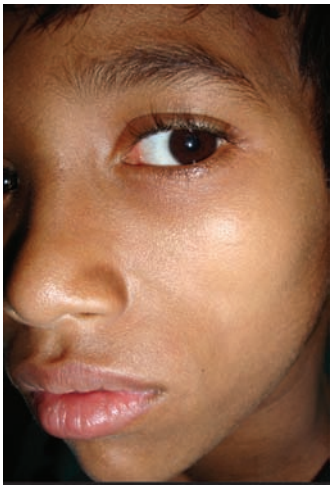

Fig. 15.12I Parry-Romberg syndrome, note facial hemiatrophy

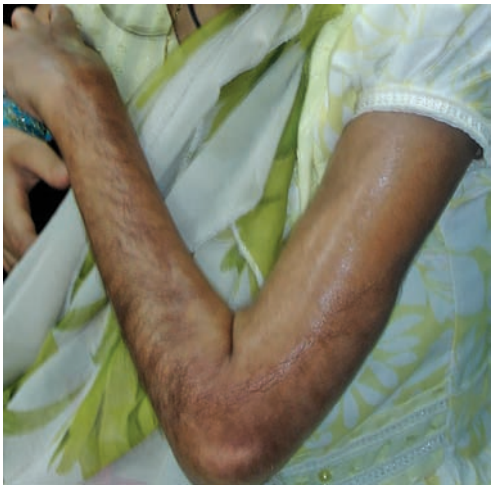

Fig. 15.12L Same patient, close up

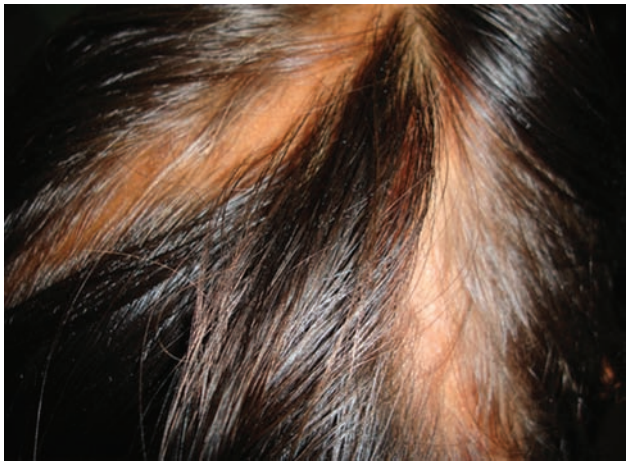

Fig. 15.12J Scarring band-like alopecia in the same boy

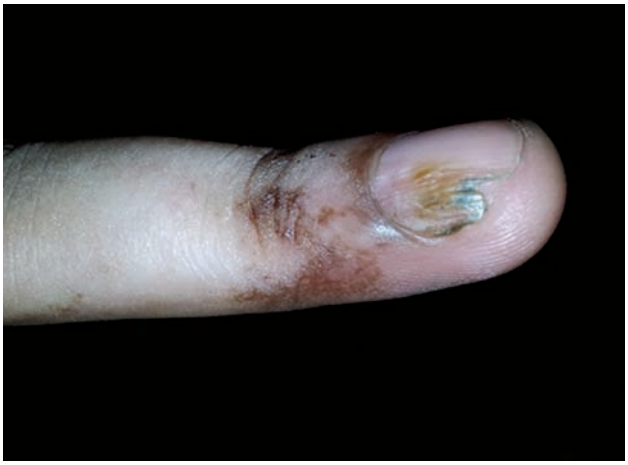

Fig. 15.12M Linear morphoea/scleroderma with nail involvement

"Always do right- this will gratify some and astonish the rest."—Mark Twain

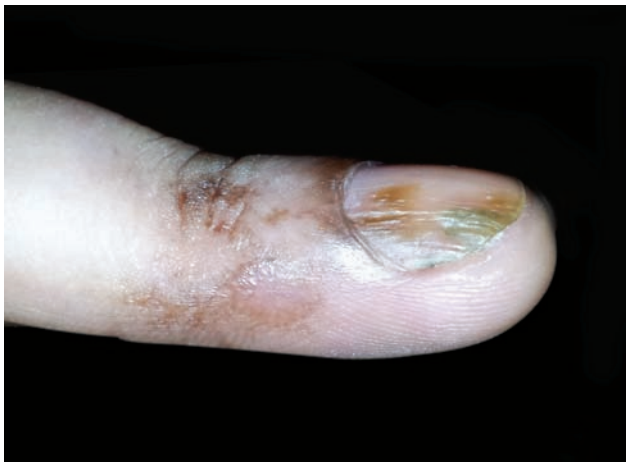

Fig. 15.12N Same girl, another view

atrophy of the soft tissue of the corresponding half of the face, accompanied at times by contralateral Jacksonian epilepsy, trigeminal, neuralgia, alopecia, enophthalmos or atrophy of the ipsilateral half of the upper lip, gum and tongue.

NECROTIZING VASCULITIS (Figs 15.13 to 15.17)

It is a histopathological description of a host of diseases affecting the skin and various other organ systems. The cutaneous lesions are quite varied in morphology, e.g. palpable purpura, papule, plaques, vesicle, pustules ulcer, etc. palpable purpura being the most common. When palpable purpura is associated with fever, pain abdomen and pain over ankle, knee or other big joints and there is deposition of IgA in and around the blood vessels, it is called Henoch-Schönlein purpura.

LIVEDOID VASCULITIS (Figs 15.18 to 15.20)

Also known as atrophie blanche, presents as a smooth, ivory-white plaque of sclerosis stippled with telangiectasis and surrounded by hyperpigmentation. The condition mostly occurs over lower legs or feet in adult women. However, it can occur in pediatric age group as well. It is seen in association with nevus flammeus and several other vascular disorders.

It is important to try to establish the type, etiology and associated systemic involvement in vasculitis. Management of vasculitis is, therefore, a teamwork involving various specialists in different fields of pediatric medicine, e.g. pediatric internists, neurologists, cardiologists, gastroenterologists, nephrologists, ophthalmologists, etc.

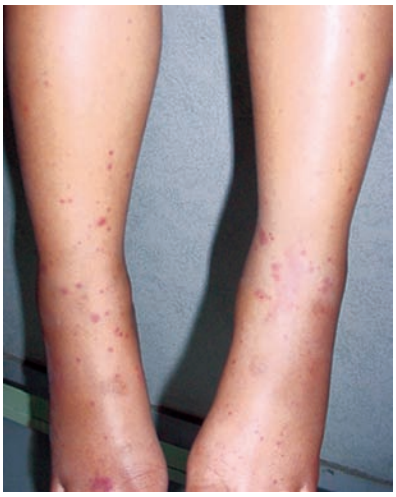

Fig. 15.13 Palpable purpura of necrotizing vasculitis

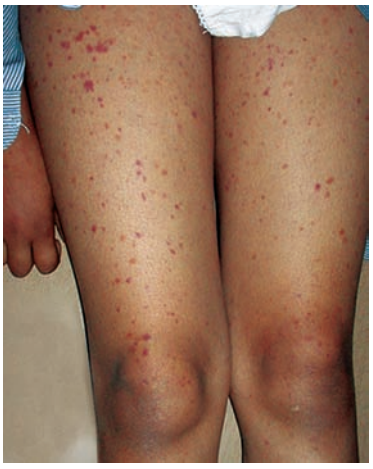

Fig. 15.14 Same girl, close-up of lesions over thighs

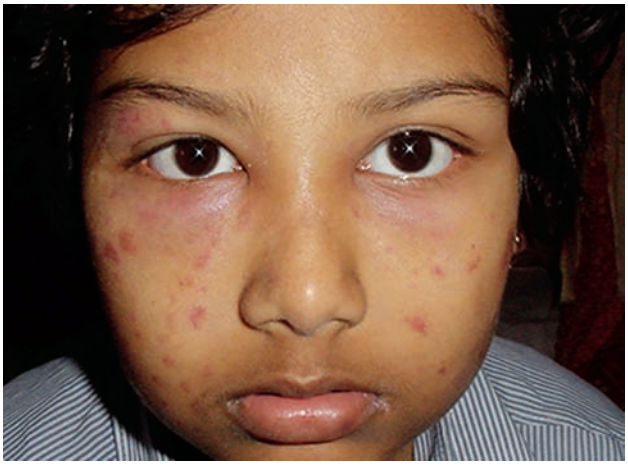

Fig. 15.15 Necrotizing vasculitis lesions over face, a rare site

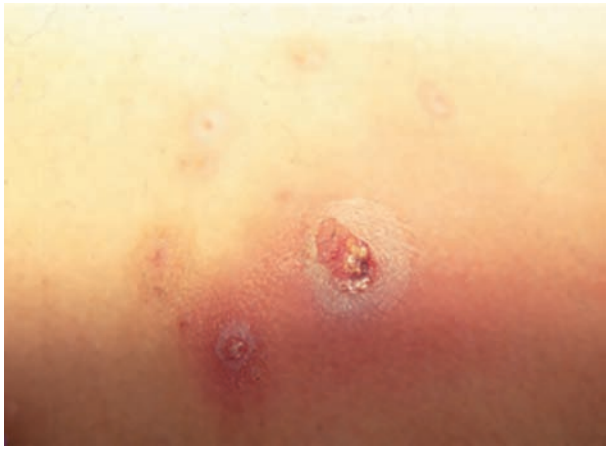

Fig. 15.16 Necrotic erythematous papulopustular of leukocytoclastic vasculitis

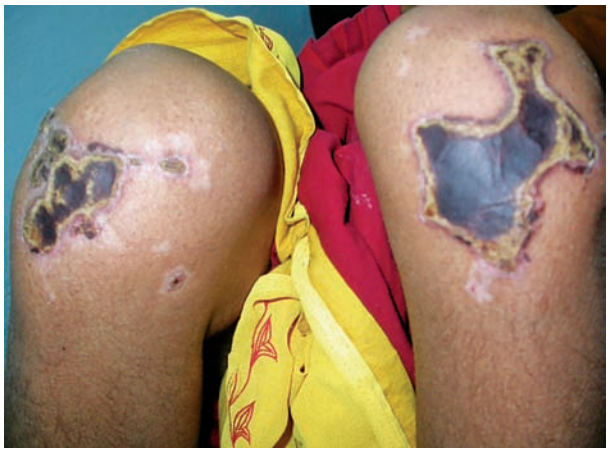

Fig. 15.17 Necrotizing vasculitis lesions, annular erythematous lesion

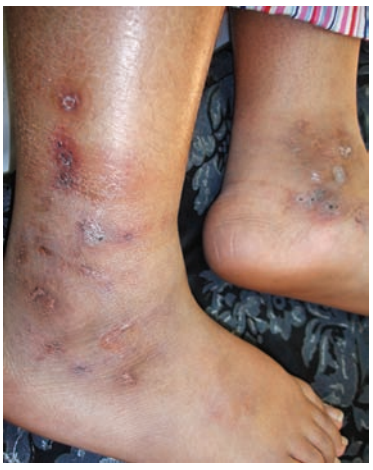

Fig. 15.18 Livedoid vasculitis

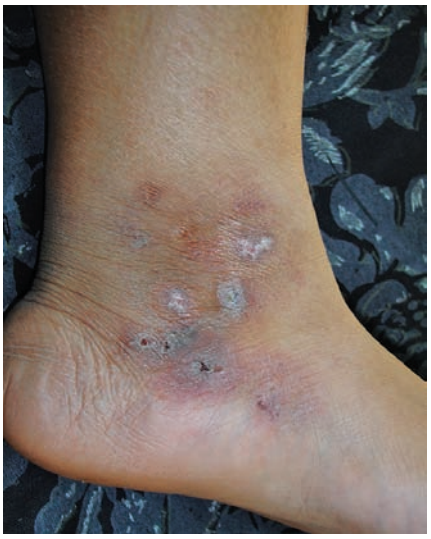

Fig. 15.19 Close-up of livedoid vasculitis

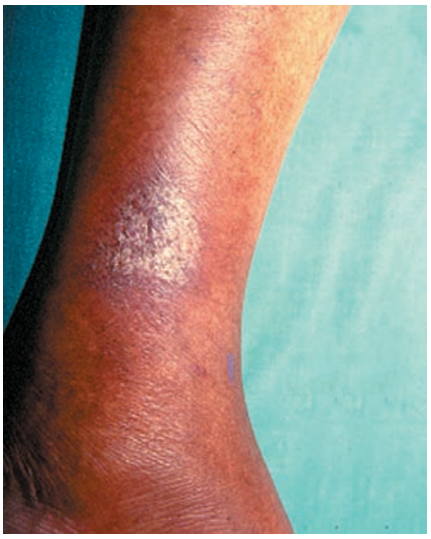

Fig. 15.20 Porcelain-white atrophic plaque of skin near ankle in atrophic blanche (livedoid vasculitis)

Treatment

Systemic corticosteroids are the treatment of choice for all types of vasculitis depending upon the degree, severity and extent of skin involvement, systemic involvement, etc. Oral prednisolone 1–4 mg/kg/day may be used in mild to moderate cases and IV methyl prednisolone as pulse therapy in severe cases or cases with multisystem involvement. Various steroid sparing agents used are azathioprine, cyclophosphamide, methotrexate, cyclosporin, etc. In children in whom steroids are contraindicated, dapsone or colchicine are used as substitutes.

"Being on the tightrope is living; everything else is waiting."—Karl Wallenda

POLYARTERITIS NODOSA (Figs 15.20A to 15.22)

This is a systemic disorder characterized by a severe necrotizing inflammation of small and medium sized arteries. It is manifested in two forms, the adult type affecting older children and adults; the infantile type affecting the children in the first two years of life. The infantile disease type affects both sexes equally, begins as a febrile illness and as the disease progresses, cardiac arteritis leads to aneurysms, infections, cardiomegaly, congestive heart failure, renal, peripheral artery and nervous system involvement resulting in hypertension, abnormal urinary findings, peripheral ischemia, neuritis, paralysis and seizures.

Natural History

The disease is almost always fatal, death resulting from cardiac decompensation. This fact distinguishes infantile PAN from Kawasaki's disease, though many authorities believe the latter to represent a variant of infantile PAN. In the adult type of PAN, there is a male predominance and is manifested by crops of subcutaneous nodules along the course of the superficial arteries of the trunk and extremities with fever, arthritis, abdominal pain, Raynaud's phenomenon, hypertension, peripheral neuropathy and myocardial infarction. Cutaneous manifestations are seen in half of the cases, are limited to the lower extremities and range from livedo reticularis, purpura, urticaria and bullae to maculopapular eruptions, necrotic vesicles, pustules, subcutaneous nodules and ulceration. Ecchymoses and peripheral gangrene of fingers and toes and other cutaneous manifestations. Benign cutaneous periarteritis nodosa is a clinical variant in which cutaneous lesions predominate and there is no visceral involvement. The term 'nodosa' refers to the focal involvement of blood vessels manifesting as nodular lesions.

Prognosis

The prognosis of adult type polyarteritis has improved with present day therapy.

Management

Supportive treatment and corticosteroids in the dose of 1–2 mg/kg/day of prednisolone or its equivalent forms the mainstay of therapy. When systemic corticosteroids fail, immunosuppressive agents may be used as steroid sparing agents; azathioprine or cyclophosphamide may be used. As systemic corticosteroids are contraindicated for Kawasaki's disease, aspirin along with IV gammaglobulin are currently used for the treatment of infantile form of PAN.

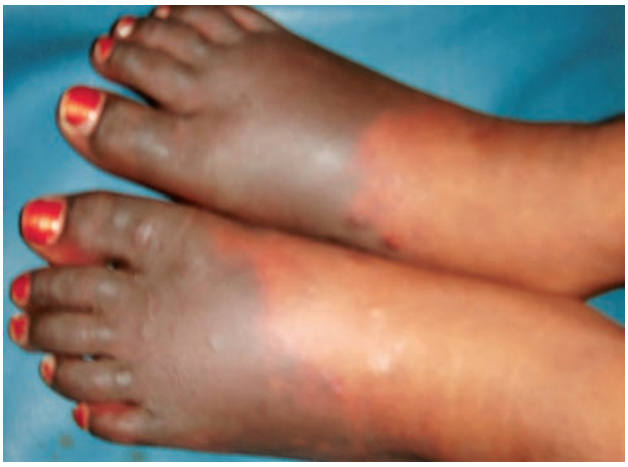

Fig. 15.20A Acrocyanosis and gangrene in a case of PAN

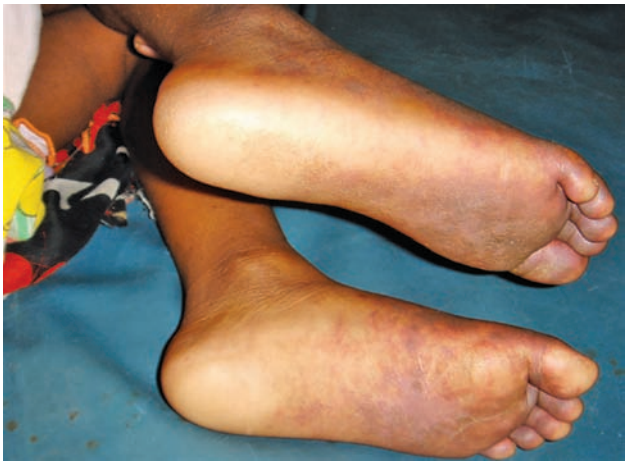

Fig. 15.21 Vasculitis lesions of PAN over soles

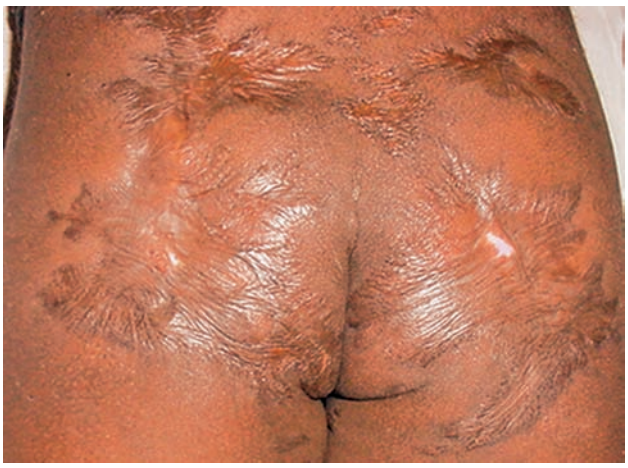

Fig. 15.22 Scarring following ulceration in a case of PAN

"Opportunities multiply as they are seized."—Sun Tzu

PITYRIASIS LICHENOIDES (Figs 15.22A to 15.22F)

Pityriasis lichenoides is a distinctive cutaneous eruption of children and young adults characterized by crops of macules, papules, or papulovesicles that tend to develop central necrosis and crusts soon after they arise. The disorder appears in two forms, an acute form seen mainly in children and young adults and a chronic form (commonly noted in adolescents and young adults).

Etiology

A number of theories have been proposed concerning the etiology of pityriasis lichenoides, but all are unsubstantiated. The clinical and histologic features suggest a vasculitis. Some authors suggest an autoimmune process, a hypersensitivity reaction triggered by various etiologic factors, or an exanthem of viral or rickettsial etiology.

Clinical Features

Acute pityriasis lichenoides (pityriasis lichenoides varioliformis acuta, PLEAVA) is a polymorphous eruption that usually begins as symmetrical 2 to 3 mm, oval or round, reddish brown macules and papules. The palpules occur in successive crops and rapidly evolve into vesicular, necrotic, and sometimes purpuric lesions. These develop a fine crust and gradually resolve, with or without a varioliform scar. Occasionally temporary hypopigmentation or hyperpigmentation may result. Although the eruption is usually the first manifestation of the disease, occasionally fever and constitutional symptoms may precede or accompany cutaneous eruption. Lesions may involve the entire body but are most pronounced on the trunk, thighs and upper arm, especially the flexural surfaces. The face, scalp, palms, soles and mucous membrane are frequently spared. The prognosis is generally good.

Chronic pityriasis lichenoides (pityriasis lichenoides chronica) may begin the novo or may evolve from pityriasis lichenoides acuta. The course of chronic pityriasis lichenoides is variable and may last for 6 months to several years. It begins with smooth and slightly firm, reddish papules that measure several millimeters to a centimeter in diameter. Scales when present are adherent, are slightly thicker in the center, and can be detached by gentle scraping to reveal a shinny brown surface (a diagnostic feature of this disorder.) Over a period of several weeks the individual papules recede, the skin separates spontaneously and a hyperpigmented or hypopigmented macule results and eventually fades without residual scar.

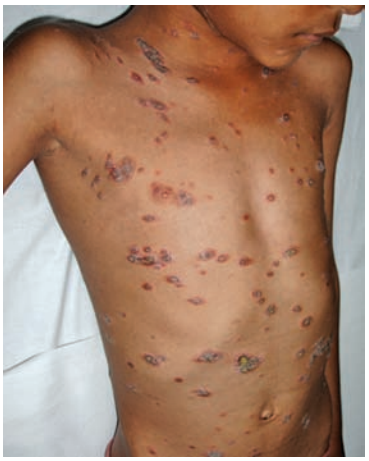

Fig. 15.22A Generalized scaly crusted papuloplaques of PLEVA

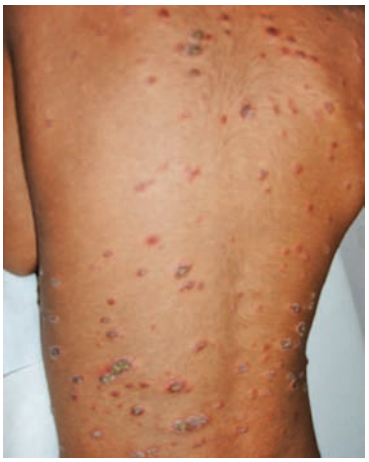

Fig. 15.22B Same boy with PLEVA, note hemorrhagic components

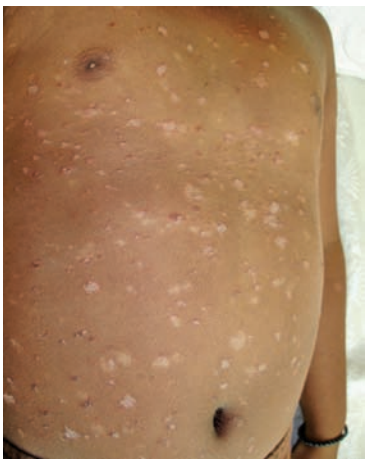

Fig. 15.22C Telangiectatic papules and hypopigmented macules of PLC

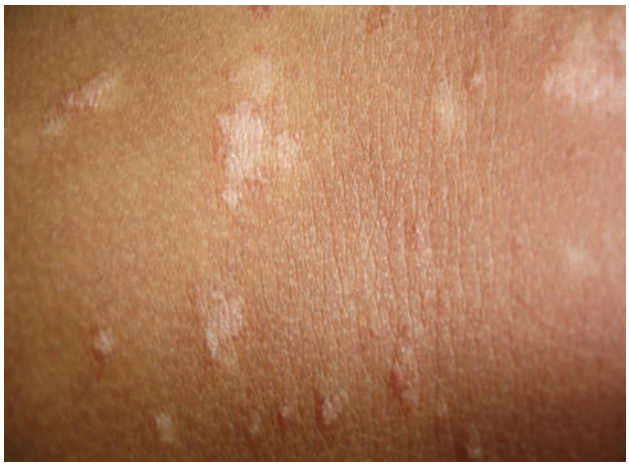

Fig. 15.22D close-up of PLC

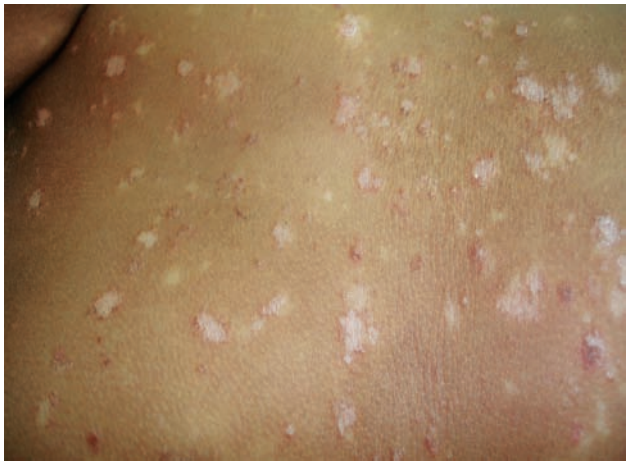

Fig. 15.22E Pityriasis lichenoidis chronica

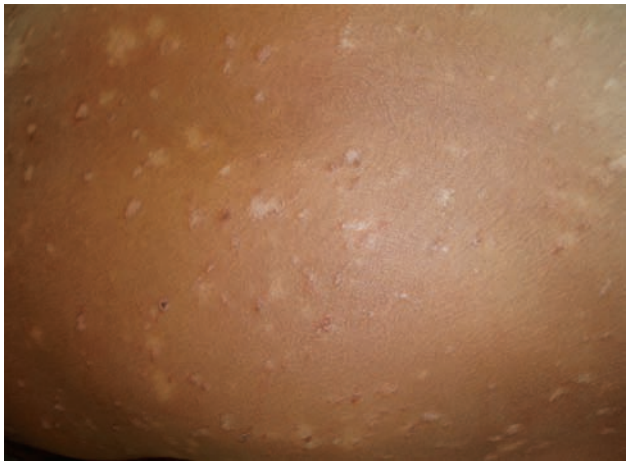

Fig. 15.22F PLC, close-up

Differential Diagnosis

In the early stages pityriasis lichenoides may be mistaken for chicken pox, arthropod bites, impetigo, pityriasis rosea, allergic vasculities, or scabies. Chronic forms may be confused with psoriasis, lichen planus and secondary syphilis. The duration of the eruption (when in crops), the presence of macules and papules interspersed with vesicular, crusted, or hemorrhagic lesions with or without varioliform scarring and subsequent hypopigmentation help to differentiate pityriasis lichenoides from other conditions. When the diagnosis remains in doubt, histopathologic examination of a skin biopsy specimen usually substantiates the proper diagnosis.

Treatment

Antipruritics, nonsteroidal anti-inflammatory agents, and lubricants may be helpful in ameliorating the symptoms, and topical corticosteroids, tar preparations, sun exposure, ultraviolet light and PUVA photo therapy have been effective for the treatment of persistent or chronic forms of the disorder. Tetracycline is high doses (2 g/day for older children and adults) and erythromycin (30–50 mg/kg/day, with a maximum of 1 or 2 g/day for older children and adults) for several weeks to 2 months are frequently helpful, particularly in the acute forms of the disorder. Methotrexate, in dosages of 7.5–20 mg weekly by mouth, has resulted in improvement in persistent cases.

ANTIPHOSPHOLIPID ANTIBODY SYNDROME (Fig. 15.23)

This condition is characterized by a past or present history of thrombotic event in the presence of circulating anti-phospholipid antibody particularly anticardiolipin antibody or lupus anticoagulant. The syndrome can be divided into two types primary and secondary based on the etiology. The secondary type is closely associated with systemic lupus erythematosus. Most of the pediatric cases of cerebral ischemia of unknown origin have been found to have this consition as an underlying disorder.

Females are more commonly affected than males, 2:1. The mean age of onset is about 10 years.

Arterial thrombosis is more common in patients less than 10 years of age whereas deep venous thrombosis is more common in older patients. Pulmonary embolism and auto immune thrombocytopenic purpura are also associated. Neonatal thrombosis have been noted in mothers suffering from this syndrome.

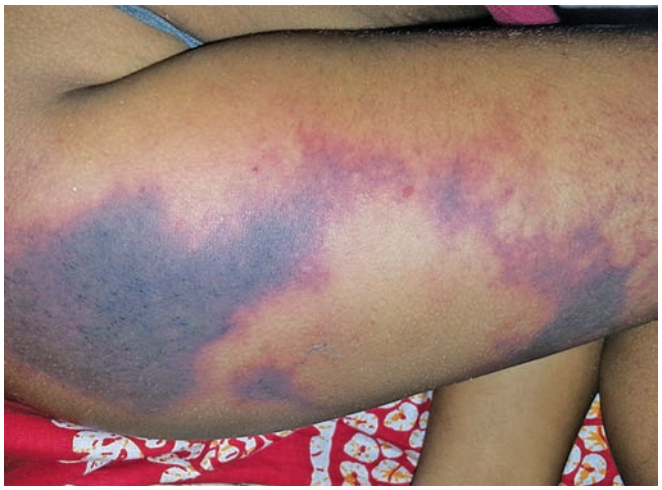

Fig. 15.23 Antiphospholipid antibody syndrome

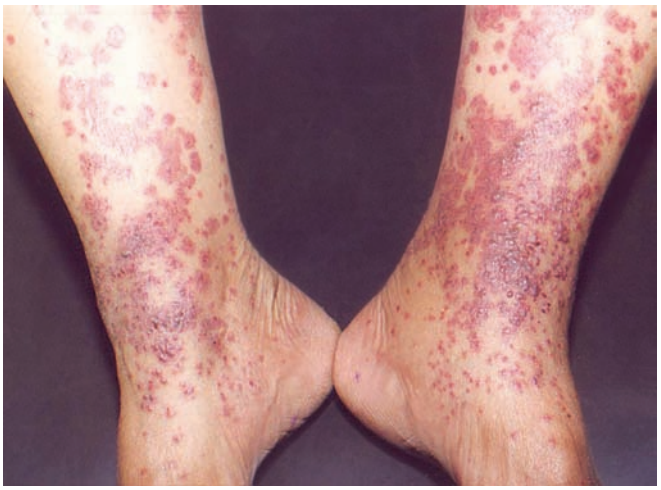

Fig. 15.24 Henoch Schonlein purpura over lower legs and ankle

The cutaneous manifestations include:

1. Livedo reticularis
2. Leukocytoclastic vasculitis
3. Superficial and deep venous thrombosis
4. Pyoderma gangrenosum
5. Dego's disease
6. Gangrene
7. Thrombophlebitis
8. Splinter hemorrhages.

Noncutaneous manifestations include:

1. Superior and inferior vena caval thrombosis
2. Pulmonary thromboembolism
3. Hypertension
4. Stroke
5. Transverse myelopathy
6. Cerebral venous sinus thrombosis
7. Retinal vein thrombosis
8. Budd-Chiari syndrome
9. Hepatomegaly and infarction
10. Renal artery thrombosis
11. Addison's disease
12. Myocardial infarction.

The antibodies are directed against the beta two Glycoprotein however there are antibodies also against prothrombin, protein C and protein S. These antibodies may also be present in about 2–5% of normal children.

HENOCH SCHONLEIN PURPURA (Figs 15.24 to 15.26)

It is a small vessel vasculitis affecting the skin, joint, gastrointestinal tract and kidneys. Infections such as Group A streptococci, mycoplasma, EBV, varicella virus, Parvovirus B19, *Campylobacter*, *H. pylori*, *Bartonella henselae*; vaccination with typhoid, cholera, measles, yellow fever vaccine; insect bites, drugs like pencillins, macrolides and aspirin have been implicated. The triggers cause I g A immune complex deposition in the tissues. Children between the age of 4 to 8 years are commonly affected. Crops of lesions occur chiefly on the lower extremities that start as palpable purpura, becomes hemorrhagic in a day and starts fading in a few days. In 40% cases the cutaneous lesions are preceeded by mild fever, headache, joint pain and abdominal pain.

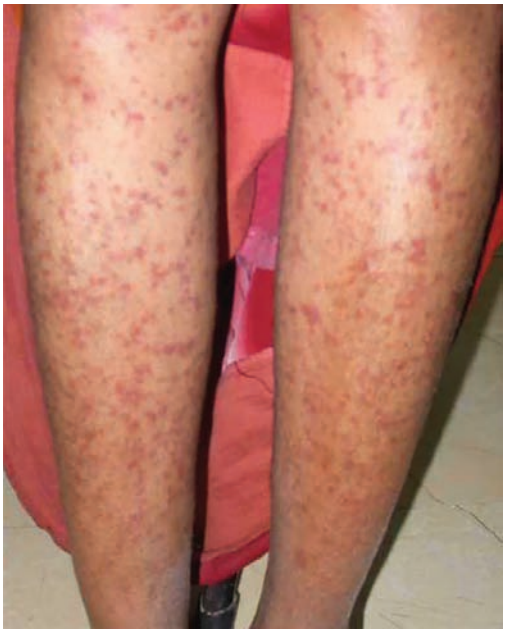

Fig. 15.25 HSP in an adolescent girl

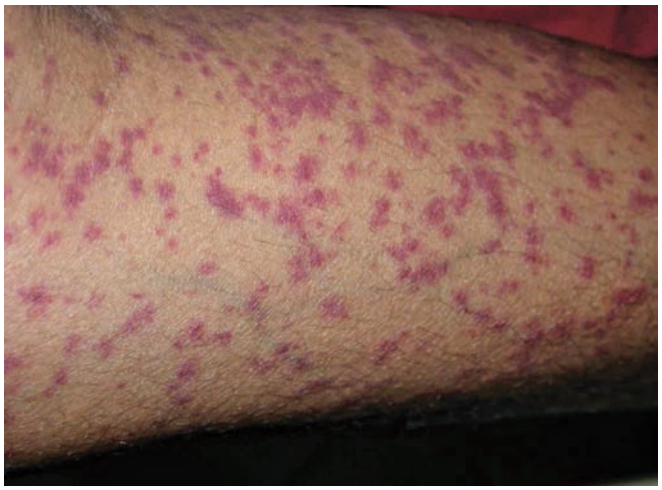

Fig. 15.26 Close-up of lesions

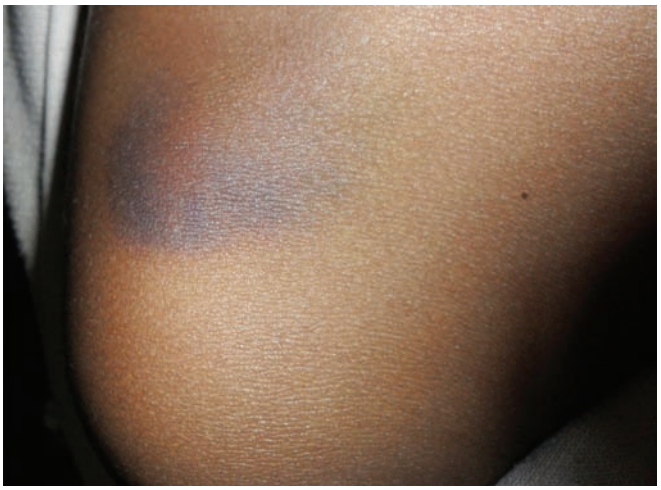

Fig. 15.27 Idiopathic thrombocytopenic purpura

Gastrointestinal symptoms include nausea, vomiting, abdominal pain, diarrhea, constipation and occasionally bleeding through stools. The most important manifestation is renal involvement which produces proteinuria, hematuria, and RBC casts. It is self limiting in most cases but may progress to renal failure especially in adults.Pulmonary hemorrhage is rare but can be fatal. On histopathology, classical features of leukocytoclastic vasculitis are seen with immunofluoresence demonstrating deposition of Ig A,C3 deposition in the vessel walls of the lesional and perilesional skin. Though a self-limiting condition lasting from 6 to 16 weeks, about 5 to 10% will have recurrence or persistence. Dapsone, Colchicine can improve cutaneous lesions. Corticosteroids are useful in abdominal pain however their role in renal disease is controversial. IV Ig has been tried with some success in patients with abdominal pain.

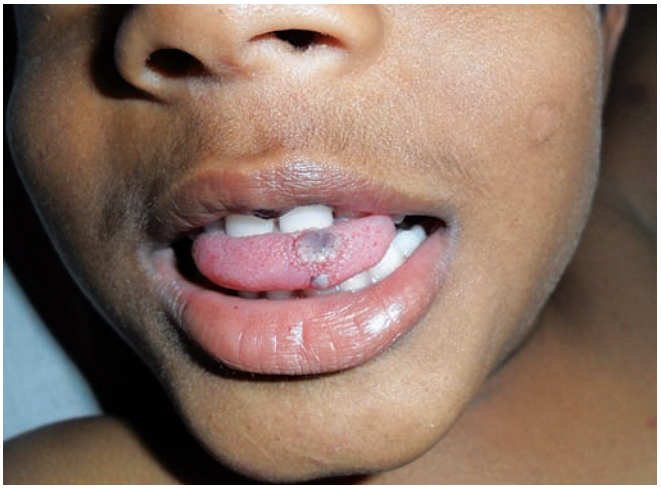

Fig. 15.28 ITP lesion over tongue

IDIOPATHIC THROMBOCYTOPENIC PURPURA (Figs 15.27 and 15.28)

Idiopathic thrombocytopenic purpura (ITP) is known as autoimmune or immune thrombocytopenia. It is no longer known as idiopathic. It has an incidence of 6.4 per 100,000 children. ITP is mediated by platelet autoantibodies that accelerate platelet destruction and inhibit their production. It is a diagnosis of exclusion. Primary ITP occurs in the absence of secondary cause. Secondary thrombocytopenia occurs following post viral illness, drug intake, recent immunization and primary immunodeficiency disorder.

ITP occurs at any age. It is more common in boys than girls. In children most cases are acute in onset. It is manifested by bleeding tendency that correlated with the severity of thrombocytopenia. Clinically presents with sudden onset of purpura without trauma, petechiae, ecchymoses, gingival bleeding, hemorrhagic bullae on the oral mucosa. Complication like intracranial hemorrhage may be fatal. Cutaneous features may mimic child abuse and should be differentiated from ITP. Investigation showing isolated thrombocytopenia indicates ITP.

Majority of children achieve spontaneous remission. These children should be regularly followed up. Treatment modalities include IVIg, oral steroids, immunosuppressants and chemotherapeutic agents. Splenectomy is the definitive treatment of ITP when it is refractory to medical measures.

16

Diseases of Hair and Nail

ALOPECIA AREATA (Figs 16.1 to 16.4I)

Alopecia areata (AA) which means localized loss of hair presents as a circumscribed, totally bald, smooth patch often noticed by chance by the parents. Exclamation-mark hairs may be present at its margin. Subsequently the initial patch may regrow or further patches may appear after an interval of 3–6 weeks and then in a cyclical fashion. Hairs regrown initially are often gray. It is frequently associated with atopy, autoimmunity and family history of hypertension.

Natural History

The course of the disease is unpredictable and new patches may appear when old patches start growing hairs spontaneously. The newly grown hairs may be gray or white but usually repigment by 2–6 months. Bad prognostic signs

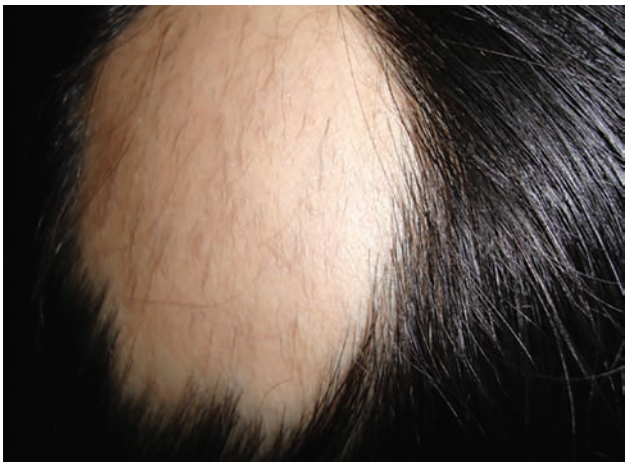

Fig. 16.1A Growth of hairs in a AA patch

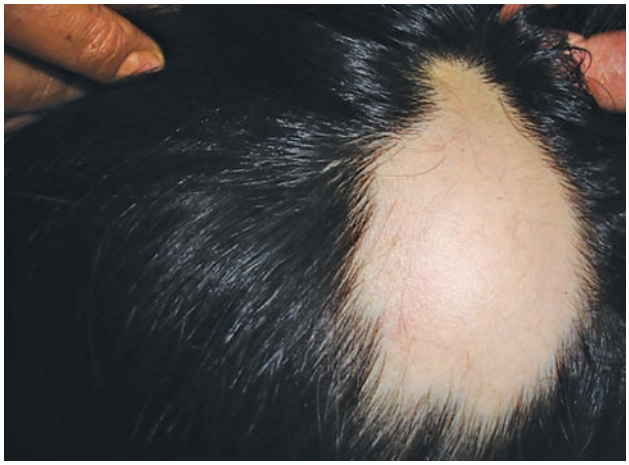

Fig. 16.1 Patch of alopecia areata over the scalp in a 10-year-old boy

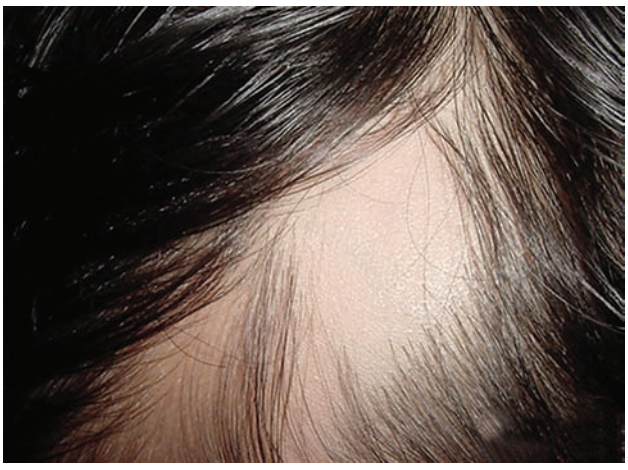

Fig. 16.2 Patch of AA, note regrowth of hairs

"Learning is what most adults will do for a living in the 21st century."—Lewis Perelman

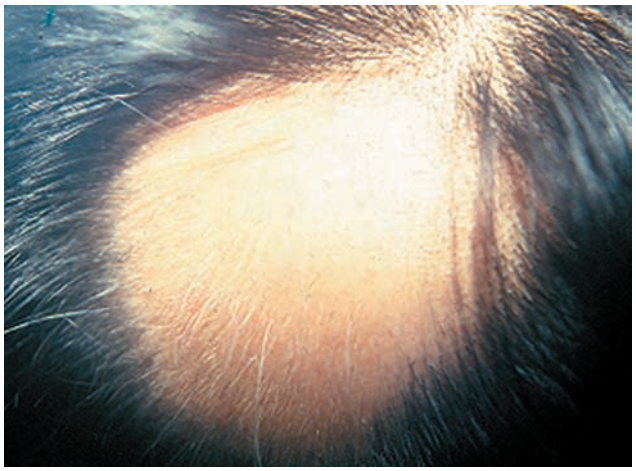

Fig. 16.3 Regrowth of hairs (gray in color) in a patch of AA

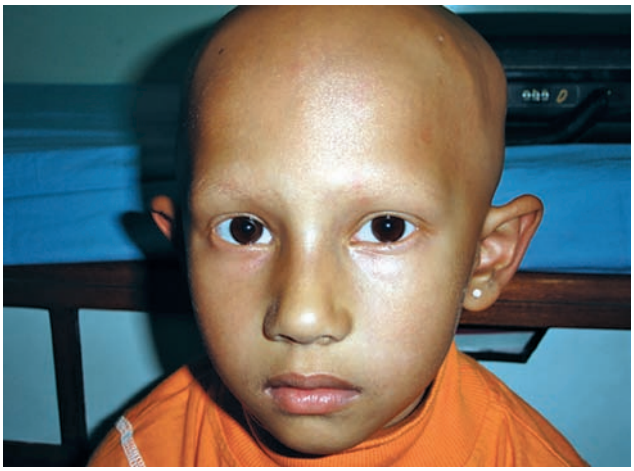

Fig. 16.4B Alopecia totalis in 4-year-old boy

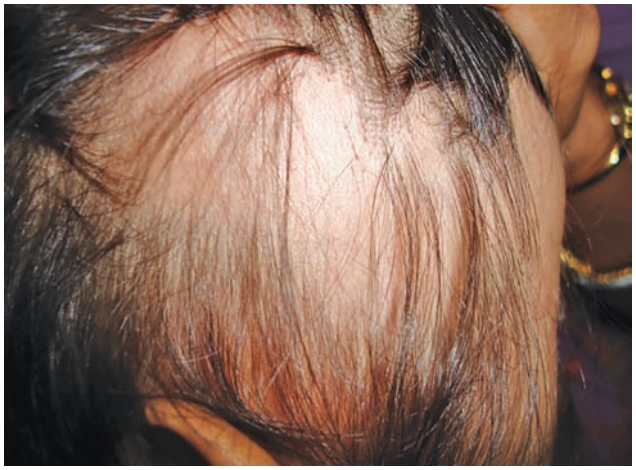

Fig. 16.4 Ophiasis involving occipital region of scalp in a 9-year-old boy

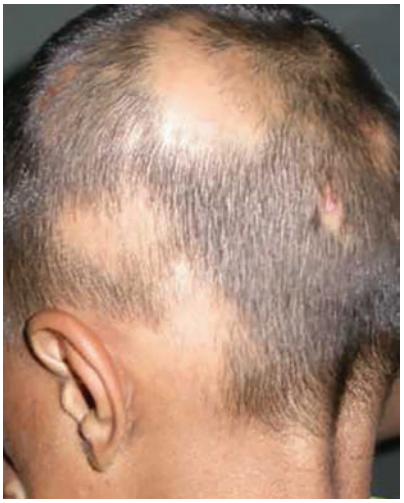

Fig. 16.4C Multiple patches of AA over scalp

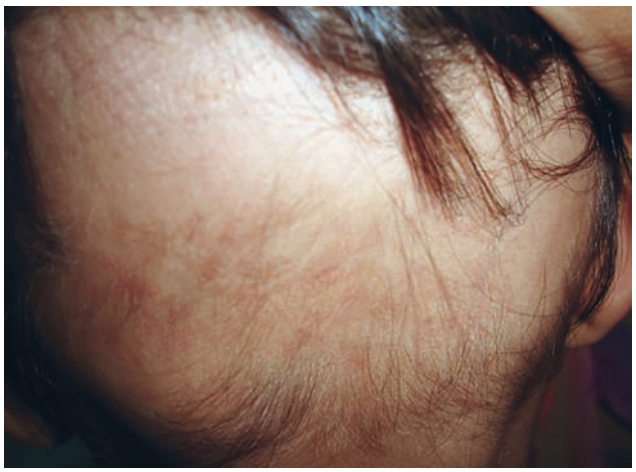

Fig. 16.4A Close-up of ophiasis in the same boy

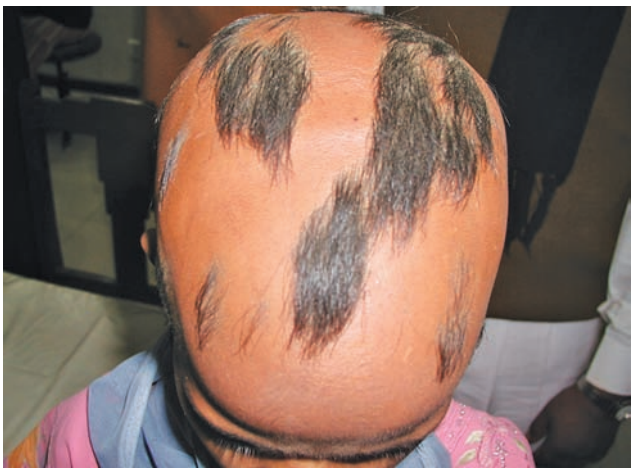

Fig. 16.4D Extensive AA, almost going to alopecia totalis

"Dogma is the sacrifice of wisdom to consistency."—Lewis Perelman

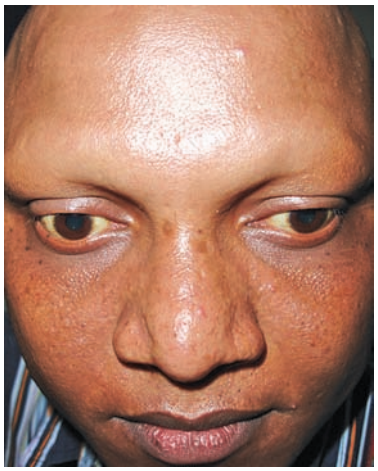

Fig. 16.4E Alopecia universalis in a 17-year-old boy

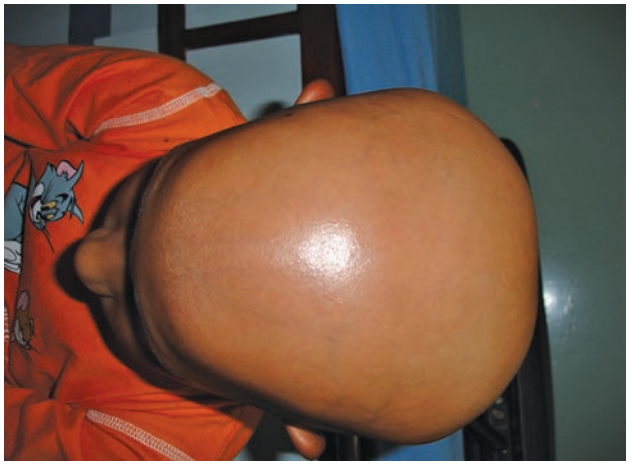

Fig. 16.4F Alopecia totalis

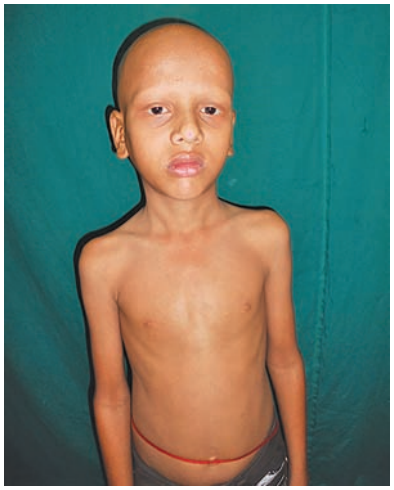

Fig. 16.4G Alopecia universalis

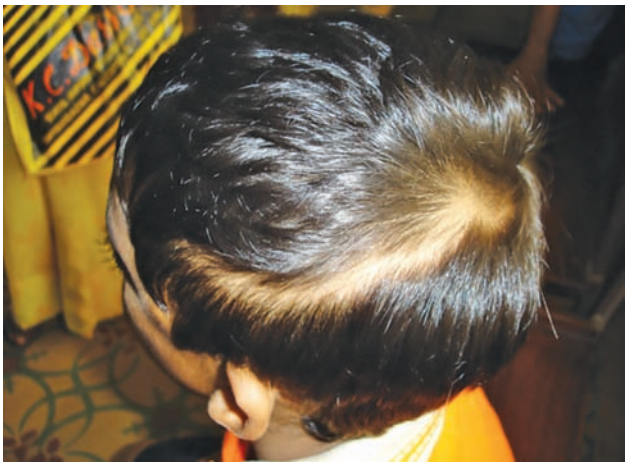

Fig. 16.4H Linear AA, a rare variant

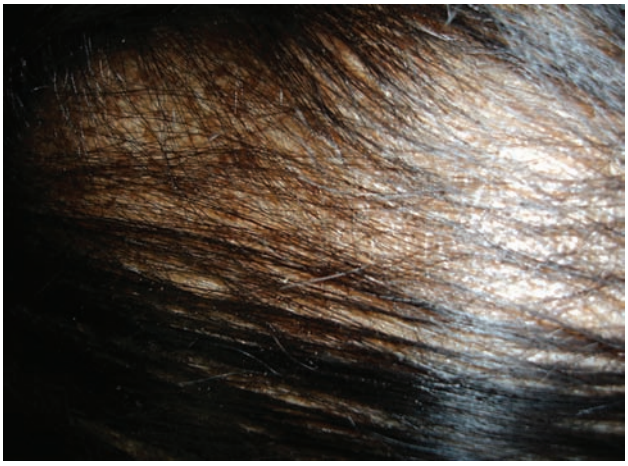

Fig. 16.4I Diffuse alopecia in alopecia areata

are early age at onset, large size and number of patches, band like involvement over occipital region (ophiasis), extensive involvement (alopecia totalis and universalis) or associated system autoimmune diseases.

Treatment

Treatment consists of application of topical moderately potent corticosteroid for 4–6 weeks, intralesional triamcinolone acetonide injection every 3–4 weeks for 2-3 injections, PUVA therapy, cyclosporin, dithranol, dinitrochlorobenzene (DNCB), topical minoxidil or diphenciprone.

SCARRING ALOPECIA (Fig. 16.5)

This is also known as cicatricial alopecia. This is the end result of a number of inflammatory processes in and about

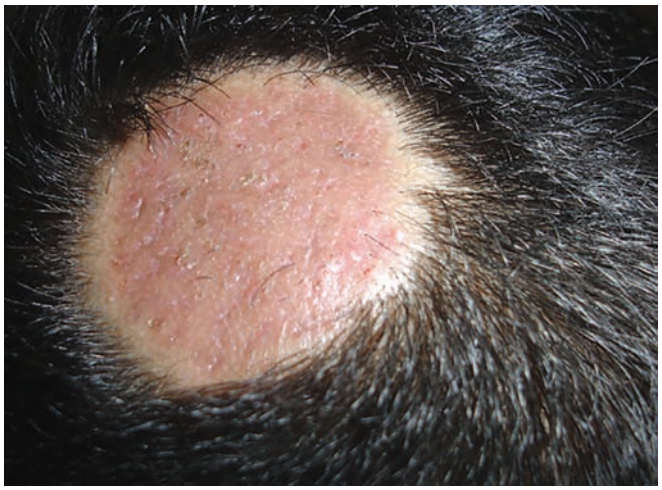

Fig. 16.5 Cicatricial alopecia over scalp in a 5-year-old boy following kerion

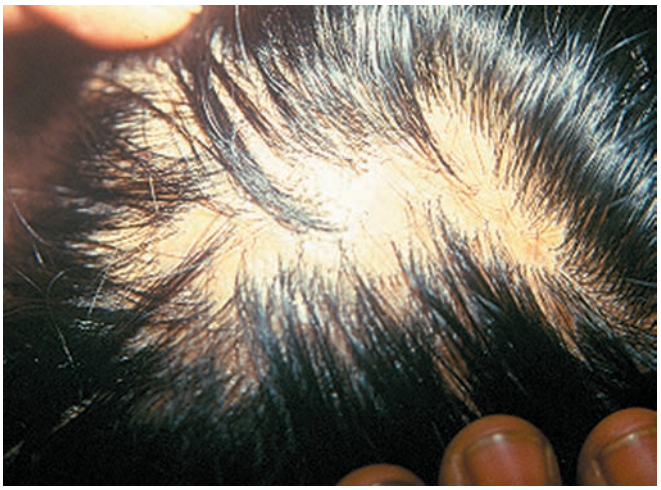

Fig. 16.5A Crablike bald patch of pseudopelade

the pilosebaceous units. This type of alopecia develops as a result of irreversible destruction of hair follicular tissue and consequent permanent scarring with loss of hairs on the affected areas. This disease may be the result of a developmental defect (aplasia cutis); inflammatory changes of infective origin, like viral or fungal infection; physical trauma (irradiation, trichotillomania practiced over a long period of time, thermal or caustic burns); neoplastic disorders; various dermatoses such as (lichen planus, lupus erythematosus, localized or systemic scleroderma); or various dermatological syndromes, e.g. keratosis pilaris atrophicans, folliculitis decalvans, dissecting cellulitis of the scalp, acne keloidalis, pseudopelade, and alopecia mucinosa.

Treatment

It is extremely difficult to induce regrowth of hairs over the patches of scarring alopecia. Intralesional injection of triamcinolone acetonide (40 mg/ml) is of some help in selected cases. Hair transplant may show some result in a few cases.

PSEUDOPELADE (Figs 16.5A and B)

Pseudopelade is a slowly progressive cicatricial alopecia without clinically evident folliculitis and no marked inflammation. It is uncommon in children. It is often noticed by a parent as a small bald patch. The extension of the patches is very slow. The affected patches are smooth, soft and slightly depressed and are round or oval in shape.

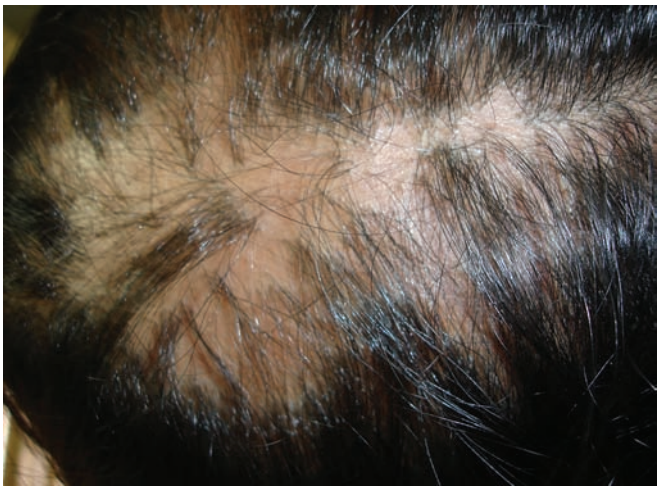

Fig. 16.5B Pseudopelade, close-up

Treatment

The response to treatment is usually not very exciting. Infiltration of triamcinolone acetonide in a 2.5 mg/mL concentration in to active areas at 6–8 weeks may be temporarily beneficial.

SEBORRHEIC ALOPECIA (Fig. 16.6)

Seborrheic dermatitis can produce alopecia at the frontal hairline where a rim of eczema forms the classical corona (crown) seborrhea. On healing it leaves behind a hypopigmented bald patch over the forehead at the frontal hairline. Does not require separate treatment for alopecia

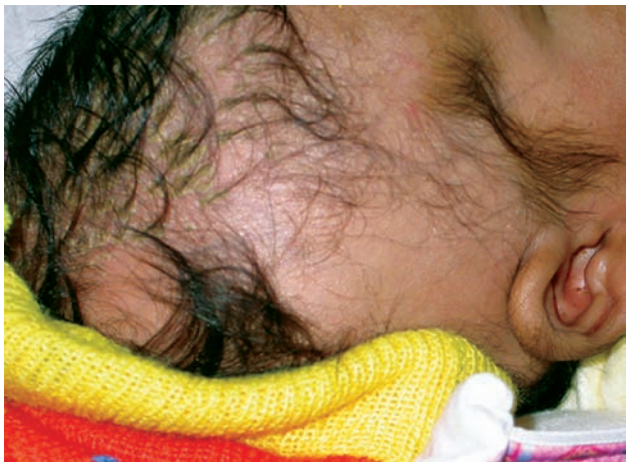

Fig. 16.6 Seborrheic alopecia in a newborn

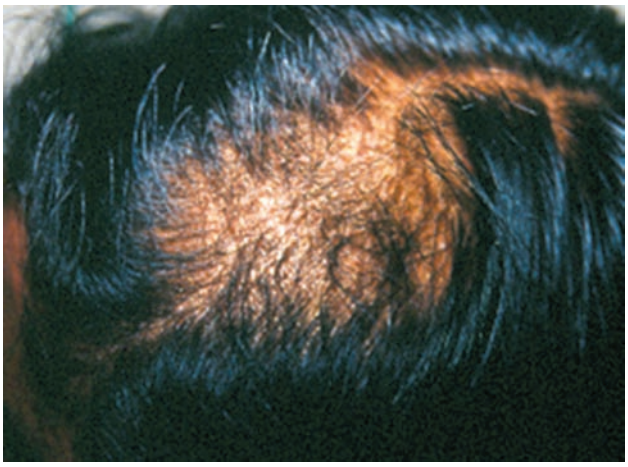

Fig. 16.6A Multiple short stumps of hairs (broken hairs) in trichotillomania (TTM)

apart from treatment of seborrhea capitis. Once the seborrhea capitis subsides, hairs grow spontaneously.

TRICHOTILLOMANIA (Figs 16.6A to D)

Trichotillomania is defined as an irresistible urge to pull out hair and a sense of relief after the hairs have been plucked. Hair pulling and plucking is most common from the scalp. Most of the children pull hair from the vertex, but temporal, occipital and frontal hair loss in children may be more prominent on the side of manual dominance.

In most of the cases of trichotillomania, the hair pulling tick is associated with habitual disorders or situational stress. In very few cases only, it is a manifestation of severe obscessive compulsive neurosis. The parents and the adolescent girls (more often) or boys often deny vigorously that they have been pulling their hairs.

Management

Treatment is basically supportive, psychological evaluation and behavior modification. For mild cases, topical moderately potent corticosteroids lotion may be helpful to reduce the inflammation or irritation. Addition of antihistamine may also reduce the itching sensation. In severe cases the boy or the girl may need treatment by oral fluoxetine or pimozide and a thorough counseling by a psychiatrist.

OCCIPITAL ALOPECIA (Figs 16.6A, 16.7 and 16.7B)

The scalp hair is shed during the fifth month of intrauterine life. After having regrown, the hairs enters telogen in a wave from front to back, starting about 12 weeks before term. After

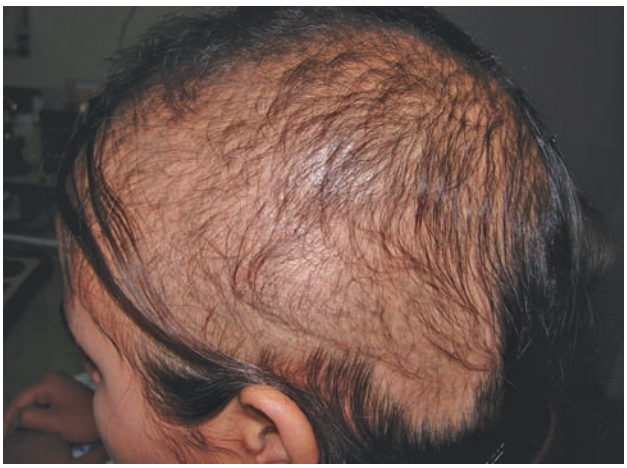

Fig. 16.6B Trichotillomania (TTM)

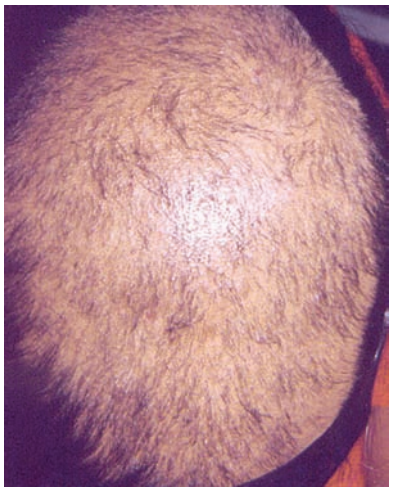

Fig. 16.6C TTM, close-up

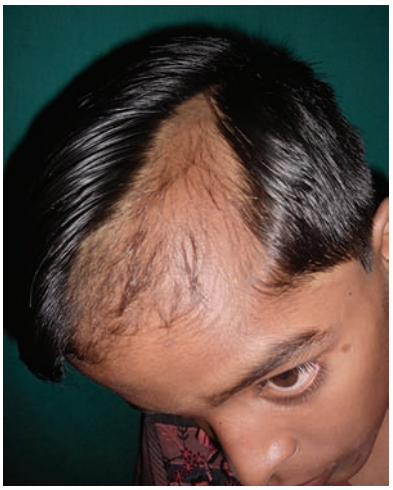

Fig. 16.6D TTM in a boy

Fig. 16.7B Neonatal occipital alopecia

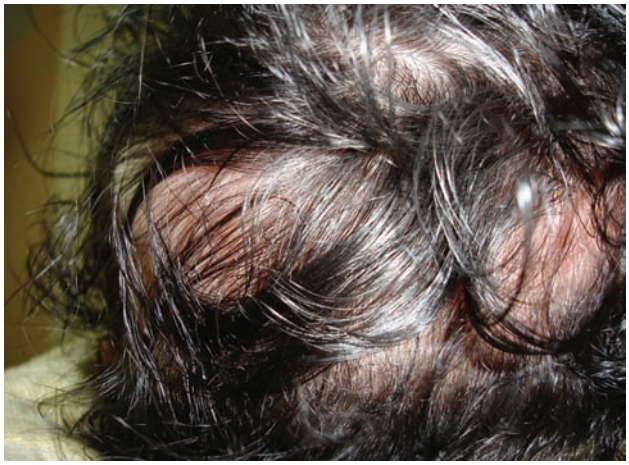

Fig. 16.7 Occipital alopecia in a newborn

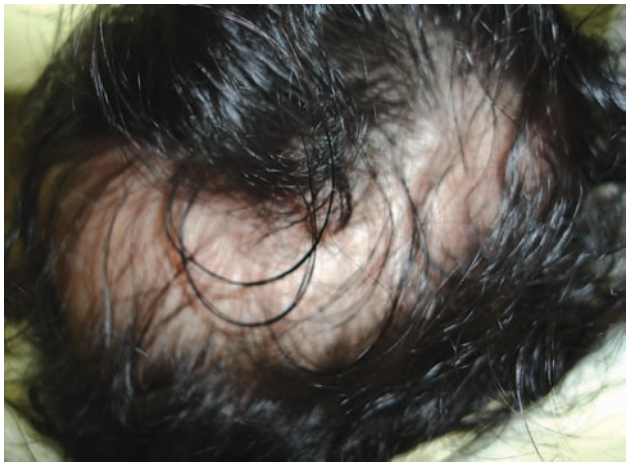

Fig. 16.7A Occipital alopecia in an infant

shading of the telogen hairs from the frontal and parietal areas, the roots again enter the anagen phase in the similar wave from front to back. The roots in the occipital area do not enter telogen until term, and therefore conspicuous alopecia appears at this site. It is certainly not due to friction with the pillow over the occipital area, as it is believed to be. Counseling of the parents, particularly the anxious mother is very important after explaining the condition to them.

WOOLY HAIR (Figs 16.8 to 16.8B)

Is tightly coiled hair occurring over the entire scalp is part of an individual not of negroid origin. It can be hereditary wooly hair, familial wooly hair, symmetrical circumscribed or wooly hair nevus. In wooly hair, there is no change of color.

MONILETHRIX (BEADED HAIR) (Figs 16.9 to 16.9B)

Is a rare autosomal dominant (AD) disorder affecting both sexes equally. It is characterized by increased fragility and alopecia, microscopically appearance of nodes (beading) on hairs and internodal fragility. The disorder mostly affects scalp hairs. However, body hairs may also be affected. The condition often becomes apparent late in childhood or during adult life. Associated abnormalities reported are retardation of growth and development, syndactyly, keratosis pilaris, trichorrhexis nodosa, brittle nails, cataracts or dental abnormalities. A tendency to improvement or remission may occur at puberty or during pregnancy. In some patients the hair disorder may persists throughout life. There is no effective therapy for this condition.

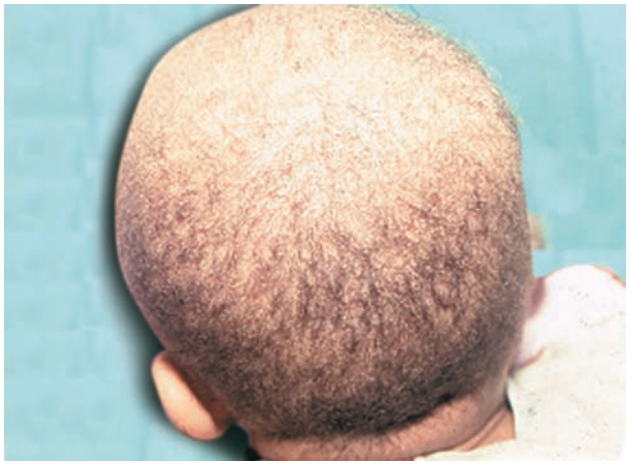

Fig. 16.8 Soft curled pigmented wooly hairs

Fig. 16.8A Siblings with wooly hairs

Fig. 16.8B Close-up of wooly hair

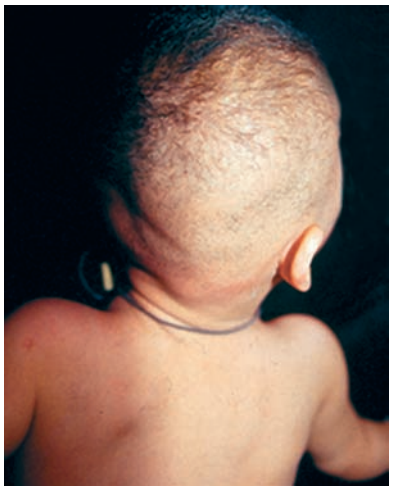

Fig. 16.9 Monilethrix is characterized by beaded hair shafts that break easily. The hairs are often unremarkable at birth and become abnormal during the first year of life

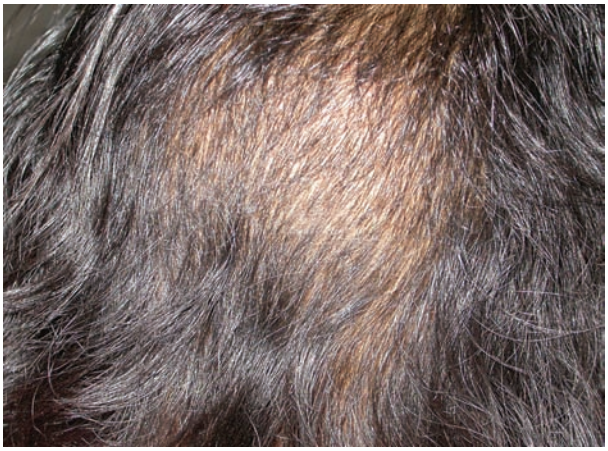

Fig. 16.9A Monilethrix, close-up

Fig. 16.9B Light microscopic feature of hair in monilethrix

"Denial ain't just a river in Egypt."—Mark Twain

Pseudomonilethrix

In this condition there is irregular beading of hair shaft as opposed to the regular beading in monilethrix. The nodes here may also be artefactual as the defect can be produced by crushing a hair between two glass slides as well.

PIEBALDISM (Figs 16.10 to 16.10D)

Piebaldism is transmitted as an autosomal dominant trait. Patches of skin totally devoid of pigment are present at birth and usually remain unchanged throughout life. Most common is a frontal median or paramedian, associated with a mesh of white hair (white forelock) and rarely this may be the only lesion. Often white patches occur on the upper chest, abdomen and limbs, bilaterally but not necessarily symmetrically. In vitiligo, the lesions appear later in life and their configuration and distribution are different. In piebaldism, there is almost invariably a white forelock.

Most patients with piebaldism are healthy and have a normal life expectancy.

Waardenburg syndrome is a group of autosomal dominant disorder characterized by a white forelock like piebaldism, cutaneous depigmentation and heterochromia iridis. Sometimes sensorineural deafness is also associated with it.

Natural History

Various associated disorders found are heterochromia irides, mental retardation, ataxia, motor incoordination, Hirschsprung's disease, recurrent pyogenic infections, hepatosplenomegaly.

Fig. 16.10 Piebaldism, note white forelock

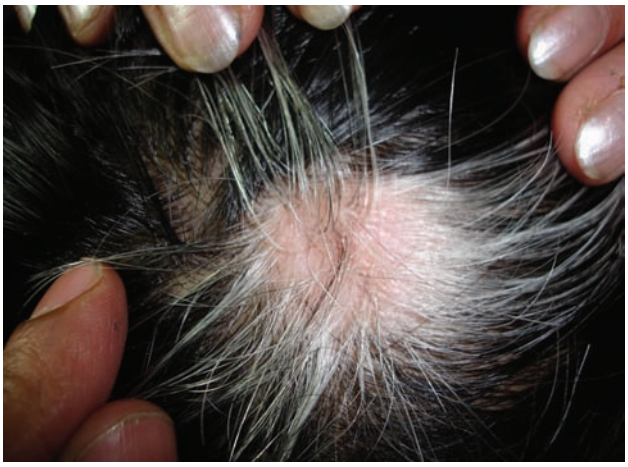

Fig. 16.10A Piebaldism in 3-year-old boy

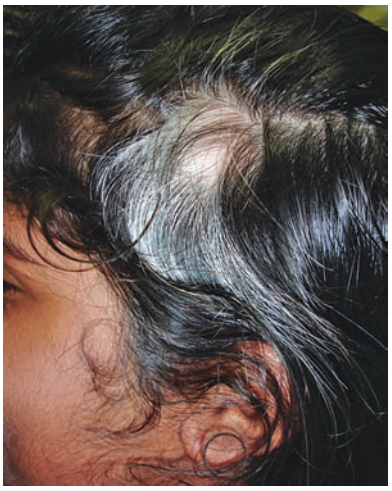

Fig. 16.10B Piebaldism, note tuft of white hairs

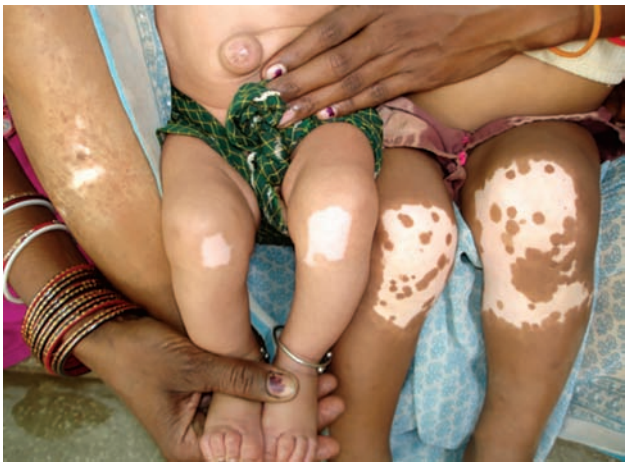

Fig. 16.10C Piebaldism in mother and siblings

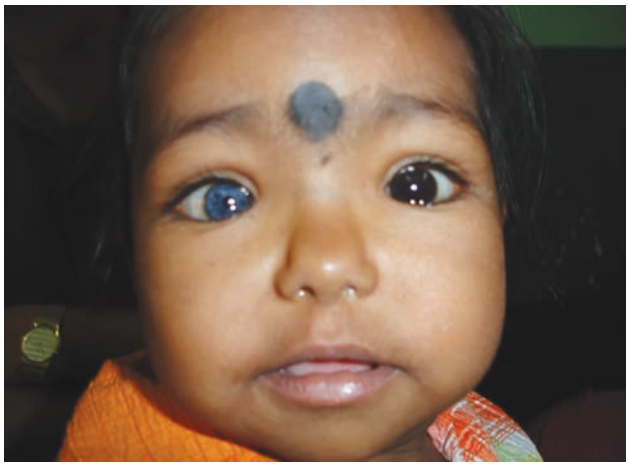

Fig. 16.10D Heterochromia irides in child with Waardenburg's syndrome

Waardenburg's syndrome is a rare autosomal dominant (AD) disorder characterized by congenital deafness, lateral displacement of medial canthi, broad nasal root, white forelock, heterochromia irides and piebaldism like skin depigmentation.

Treatment

Treatment of piebaldism consists of cosmetic camouflaging of depigmented patches. For prevention of suninduced damage of the depigmented patches, regular use of sunscreen is a must and areas around eyes and eyelids are best protected by dark glasses.

PREMATURE CANITIES (PREMATURE GRAYING) (Figs 16.11 and 16.12)

Premature graying of hairs probably has a genetic basis and occasionally occurs as an isolated autosomal dominant condition. The association between premature graying of hair and certain organ specific autoimmune disorders is well-documented. Premature greying may be an early manifestation of pernicious anemia, hyperthyroidism, hypothyroidism and all autoimmune diseases that have a genetic predisposition. In Book's syndrome, an autosomal dominant trait, premature graying is associated with premalar hypodontia, and palmoplantar hyperhidrosis. The premature ageing syndromes, progeria and Werner's syndrome may have premature graying as a prominent feature.

Management

Counseling is the cornerstone of management for cases of premature canities. For idiopathic cases calcium and pantothenic acid supplementation may be helpful. The children and the parents are to be told clearly that plucking of the gray hairs do not lead to growth of new gray hairs and that it is a myth.

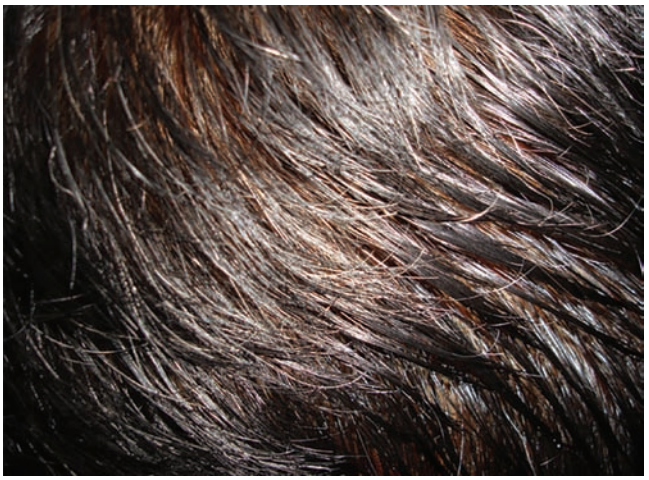

Fig. 16.11 Scattered white hairs all over scalp in premature canities in a 5-year-old girl

Fig. 16.12 Close-up of hairs in premature canities

PITYRIASIS AMIANTACEA (TINEA AMIANTACEA) (Figs 16.12A and B)

A variant of psoriasis of the scalp, also known as tinea or pityriasis amiantacea. Usually, this disease seen in children or adolescents in which crusts are firmly adherent and asbestos-like. This disease is unrelated to fungus infection of scalp and probably represent a form of seborrhea or psoriasis of scalp. This disorder is often persistent and somewhat resistant to therapy, when seen as a manifestation of psoriasis.

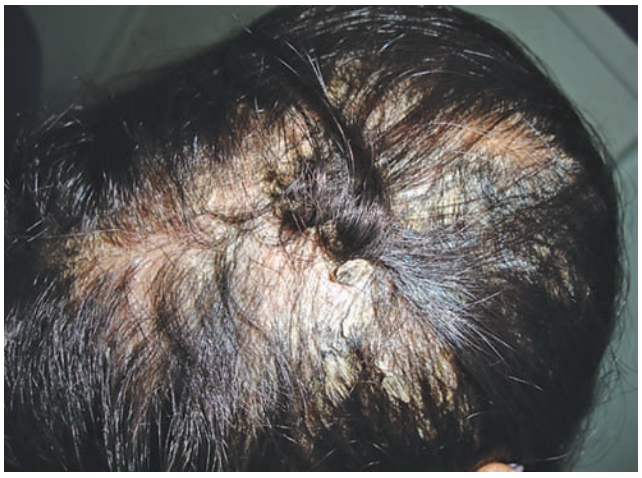

Fig. 16.12A Tinea amiantacea in 15-year-old girl, note asbestos-like thick scales attached to hair shafts

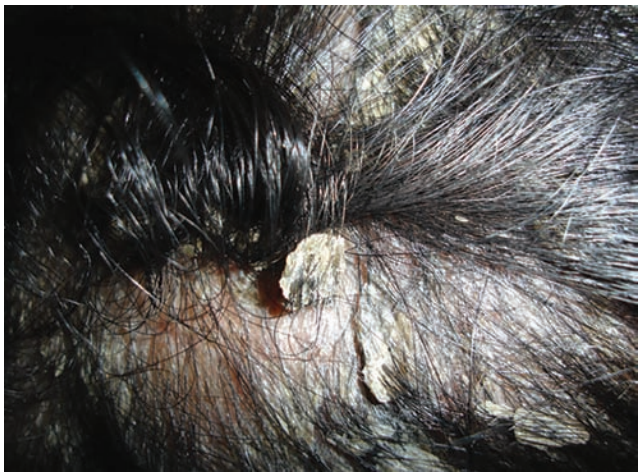

Fig. 16.12B Close-up of the scalp in the same girl

Treatment

Soaking of the scalp with lukewarm coconut or olive oil help the thick crust to become soft. Daily application of coal tar shampoo over 2–3 months help to resolve the lesions gradually.

NEONATAL HAIR (Fig. 16.12C)

Postnatal hair is divided into terminal and vellus hair. Vellus hair are very fine, lightly pigmented and predominantly found on the face and arms. Terminal hair is thick, coarse, dark and found on scalp, eyebrows and eyelashes. New follicles are not formed after birth.

The first crop of terminal hair is in anagen phase at birth but within few days physiological conversion to telogen occurs. There is increased shedding of hair in the first four months. The shedding may be sudden or gradual and is generally completed before the first six months. The hair extends from the frontal hair margin up to the eyebrows and later gets converted to vellus hair in the first year of life.

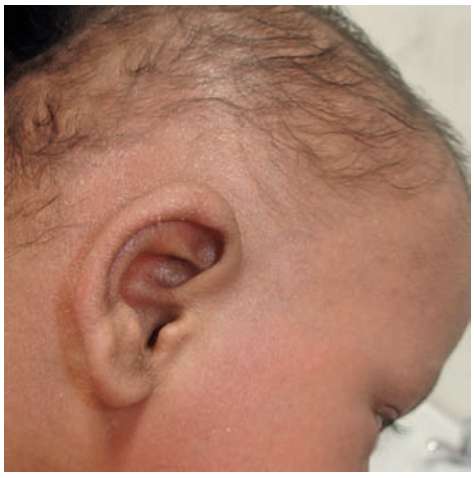

Fig. 16.12C Neonatal hairs

Premature infants are covered with lanugo hair which is generally shed within the first month of life.

ANAGEN EFFLUVIUM (Figs 16.12D and E)

Telogen hair is generally shed thereby making anagen hair-loss abnormal, with the exception of loose anagen syndrome and alopecia areata. The most commonly recognized cause of anagen loss is exposure to radiotherapy or chemotherapy. Diminution of metabolic activity in the hair matrix results in increased shedding to the extent of about 90% scalp hair being lost. The hair loss starts within days to weeks of the insult. If exposure is persistent or particularly toxic then anagen may be interrupted.

In general chemotherapy induced hair loss is generally reversible when the therapy is stopped, whereas in case of radiotherapy induced hair loss the rate of regrowth depends on the dose, intensity and depth of penetration of the radiation. The resultant growth of hair may differ in color, curl or texture.

Other causes of anagen loss includes loose anagen syndrome, alopecia areata and boric acid exposure or exposure to other toxic metals. Mercury exposure may lead to acrodynia characterized by a constellation of symptoms including pain in abdomen, extremities and joints, pink scaly palms and soles, headache, photophobia, irritability, hyperhidrosis and hairloss. The diagnosis is made by measuring mercury levels in urine, blood or hair.

Arsenic and thallium toxicity have also been implicated in anagen effluvium. Very severe protein malnutrition may also

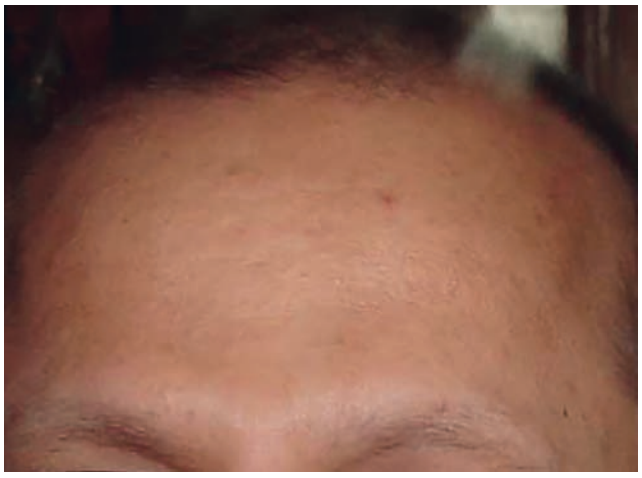

Fig. 16.12D Anagen effluvium

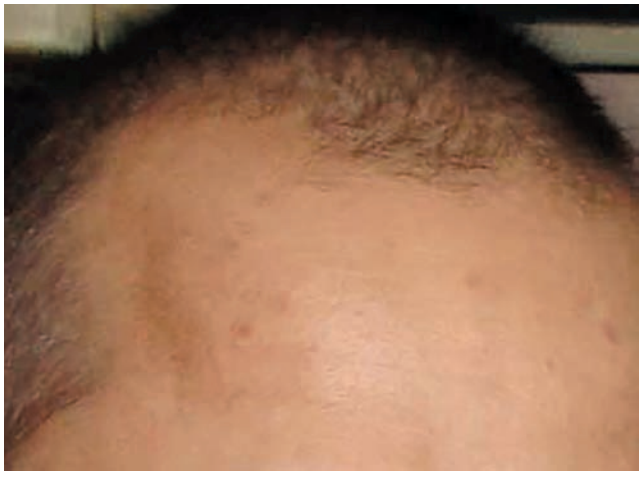

Fig. 16.12E Close-up of anagen effluvium

result in anagen effluvium. Colchicine and ingestion of some organic plants can also result in anagen effluvium.
Management is generally directed towards withdrawing the trigger for the loss of hair.

ANDROGENETIC ALOPECIA (Figs 16.12F to H)

This is a condition which represents the common baldness and is characterized by miniaturization of the dermal papillae and corresponding matrix. There is a decrease in the anagen and increase in telogen.

The initial presentation of this condition can be seen immediate post puberty phase. It presents with thinning of hair of bilateral temporal area and the central parietal area in both boys and girls.

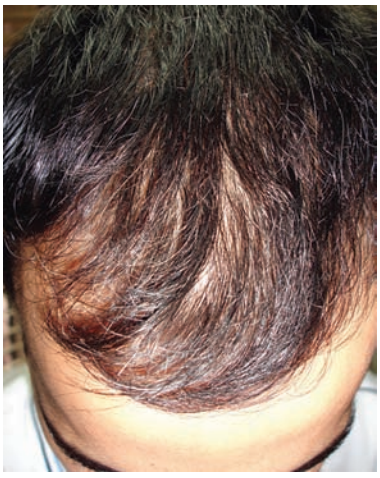

Fig. 16.12F Androgenetic alopecia in a 18-year-old boy

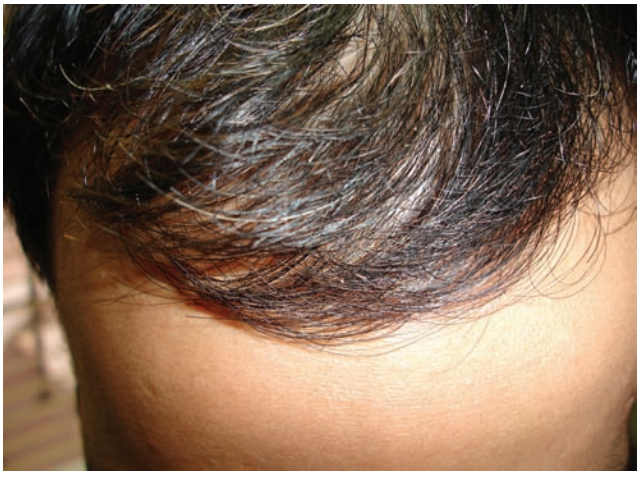

Fig. 16.12G Same boy with AGA, note frontal recession

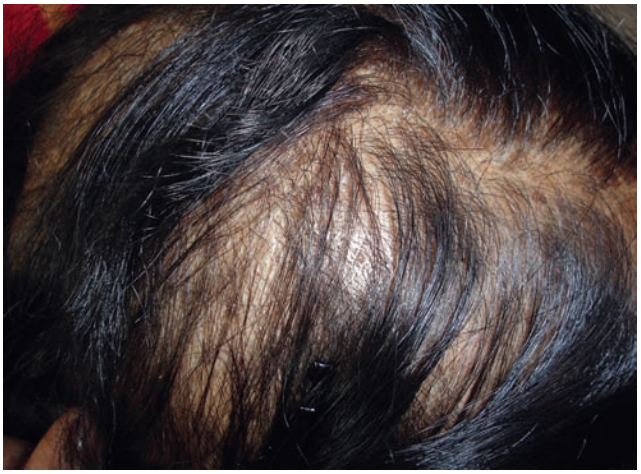

Fig. 16.12H AGA in a girl, note diffuse thinning of hairs

The investigations in a girl with suspected patterned hair loss should include evaluation for any signs of hirsutism, acne and acanthosis nigricans. Blood investigations include thyroid function tests, free testosterone and dehydroepiandrosterone sulphate. Attempts should also be made to rule out the possibility of polycystic ovarian disease in a girl. Non-invasive procedure like trichoscopy using a dermatoscope is being increasing preferred than biopsy to determine the hair diameter diversity and to demonstrate miniaturization of hair follicle. Biopsy of the scalp reveals terminal to vellus hair ratio of 3:1 in children as opposed to 4:1 in adults.

Management

In males topical minoxidil lotion 2% is the main stay of treatment and can be increased to up to 5% strength. Finasteride is not recommended for use below 18 years of age.

In females minoxidil remains the main stay of treatment. They can also benefit from treatment of underlying polycystic ovarian disease using hormonal therapy. Spironolactone have been used with good response in the Western countries.

TELOGEN EFFLUVIUM

This type of hair loss occurs very commonly after any prolonged episode of fever, typhoid, chicken pox, after any operation. With a few months hairs usually regrow back to normal.

ACQUIRED PROGRESSIVE KINKING OF THE HAIR [Figs 16.12I(i) and (ii)]

It encompasses various conditions characterized by acquired curling of the hair. Most commonly this condition presents in young males and is characterized by the presence of short curly, lustreless, frizzy hair in the frontotemporal region and vertex of the scalp with subsequent progression to androgenetic alopecia. Localized and diffuse forms that are not associated with hair thinning have also been described.

PILI TORTI (Fig. 16.12J)

It is a condition characterized by a flattened shaft and twisting of the hair along its own axis, giving the hair a spangled appearance. Most commonly pili torti is associated with ectodermal abnormalities like keratosis pilaris, nail dystrophy and dental anomalies.

The hair may be abnormal or sparse at birth or may be normal and progressively become brittle and fragile during infancy. Body hair may also be sparse. It may sometimes present after puberty as patchy alopecia of the scalp, eyebrows and eyelash.

Fig. 16.12I(i) Acquired progressive kinking of hairs

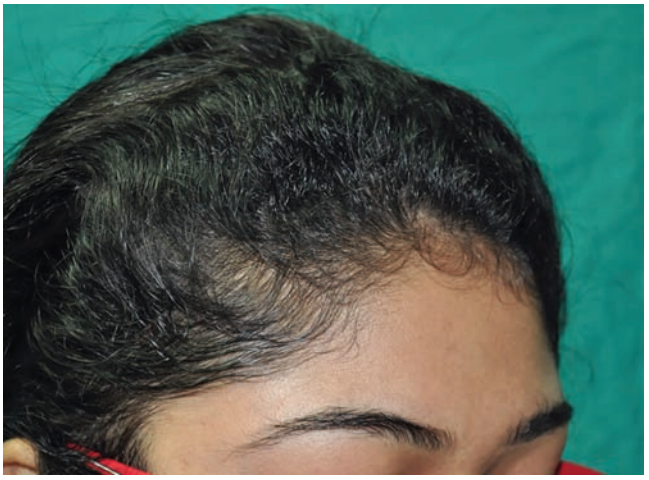

Fig. 16.12I(ii) Same girl, close-up of hairs

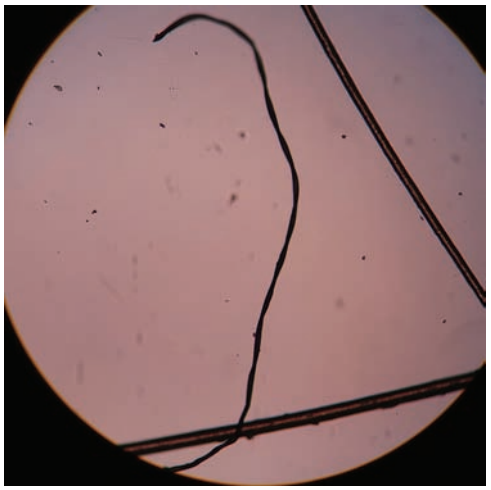

Fig. 16.12J Microscopy of hair with pili torti

Acquired pili torti like condition has been reported with anorexia nervosa, malnutrition, at the edge of cutaneous lupus erythematosus lesions and oral retinoid therapy. Other disorders which can have pili torti as an association include Menke's disease, Laron syndrome, Bazex-Dupre-Christol syndrome, hypotrichosis with juvenile macular dystrophy, ectodermal dysplasias, mitochondrial disorders and urea cycle defects.

Pili torti associated with hearing loss is seen in Björnstad syndrome and therefore a screening for hearing loss is recommended in all these patients.

Light microscopy reveals groups of twisted flattened hair.

At present there is no effective therapy for this condition.

Pili Annulati

This condition is also known as ringed hair and is characterized by hair shafts that are banded by alternating light and dark color when seen in reflected light. It is inherited as autosomal dominant condition or may be sporadic. The major defect is the presence of air filled cavities within the hair shaft at regular intervals giving rise to scattering of light which thereby becomes visible as a bright band. On microscopic evaluation these air filled cavities are seen as black regions.

TRICHORRHEXIS NODOSA (Fig. 16.12K)

As the name suggests this condition is characterized by the formation of nodes in the hair shaft leading to fragility and braking of the hair shaft. It can be congenital or acquired. The acquired forms are a result of physical or chemical trauma.

Macroscopically these hair are characterized by white nodes which represent areas of cuticular disruption, and are placed at regular or irregular intervals along the hair shaft. The cortical fibers splay outwards and fracture, giving the node the microscopic appearance of 2 brooms or paintbrushes thrust together end to end by their bristles. A primary congenital form of trichorrhexis nodosa is inherited as an autosomal dominant trait in some families. It has been described in association with hypothyroidism, trichoohepatoenteric syndrome and biotinidase deficiency.

It may present at birth or within couple of months of life. It has a female preponderance.

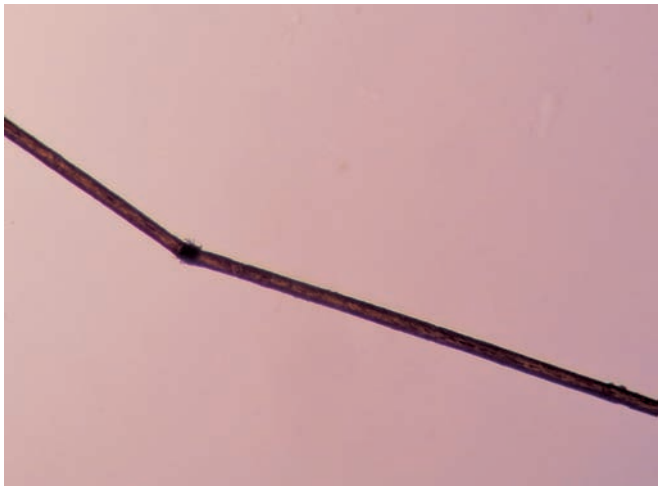

Fig. 16.12K Microscopy of hair with pili annulati

Clinical Features

The patient presents with the nodes in the hair or history of failure to grow hair and easy breakability. Congenital trichorrhexis nodosa is apparent at a younger age and may be associated with other symptoms like mental retardation, motor defects, growth failure, and seizures. Other associated symptoms may include nail and skin changes (ichthyosis), photosensitivity, ocular dystrophy, and infertility. It has also been seen in association with Menke's disease. Acquired trichorrhexis nodosa has 3 clinical patterns namely distal, localized and proximal.

Dermoscopy shows breakage in hair shafts at multiple levels, producing an appearance suggestive of the ends of 2 brushes aligned in opposition, resembling "thrust paint brushes."

Differential Diagnosis

- Piedra
- Trichorrhexis invaginata
- Monilethrix
- Menke's kinky hair disease
- Trichomycosis axillaris and pubis
- Seborrheic dermatitis

Investigation

Dermoscopy and light microscopy reveals the classical paint brush fracture appearance.

Tests should be performed to rule out trichothiodystrophy.

Management

The treatment should be aimed at avoiding chemical and physical trauma. Underlying metabolic disorders need to be treated accordingly.

Trichothiodystrophy

It is a rare autosomal recessive condition characterized by sparse brittle hair which occurs due to sulfur deficiency.

The microscopic examination of hair fibers reveal transverse fractures, alterations in the cuticle and alternating light and dark bands under the polarising light. The associations to trichothiodystrophy includes PIBIDS, spasticity, ataxia, tremors, nail dystrophies, dental caries, eye anomalies, bony defects and immunodeficiency.

The diagnosis of trichothiodystrophy can be made by:

Reduced sulfur content of the hair and one of the following:

- Trichoschisis
- Alternating light and dark bands by polarising microscopy
- Absent or severely damaged hair cuticle by electron microscopy.

Trichorrhexis Invaginata

It is also known as bamboo hair. It generally presents in infancy as sparse and short brittle hair. The defect is generally abnormal keratinisation of hair shaft in the keratogenous zone allowing invagination of the distal portion into the proximal part, giving rise to a ball in socket like deformity. Fracture of the shaft is commonly noted on dermoscopy along with golf tee or tulip shaped end of the hair.

Associations of this condition can be seen with pili torti, trichorrhexis nodosa, Netherton's syndrome, lamellar ichthyosis, ichthyosis vulgaris and X-linked ichthyosis. The sulfur levels are normal which helps in differentiating from trichothiodystrophy.

As the abnormal hair may be seen only in some sections of the scalp it is important to undertake multiple site examination.

There is no specific treatment for trichorrhexis invaginata. Spontaneous improvement with age is generally seen. Photochemotherapy and retinoids have been reported to be useful in a few cases.

UNCOMBABLE HAIR SYNDROME (Fig. 16.12L)

This condition is generally seen in infancy up to puberty. The patients generally complain of slow growing, silvery blond hair having a spun glass appearance which are unruly and unmanageable. The condition is autosomal dominant with incomplete penetrance but sporadic cases have also been noted. There are no reported associations or abnormalities.

Premature keratinization of the inner root sheath has been implicated in the etiopathogenesis of this disorder.

Electron microscopy reveals longitudinal grooving and the cross-section appears triangular.

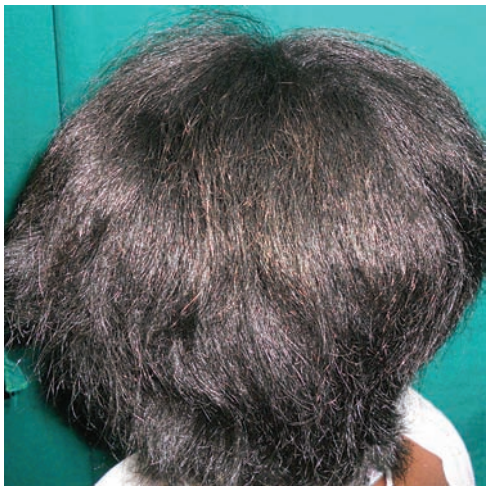

Fig. 16.12L Uncombable hair

The condition improves with age. Biotin supplements and regular use of hair conditioners have been found to be useful in management of this disorder.

Loose Anagen Syndrome

It is an autosomal dominant condition, but can be sporadic in few cases. The presenting complaints include sparse short hair, patches of dull matted hair and easy pluckability. There is a strong female preponderance and the condition manifests at an age less than 6 years.

These hair have malformed hair bulbs, absent root sheath and ruffled cuticle giving rise to the floppy socks appearance. The main structural defect lies in the inner root sheath. Loose anagen syndrome has been divided into three types A,B and C. Type B presents with patches of unruly hair, whereas type A and C presents with increased shedding in clinically normal hair.

The diagnosis is made when there is easy pluckability of 3-10 hair per hair pull or percentage of all hair obtained on hair pull (50% suggested).

The differential diagnosis includes wooly hair nevus for type B and short anagen syndrome for type A.

This condition remains elusive to treatment.

Hypertrichosis

Hypertrichosis refers to a generalised or localised non androgen dependent excessive hair growth in males or females without evidence of masculinisation or menstrual abnormalities.

Congenital Hypertrichosis (Fig. 16.12M)

Congenital hypertrichosis encompasses the following conditions.

Hypertrichosis Lanuginosa [Fig. 16.12M(i)]

It is an inherited condition in which lanugo hair persist throughout life or there is an overproduction of the same. Spontaneous loss of hair have been noted in childhood, others which persist has remained same until adulthood. Due to increased hairiness various descriptive terms like "monkey men", "dog face" and "human skye terriers" have been used. Sporadic, autosomal dominant and autosomal recessive inheritance have been documented. The associations included are glaucoma, missing teeth and skeletal abnormalities.

Fig. 16.12M Neonatal hypertrichosis

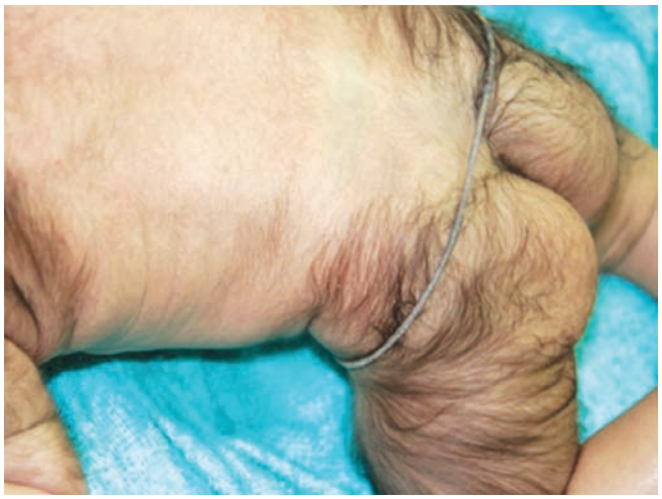

Fig. 16.12M(i) Hypertrichosis lanuginosa

Ambras Syndrome

This condition has vellus hair than lanugo hair. It predominantly affect the face, ears and shoulder area. The affected patients have dysmorphic facies and the condition is persistent.

X-linked Dominant Hypertrichosis

This condition affects males more than females and presents with increased growth of terminal hair in a generalized distribution which improves after puberty. Females show asymmetric hypertrichosis due to the lyonization effect.

Generalized Hypertrichosis (Fig. 16.12N)

Cornelia De Lange syndrome is an autosomal dominant condition which presents with overgrowth of eyebrows, lashes, upper lip, saddle nose, cyanotic hue about the eyes, nose and mouth along with recurrent gastrointestinal upset, upper respiratory tract infection and seizures.

Hypertrichosis with Gingival Hyperplasia

It is an autosomal dominant condition presenting with increased body and facial hair along with gingival hyperplasia. It begins at puberty but sometimes may be present at birth or infancy. There is delayed tooth eruption with pebbling of the gums which interferes with chewing, respiration and speech. There is history of peridenatal abscess formation. Debulking of the gum is generally helpful.

Nevoid Hypertrichosis (Fig. 16.12O)

It is a rare congenital disorder characterized by growth of terminal hair in a circumscribed patch present at or soon after

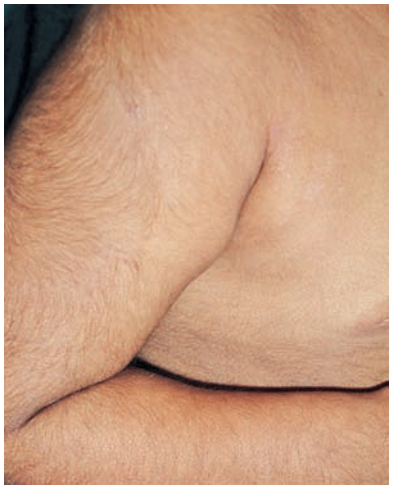

Fig. 16.12N Generalized hypertrichosis

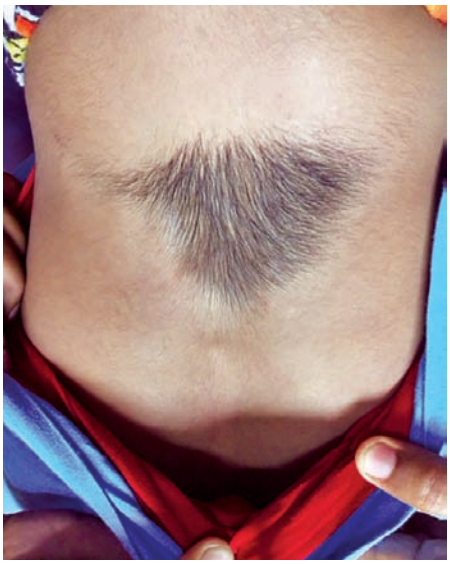

Fig. 16.12O Nevoid hypertrichosis

birth. Though the lesion is typically solitary, reports are there with multiple patches developing after puberty. Patches in multiple nevoid hypertrichosis (NH) may be linear, round, in check board pattern or may follow Blaschko's line. The color of the terminal hair may be normal or hypopigmented. In primary NH the affected area is normally pigmented and there is no associated cutaneous or extracutaneous abnormality. Several systemic associations including partial lipodystrophy, scoliosis, vascular abnormalities, hemi hypertrophy have been reported with secondary NH. Among the cutaneous associations lipoma, dermoid cyst and sacral dimple are worth mentioning. It is advised that any case of NH must be investigated to rule out underlying systemic association. Histopathology reveals normal epidermis with increased number of hair follicle in the dermis. Important clinical differentials are smooth muscle hamartoma, congenital melanocytic nevus and Becker's nevus. Histopathological differentiation from congenital melanocytic nevus should be made. The cutaneous lesion may persist for life or may spontaneously resolve. The underlying pathology may be explained by 'Twin Spotting' phenomenon which comprise of two different clones of cells in a background of normal cells. Genetic mutations of this so called Twin Spot manifest phenotypically as paired nevoid cutaneous abnormalities.

Hypertrichosis

Hypertrichosis refers to the excessive growth of hair in respect to age and not restricted to the androgen dependent areas of skin. This entity can be classified into localized and generalized variant which can be furthur classified into congenital and acquired.

IDIOPATHIC HYPERTRICHOSIS (Figs 16.12P to S)

It is a condition generally affecting girls where there is presence of excess body hair in a male pattern distribution in the absence of clinical evidence of endocrine or metabolic disorders. This condition occurs due to the hyperstimulation of the hair follicles in genetically predisposed individuals with normal androgen levels. When hirsutism is observed in post pubertal girls without other signs of virilization endocrinological abnormalities are unlikely. Endocrine disease should be ruled out when there are signs of masculinization. The various endocrinal abnormalities include exaggerated adrenarche, adrenal hyperplasia, Cushing's disease, hyperprolactinemia and polycystic ovarian disease.

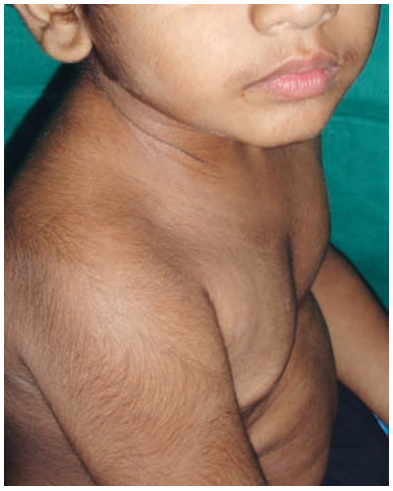

Fig. 16.12P Idiopathic hypertrichosis in a 6-year-old boy

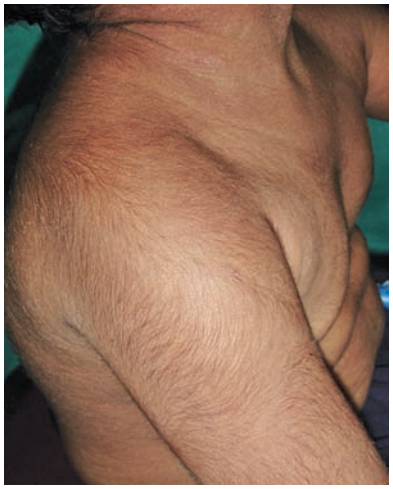

Fig. 16.12Q Same boy, close-up

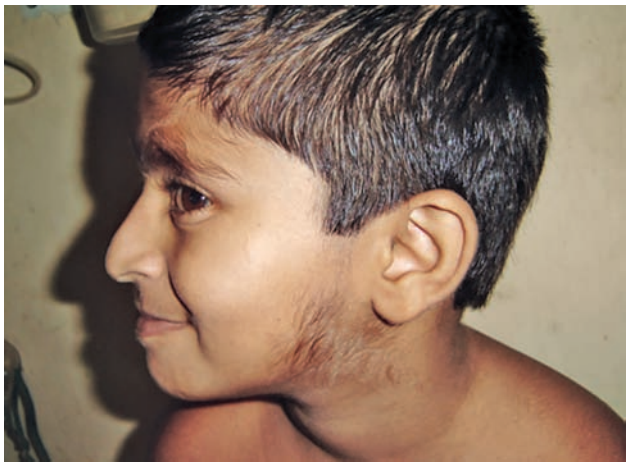

Fig. 16.12R Hypertrichosis over cheek

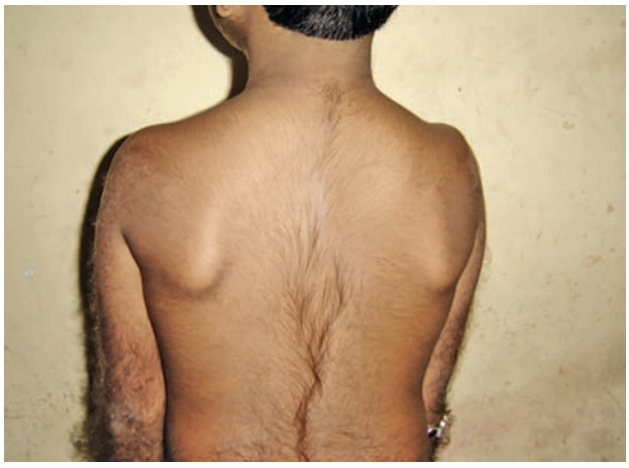

Fig. 16.12S Hypertrichosis over the back

Investigations in these patients include assays of 17 ketosteroid levels, free testosterone levels, dihydroepiandrosterone sulphate levels, cortisol assay, LH:FSH and ultrasound of the pelvis to look for any ovarian dysfunction.

Treatment

Hypertrichosis is overgrowth of hair with respect to age and site and is not androgen dependent. Treatment is directed towards removal of unwanted excess hair and avoidance of offending medicines in case of drug induced hypertrichosis. Available therapeutic modalities are bleaching, trimming, shaving, plucking, waxing, depilatory creams, topical eflornithine (13.9%) and electrosurgical epilation. Different types of laser like long-pulse Nd: YAG, diode, ruby, long and short-pulse alexandrite lasers and intense pulsed light sources give encouraging results. Skin type is the determining factor in selection of laser.

Hirsutism is excess growth of terminal hair in women in a male sexual pattern and is androgen dependent. Treatment hirsutism is challenging one. Obese patients should be advised to reduce weight thereby reducing insulin resistance and levels of androgen and LH while increasing sex hormone binding globulins. Idiopathic, familial and racial hirsutisms with normal hormonal level are treated as for hypertrichosis. In other cases, treatment should be individualized and is directed towards the underlying causes. Various drugs used to treat hirsutism either alone or in combination are spironolactone (100 mg/day), oral contraceptives, cyproterone acetate (2 mg/day), ethinyl estradiol (35 mcg/day), gonadotropin-releasing hormone (GnRH) agonists such as leuprolide, anti androgens like flutamide (250 mg/day followed by 125 mg/day) and finasteride (2.5–5 mg/day). Insulin sensitizer, metformin gives encouraging result in polycystic ovarian syndrome. Hirsutism associated with congenital adrenal hyperplasia can be managed successfully with very low dose dexamethasone (<0.3 mg/day). Idiopathic hirsutism with high testosterone level is treated by either ovarian suppression with cyclical OCPs or by adrenal suppression with low dose dexamethasone (0.5–1 mg/day at bed time). Surgical resection of underlying ovarian or adrenal tumor improves hirsutism due to it.

HIRSUTISM (Figs 16.12T to V)

Hirsutism is characterized by excessive hair growth in the sex-hormone dependent areas. It is usually caused by androgen overproduction on increased metabolism in the skin. Along with hirsutism other features of virilization or

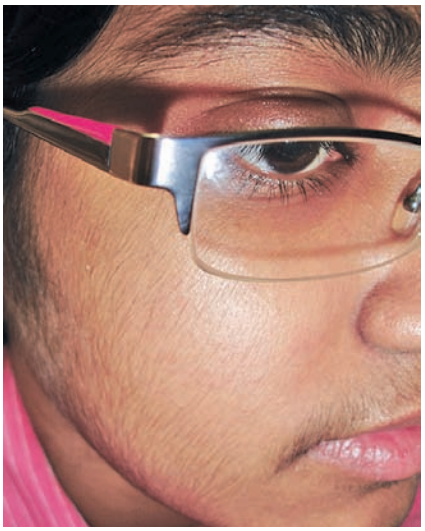

Fig. 16.12T Hirsutism in 14-year-old girl

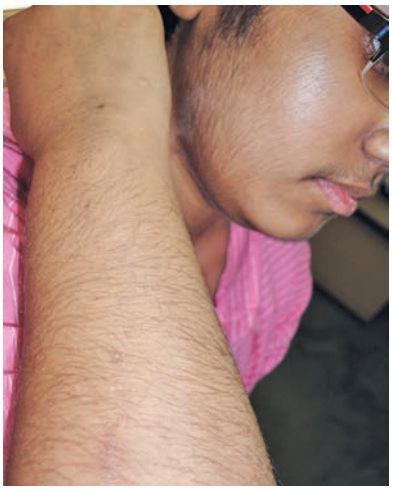

Fig. 16.12U Same girl, note hair growth over face and forearm

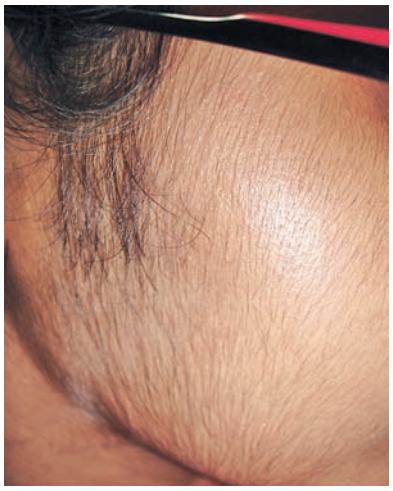

Fig. 16.12V Close-up of face

masculinization due to androgen excess may be manifested like enlargement of the phallus or clitoris, deepening of voice, male type of body structure, temporal loss of hair and menstrual irregularities (in post pubertal females).

A child may develop hirsutism due to prenatal or postnatal exposure to androgens. Exposure to androgens during the first trimester (for example in congenital adrenal hyperplasia) will lead to virilization of the female fetus. Postnatal causes may include early gonadarche, polycystic ovarian disease, adrenal hyperandrogenism, androgen producing gonadal tumors causing precocious puberty.

Clinically, the child will have manifestations depending upon the onset and extent of exposure to androgens. Females exposed to androgens during intrauterine life will have ambiguous genitalia with fusion of the labia. With postnatal exposure, there will be accelerated growth with advanced bone age, increased weight gain, hypertension, hirsutism, enlargement of testis and breast, oily skin with acne, increased axillary and pubic hair, irregular menstrual spotting or bleeding. If congenital adrenal hyperplasia is present then depending upon the enzymatic defect salt wasting symptoms can occur along with features of virilization.

Precocious puberty may be central (true) or peripheral. Central causes include hypothalamic or pituitary lesions like astrocytoma, craniopharyngioma, ependymoma, glioma etc. Peripheral causes include ovarian androgen producing tumors, testicular tumors, adrenal hyperandrogenism, etc. Drugs may also cause hirsutism like anabolic steroids, methyl dopa, metoclopramide, phenothiazines, etc.

If a child presents with hirsutism along with other features of androgen excess then a thorough and complete workup must be carried out. Hormonal profile, karyotyping, GnRH stimulation test, ACTH stimulation test, magnetic resonance imaging of the hypothalamic-pituitary area, bone-age radiograph, ultrasonography of the ovaries and other relevant investigations. Treatment should include supportive measures like shaving, epilation, bleaching and depilatories. Specific treatment directed towards the cause of the hirsutism may be tried and the patient followed up regularly.

Silvery Gray Hair Syndromes

It comprises of three different entities which have many overlapping clinical features and microscopy of hairs often come handy in making a specific diagnosis of the conditions.

GRISCELLI SYNDROME (Figs 16.13 to 16.13C)

Griscelli syndrome is a rare autosomal recessive silvery gray hair disorder characterized by pigmentary dilution of skin and hair, with cellular and humoral immunodeficiency. It was describe by Griscelli and Prunieras in 1978. Children characteristically present with silvery hair at birth or in early infancy. It can be associated with hypopigmentation of skin. There are recurrent episodes of fever, hepatosplenomegaly, lymphadenopathy, pancytopenia and neurological impairment. There are three types of Griscelli syndrome. Type 1 Griscelli syndrome results from *MYO5A* mutations. It is associated with severe neurological involvement with no immunodeficiency. Type 2 is associated with hemophagocytosis and immunodeficiency and is due to mutation in Rab27a. Type 3 Griscelli syndrome involves only skin and hair and results in mutation in the gene encoding melanophilin *(Mlph)*. The diagnosis is made by microscopic examination of hair shaft. Light microscopy shows irregular clumping

Fig. 16.13 Griscelli syndrome, note color of skin and hair

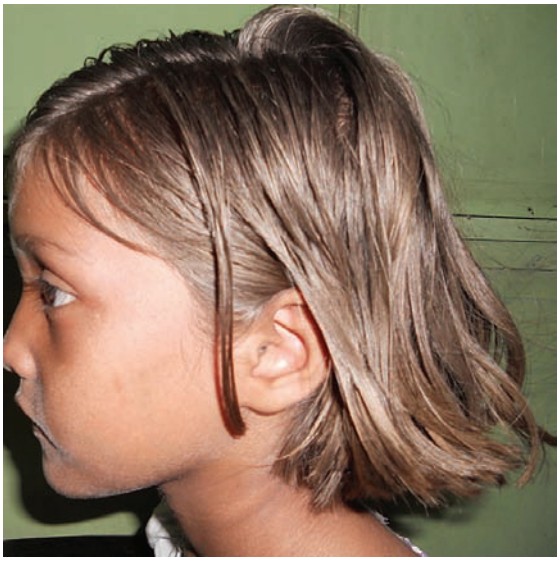

Fig. 16.13A Griscelli syndrome, close-up

of melanin in the hair shaft. It should be differentiated from other silvery gray hair syndromes. Prognosis is grave. Treatment is bone marrow transplantation.

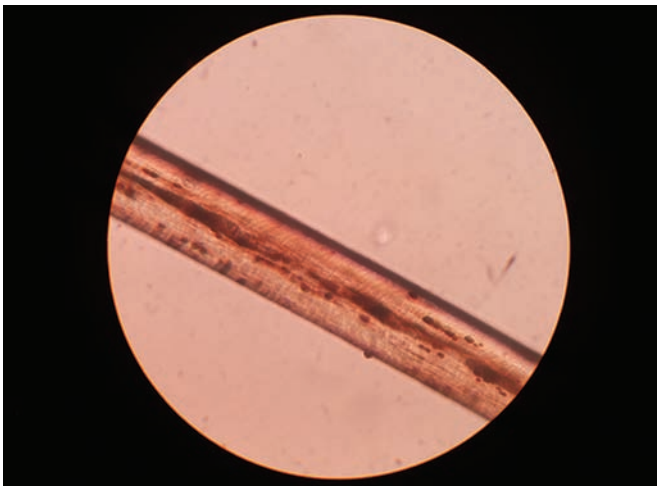

Fig. 16.13B Griscelli syndrome, light microscopy of hair

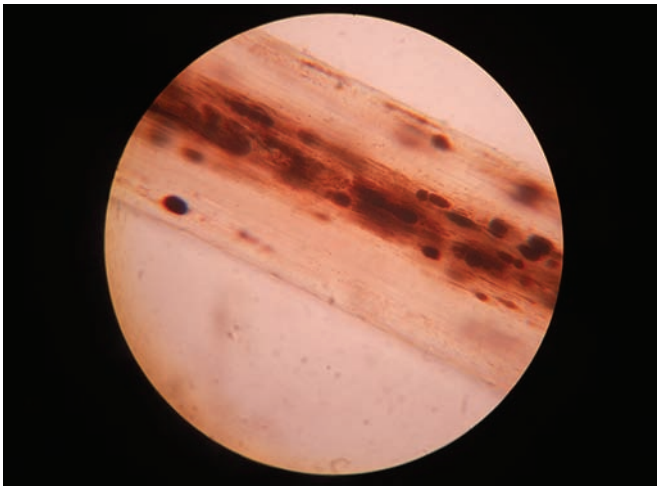

Fig. 16.13C Higher magnification

CHEDIAK-HIGASHI SYNDROME (Figs 16.14 to 16.14C)

Chediak-Higashi syndrome (CHS) is characterized by silvery sheen to hair and skin. There is intense hyperpigmentation of acral areas especially on sun exposed areas like ears and nose. Other features are photophobia, iris pigmentation, strabismus, recurrent infections of skin and lungs, hepatosplenomegaly, lymphadenopathy, pancytopenia, jaundice and neurological detoriation. Peripheral smear shows giant granules within phagocytes. Hair shaft examination shows small melanin pigment arranged in a regular pattern like a band inside the hair shaft. This disorder is fatal. Children usually die by 6 years of age. Treatment of choice is bone marrow transplantation.

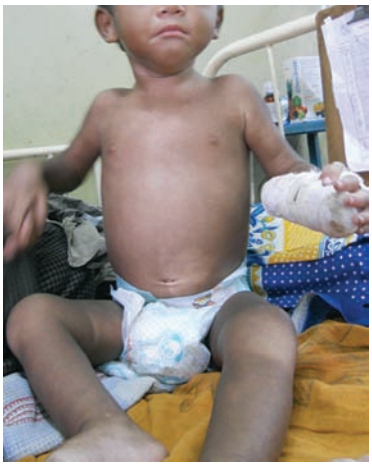

Fig. 16.14 Chediak-Higashi syndrome

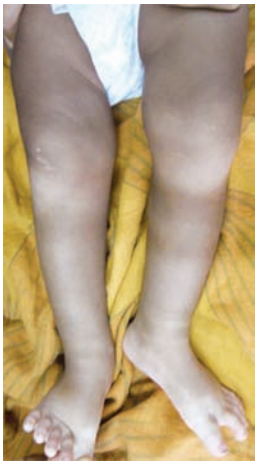

Fig. 16.14A Chediak-Higashi syndrome, note color of skin over thigh and legs

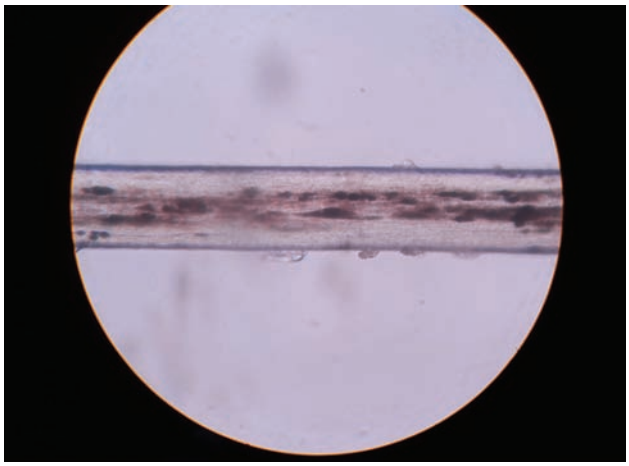

Fig. 16.14B Chediak-Higashi syndrome, light microscopy of hairs

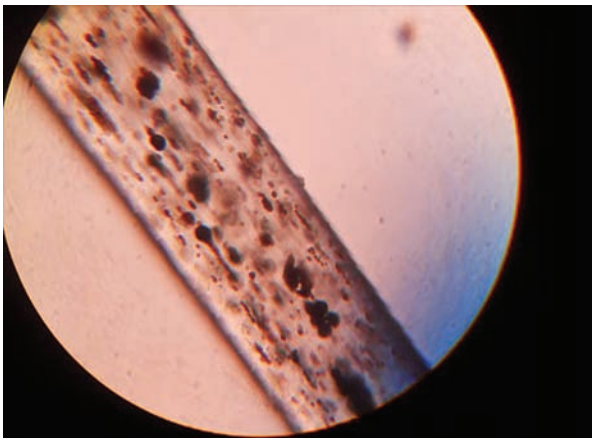

Fig. 16.14C Higher magnification

Elejalde Syndrome

Elejalde syndrome is characterized by silvery gray hair with severe neurological involvement, seizures, hypotonia and ocular abnormalities. There is no immunodeficiency or hemophagocytosis in this condition. Light microscopy of hair shaft shows large, irregularly distributed melanin pigments resembling Griscelli syndrome. It is now thought that Griscelli type 3 could be elejalde syndrome. Management is bone marrow transplantation.

CUTIS VERTICES GYRATA (Figs 16.14D and E)

This entity implies hypertrophy and folds or furrow on the scalp usually in an anteroposterior direction. There is a definite male preponderance with onset before 30 years in most of the cases. Vertex is the most common

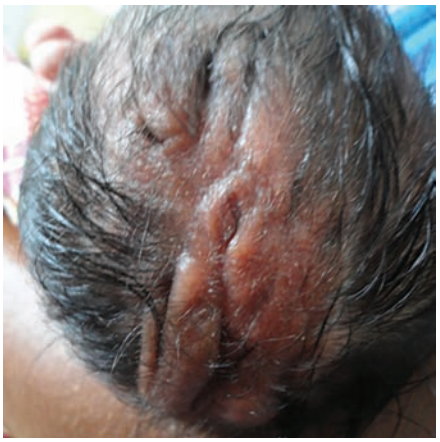

Fig. 16.14D Cutis vertices gyrata

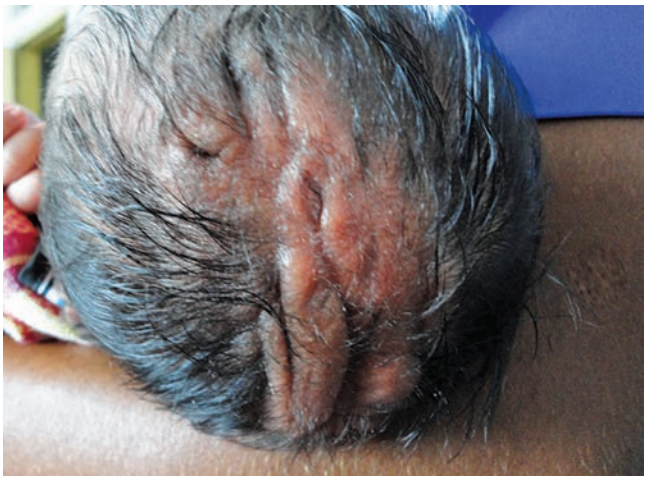

Fig. 16.14E Close-up

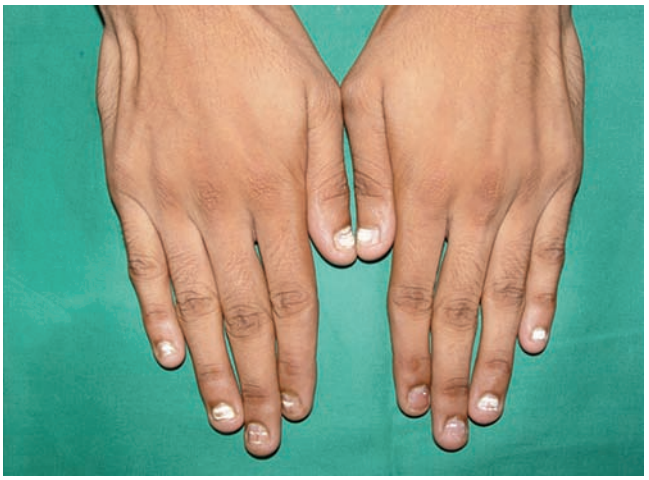

Fig. 16.15 Punctate leukonychia over multiple nails

site to get involved with normal hair. Number of folds varies from 2 to 20. Biopsy reveals normal or increased collagen with hypertrophy of sebaceous glands. Both X-ray and CT scan are almost equally effective to detect this pathological entity. Surgical excision followed by grafting or scalp reduction can be tried in severe cases or in case of facial involvement. Causes of cutis vertices gyrata can be summarized as below:

1. Idiopathic
2. Hereditary-familial, pachydermoperiostosis, Ehlers-Danlos syndrome, Turner syndrome, Klinefelter syndrome, tuberous sclerosis, Plexiform neurofibromatosis, associated with mental retardation, Fragile X syndrome, insulin resistance syndrome
3. Traumatic
4. Inflammation-chronic folliculitis, dissecting cellulitis of scalp
5. Endocrinal-myxedema, acromegaly
6. Neoplastic-Cerebriform congenital melanocytic nevus
7. Others-syphilis, amyloidosis

PUNCTATE LEUKONYCHIA (Figs 16.15 to 16.17)

It is a condition mostly seen in children. The cause is repeated minor trauma to the nail matrix causing disturbance in nail matrix keratinization. The incomplete keratinization of the nail matrix leads to parakeratotic formation of parakeratotic cells in the matrix which appear as white spots in the nail plates. The condition usually involve multiple finger nails with a variable number of white opaque spots which tend to disappear before reaching the distal margin. The condition is often believed to be due to calcium deficiency. However, there is no scientific documentation for this. Punctate leukonychia spontaneously regresses by avoiding trauma.

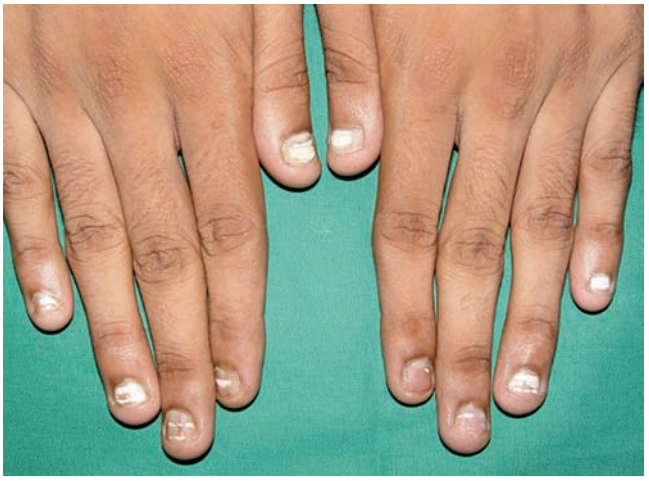

Fig. 16.16 Punctate leukonychia,close-up

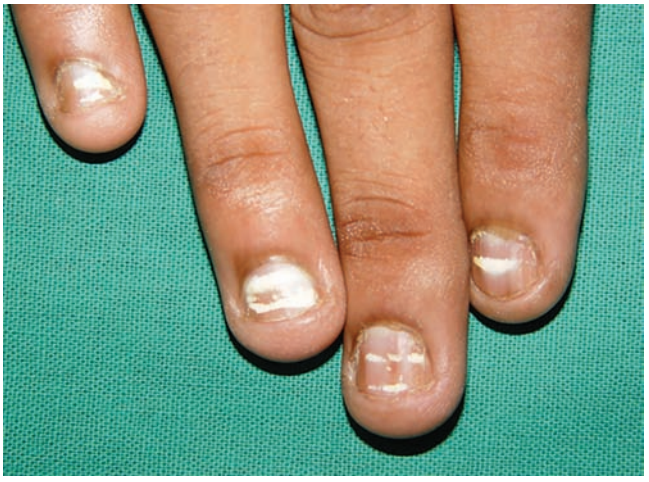

Fig. 16.17 Close-up of punctate leukonychia

"Twenty years from now you will be more disappointed by the things that you didn't do than by the ones you did do."—Mark Twain

TOTAL LEUKONYCHIA (Fig. 16.18)

White discoloration of the nails may be either because of defect in the nail plate or nail bed. The nail plate defect causing total leukonychia is an inherited condition in which all nails become porcelain white. In subtotal leukonychia, the proximal 2/3rd of the nails are white and the distal part remains pink.

Nailbed pallor may result from anemia, edema or vascular impairment.

YELLOW NAIL SYNDROME (Fig. 16.18A)

It is a distinct entity characterized by yellow thickened nail, lymphedema and respiratory disorders. Nails grow very slowly (less than 0.2 mm/wk). Other important nail changes are absent lunulae, absent cuticle and increased curvature both transversely and longitudinally. Adults are more commonly affected and involvement of all of the nails is a common feature. Among the respiratory disorders pleural effusion, pulmonary tuberculosis, chronic sinusitis and chronic bronchitis are worth mentioning. Other important systemic associations are malignancies such as mycosis fungoides, autoimmune diseases such as rheumatoid arthritis, drugs like D-penicillamine therapy and immunodeficiency state. Treatment of underlying respiratory disease or malignancy results in resolution of nail changes though spontaneous clearance is also reported. Different treatment modalities such as oral zinc, oral and topical vitamin E, oral antifungal have shown encouraging results.

Fig. 16.18 Total leukonychia

BEAU'S LINE (FIG. 16.18B)

These are the transverse depression in the nail plate which begins at the cuticle and progress distally as the nail grows out. Beau's line denotes temporary arrest of the growth of nail matrix and analogous to pohl-Pinkus line in the hair. Commonly found bilaterally, though unilateral involvement is also reported. Involvement of thumb and great toenail is most severe. Time passed since insult can be decided from the distance between the leading edge of the depression and proximal nail fold. Beau's line of local cause can be suspected if margin of the same corresponds with proximal nail fold; where as margin following lunulae is suggestive of systemic cause. Important local causes are truma, paronychia and eczema. Among the systemic causes childbirth, mumps, measles, pneumonia, zinc deficiency, Kawasaki disease, renal failure and drugs such as retinoids.

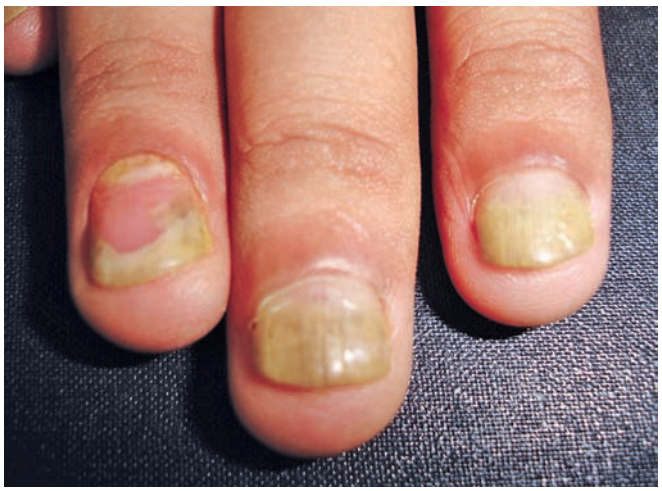

Fig. 16.18A Yellow nails

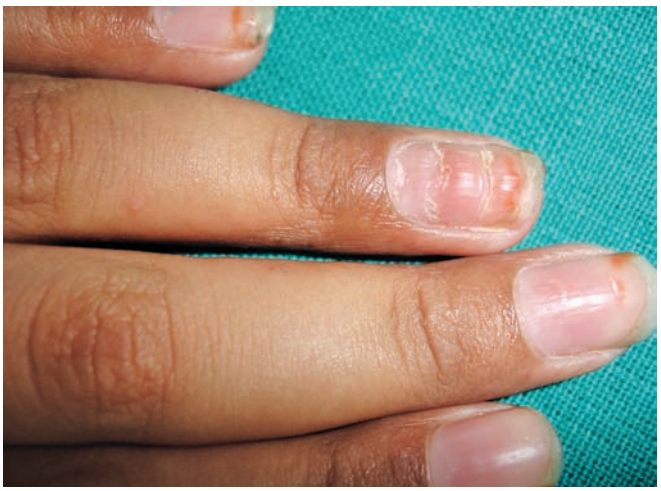

Fig. 16.18B Beau's line

"The difference between a successful person and others is not a lack of strength, not a lack of knowledge, but rather a lack of will."—Vince Lombardi

KOILONYCHIA

This entity can be described as loss of normal contour of nail; nail becomes either flat or concave with everted edge. Thinning of nail is not a rule; it may be thickened, softened or even normal also. Finger nail affection is more frequent than toenail. A bulk number of cases are idiopathic. Familial cases are also reported. Some of the inherited disorder associations are focal dermal dysplasia, Incontinentia pigmenti, LEOPARD syndrome and monilethrix. Koilonychia is common in sherpas and tibetians due to chronic cold exposure and hypoxemia. Dermatological causes such as lichen planus, psoriasis, raynaud's phenomenon, acanthosis nigricans and alopecia areata should be kept in mind. Koilonychia is a important marker of iron deficiency anemia even before the appearance of clinical and biochemical sign of anemia. Other systemic associations are hemochromatosis, ischemic heart disease, thyroid disorders, acromegaly, malnutrition, pellagra and porphyria.

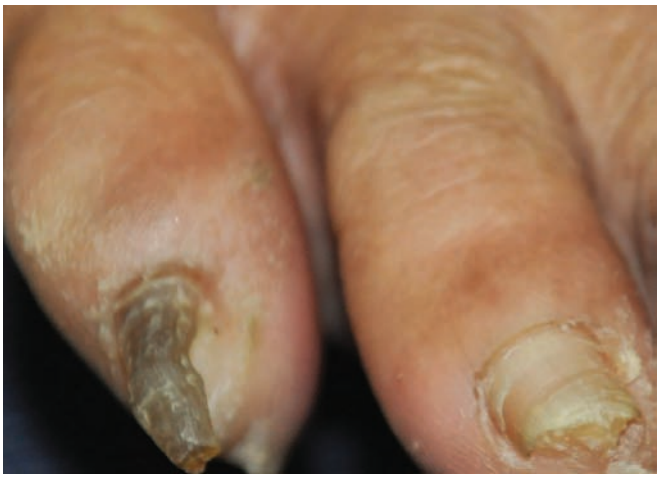

Fig. 16.18B(ii) Onychogryphosis, close-up

ONYCHOGRYPHOSIS [Figs 16.18B(i) and 16.18B(ii)]

The term onychogryphosis denotes excessive thickening and increased curvature of nail plate. This condition is most commonly seen in elderly and great toenail is most frequently affected. Neglect in terms of lack of cutting nail for long period is supposed to be most common cause. Other important causes are trauma, onychomycosis, peripheral vascular disease, psoriasis, Darrier's disease, pachynoychia congenita, ectodermal dysplasia, atopic erythroderma and neurological disorders.

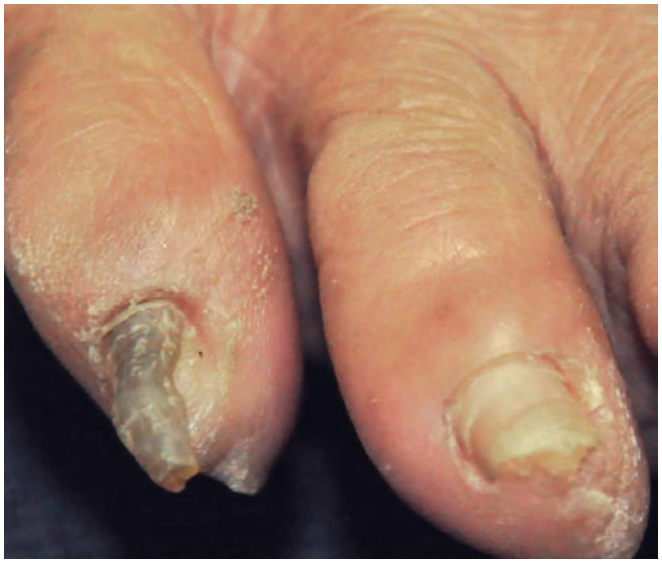

Fig. 16.18B(i) Onychogryphosis of little toe

MEDIAN NAIL DYSTROPHY (DYSTROPHIA UNGUIS MEDIANA CANALIFORMIS) (Figs 16.18C and D)

This entity represents a midline canal or split in the nail plate which starts from the cuticle and extends to the growing free edge. Lateral extensions of the split towards the edge of the nail resemble inverted fir tree. This rare entity usually affects thumb nails symmetrically. Most probable underlying cause is damage to nail matrix. Though several causes have been reported starting from familial, tumor growth like papilloma of matrix, drug like isotretinoin; but main cause is repeated trauma. Use of blackberry type device is another drawback of civilization causing this type of nail deformity.

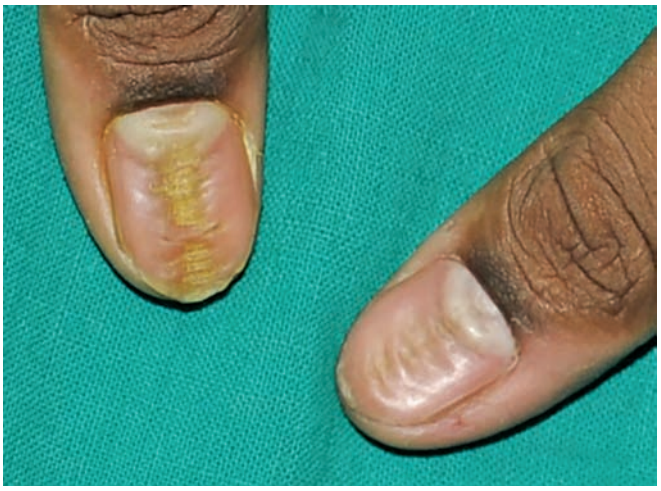

Fig. 16.18C Median nail dystrophy

"It is our choices, that show what we truly are, far more than our abilities."—JK Rowling

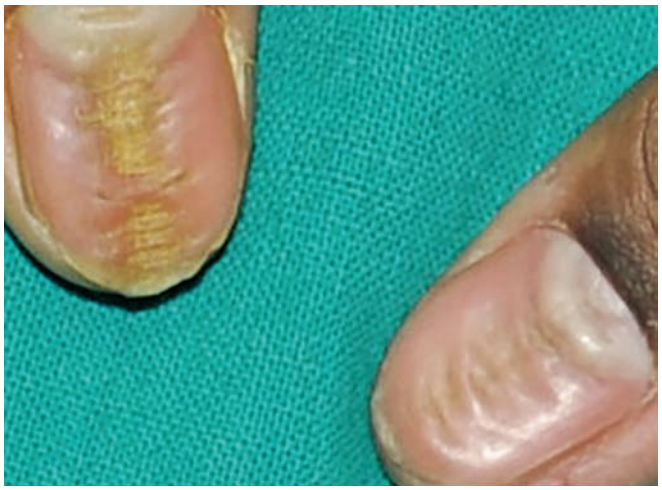

Fig. 16.18D Same patient, close-up

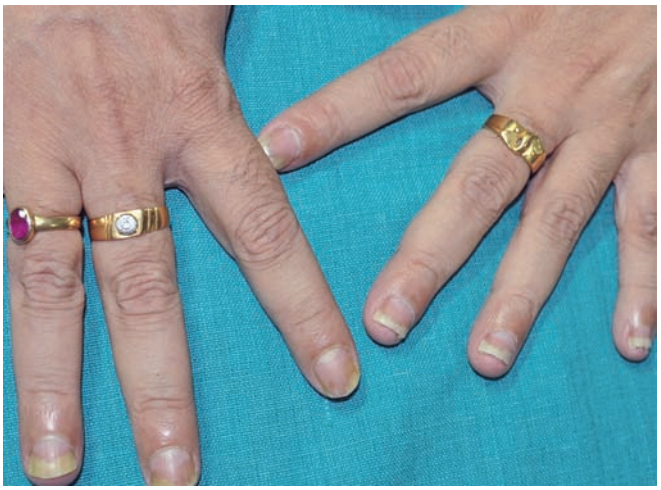

Fig. 16.18E(i) Onycholysis, multiple nails

ONYCHOLYSIS (Figs 16.18E(i) and E(ii)

Onycholysis is the separation of nail plate from nail bed. Usually it starts from distal free edge and progress proximally; where as proximal onycholysis (onychomadesis) also occurs. Important local causes are occupational trauma, chronic exposure to irritants, and untreated hand dermatitis with secondary infection such as *Candida* and *Pseudomonas*. Cosmetic procedures such as manicure; use of nail polish base coat, nail hardners and artificial nail make women more susceptible. Vaginal candidiasis is a important source of transfer of infection to nail causing onycholysis. Other worth mentioning dermatological causes are psoriasis, lichen planus, atopic dermatitis, pemphigus vulgaris, leprosy and syphilis. Among the systemic causes hyperthyroidism, anemia, scleroderma, porphyria and peripheral vascular disease should be kept in mind. Photo-onycholysis may occur following therapy with tetracycline, psoralen, chloramphenicol, fluroquinolones and thiazides; where as chemotherapeutic drugs and retinoids cause non photo induced onycholysis.

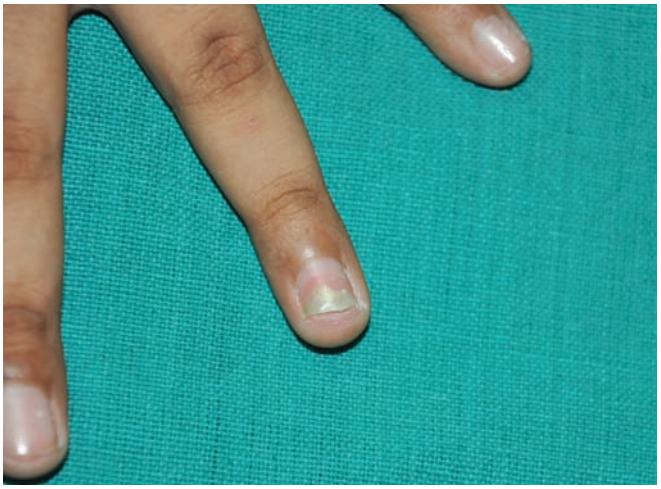

Fig. 16.18E(ii) Onycholysis, close-up

INGROWING TOENAIL (ONYCHOCRYPTOSIS) (Figs 16.18F to H)

Ingrowing toenail is characterized by lateral growth followed by embedding of nail edge into the nail fold leading to pain, inflammation and granulation tissue formation. Ingrowing toenail is rare in elderly; it mainly affects hallux of young adults with congenital malalignment of great toenail. Predisposing factors are trauma, ill fitting shoes and aggressive or improper trimming of lateral edge of nail. Isotretinoin or indinavir induced periungual granulation tissue should be kept in differential diagnosis. Prevention through patient education is an important aspect of management. Other treatment modalities are soaking of foot in warm soap water,

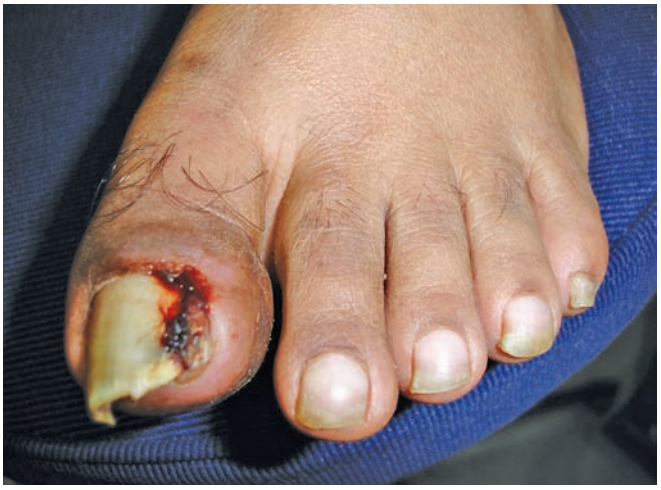

Fig. 16.18F Ingrowing toenail

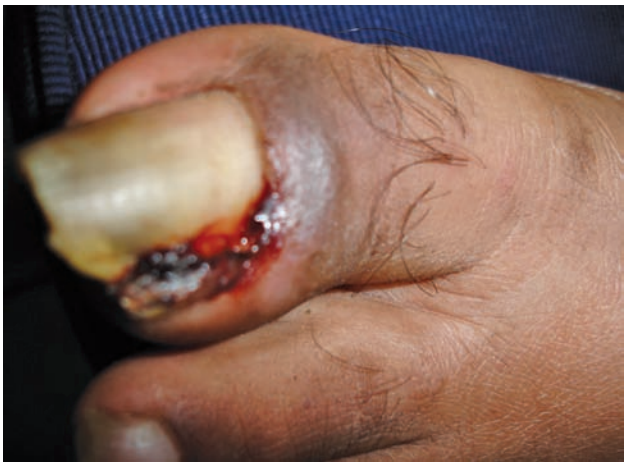

Fig. 16.18G Close-up

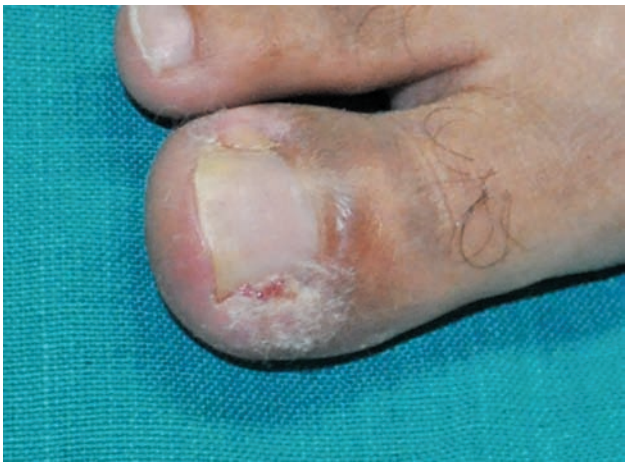

Fig. 16.18H Ingrowing toenail, different presentation

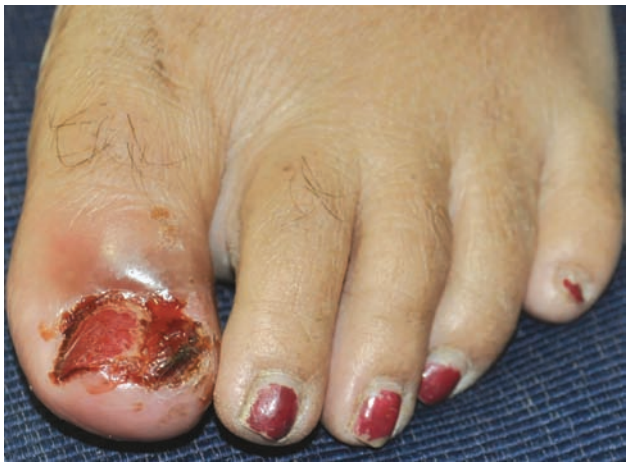

Fig. 16.18G(i) Ingrowing toenail with gross inflammation of posterior nail fold

lifting of lateral nail plate with cotton or dental floss, surgical removal of lateral portion of nail plate. Chemical, surgical or laser ablation of nail matrix prevent recurrences.

HABIT TIC DYSTROPHY (Figs 16.18I and J)

This entity represents one of the self induced nail abnormality due to nervous habit of pushing back the mid portion of the cuticle of the thumb with the index finger of the affected hand. Thumb nail plate shows multiple transverse groove and central longitudinal depression. Median nail dystrophy of Haller is considered to be a variant of this deformity.

PTERYGIUM UNGUIS (Fig. 16.18K)

The term 'pterigion' literally denotes wing. This defect occurs as a result of focal destruction of nail matrix which leads

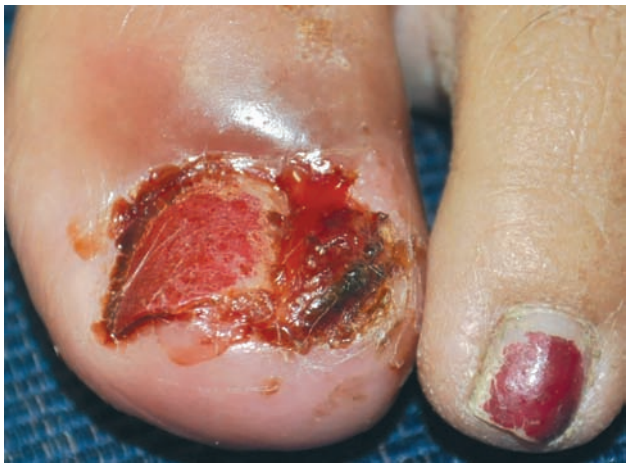

Fig. 16.18G(ii) Same patient, close-up

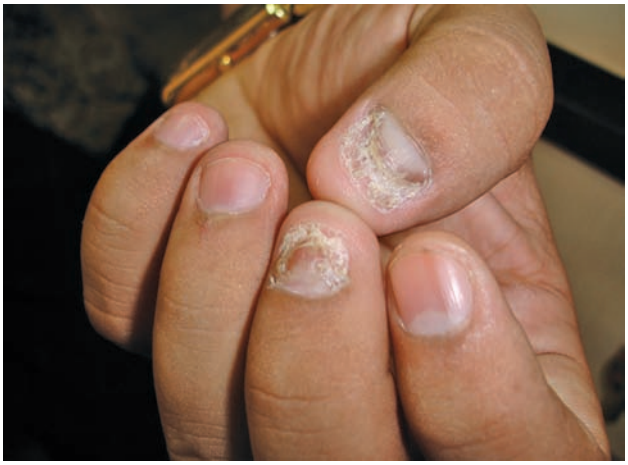

Fig. 16.18I Habit tic dystrophy of nail

"The successful warrior is the average man, with laser-like focus."—Bruce Lee

Fig. 16.18J Habit tic nail dystrophy (demonstration)

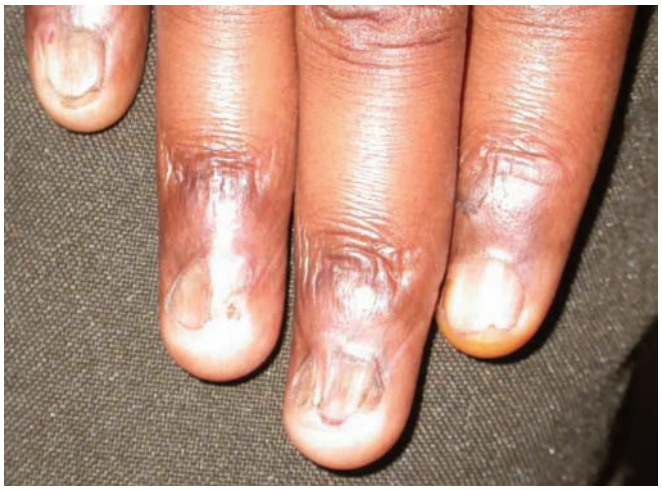

Fig. 16.18K Pterygium unguis

to attachment of proximal nail fold epithelium to nail bed epithelium; ultimately both of the epithelia grow out distally. Finger nails are affected more commonly than toenail. Though classically seen in lichen planus, other important causes are leprosy, toxic epidermal necrolysis, pemphigus foliaceous, cicatricial pemphigoid, sarcoidosis, porokeratosis and peripheral vascular disease. In this regard another term should be highlighted i.e., pterygium inversum unguis. It is a different entity where distal portion of nail bed gets adhered to ventral surface of nail plate. Though can occur following repeated trauma such as typing, manicuring; most common acquired causes are systemic sclerosis and systemic lupus erythematosus.

MELANONYCHIA STRIATA (Figs 16.18L and M)

This nail discoloration represents linear streaks of black or brown pigmentation affecting nails of one or more digits. Melanonychia results from either activation or hyperplasia of normally quiescent melanocytes. Most common cause is racial mainly in blacks followed by drugs such as minocycline, zidovudin and antimalarials. Other important causes are trauma; post inflammatory hyperpigmentation following lichen planus, onychomycosis, vitamin B_{12} and folic acid deficiency, hyperthyroidism, cushing syndrome and nonmelanocytic tumor of nail apparatus such as onychomatricoma and Bowen's disease. Longitudinal melanonychia of a single nail should raise suspicion of nail matrix tumor, most importantly malignant melanoma. Signs suggestive of malignant melanoma are triangular shape (broader proximally), blurred lateral border of the band, heterogenecity in pigmentation and pigmentation of nail fold and finger tip due to radial growth of subungual melanoma (Hutchison's sign). Longitudinal melanonychia in children

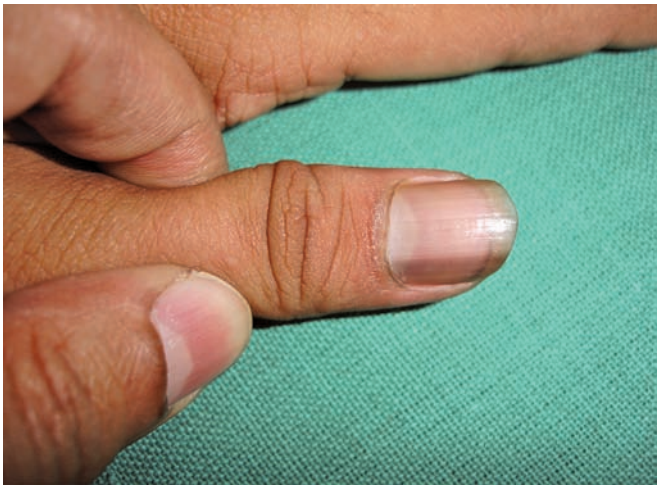

Fig. 16.18L Melanonychia striata

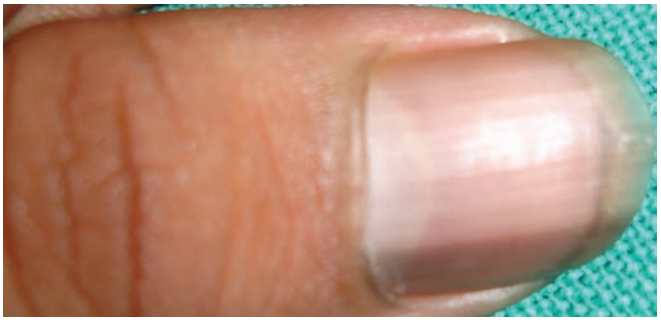

Fig. 16.18M Close-up

"Take up one idea. Make that one idea your life – think of it, dream of it, live on that idea. Let the brain, muscles, nerves, every part of your body, be full of that idea, and just leave every other idea alone. This is the way to success."—Swami Vivekananda

is usually benign in nature. They should be followed up and biopsy should be ordered only when there is widening, darkening of the lesion or development of other signs suggesting malignant transformation.

MUEHRCKE'S NAILS (Fig. 16.19)

Present as paired white bands parallel to lunula in the nail bed with pink discoloration between two white lines. They are commonly associated with hypoalbuminemia. The nail changes may disappear on correction of hypoalbuminemia, if associated.

TWENTY NAIL DYSTROPHY (TND) (Figs 16.20 and 16.20A)

Also known as trachyonychia, is a self-limiting spontaneously occurring idiopathic condition of the nails involving all 20 nails (fingers and toes). It is characterized by ridging, thickening increased curvature, discoloration of the nail plates without any changes in the nail folds or cuticle. Nail biopsy has revealed eczematous change in some nail matrix and psoriasiform in others. The condition classically occurs in childhood and a significant number of cases resolve spontaneously. Counseling forms the cornerstone of management.

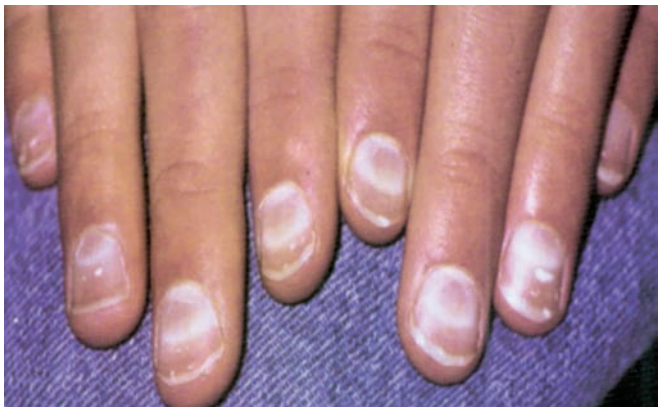

Fig. 16.19 White bands of Muehrcke's nails

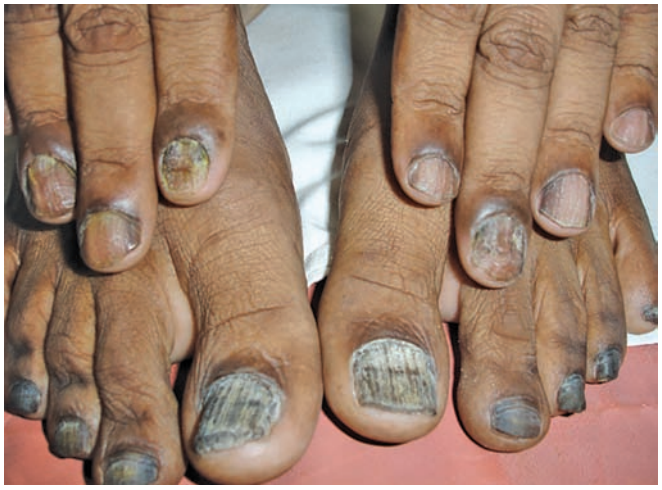

Fig. 16.20 Thickening, stunted growth dystrophy of nails in TND

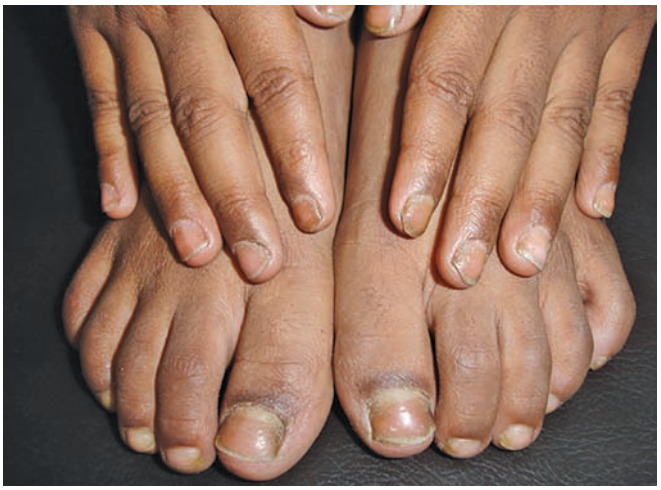

Fig. 16.20A Closed-up of TND

NAIL SHEDDING OR ONYCHOMADESIS (Figs 16.21 to 16.23)

Like the shedding of skin because of necrolysis, there is nail shedding also in Stevens-Johnson syndrome, hand foot and mouth disease and a host of other conditions where it may be periodical. It starts as formation of a horizontal depression over the nail plate called 'Beau's line' followed by gradual separation of nail plate and shedding.

It may take 3–6 months for the fingernails and 6–12 months for toenails to grow to their full size. No additional treatment for growth of nails is required.

ONYCHOMYCOSIS (Figs 16.24 and 16.25)

Onychomycosis is a broad term encompassing all fungal infections of the nail. It is much less common in pediatric population compared to adults but it is possible that the disease is under recognized and under reported. Cosmetic disfigurement is often the reason for seeking treatment since the nails appear dry, lusterless with debris beneath the nail plate and pain due to pressure on the underlying nail bed from the deformed nail. The most common organism in *Trichophyton rubrum*. Candidal onychomycosis can also occur in neonates and infants if the infection is acquired intrauterine or vaginally.

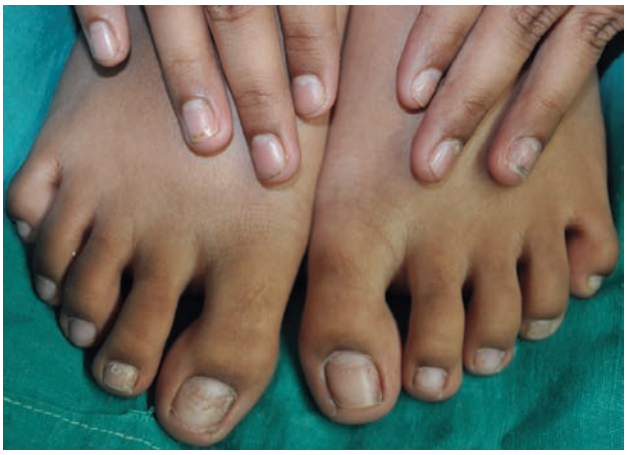

Fig. 16.21 Nail shedding in SJS

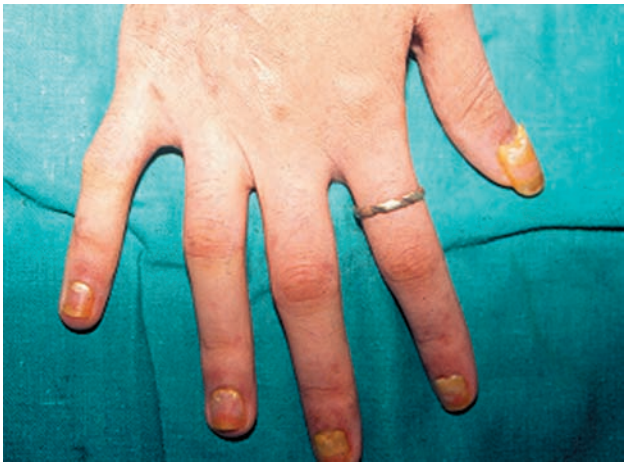

Fig. 16.22 Close-up of nail shedding in SJS

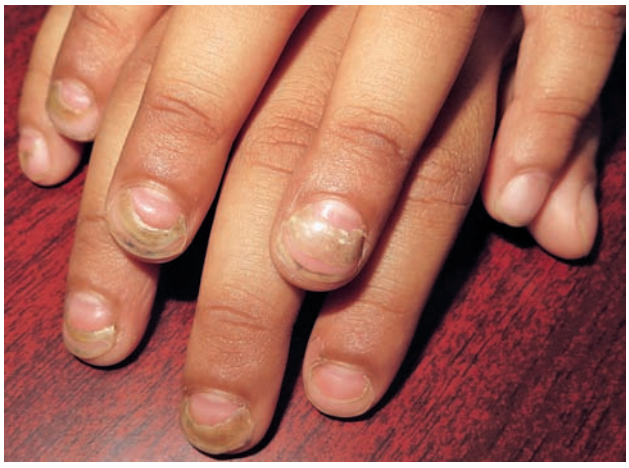

Fig. 16.23 Nail shedding (onychomadesis), close-up

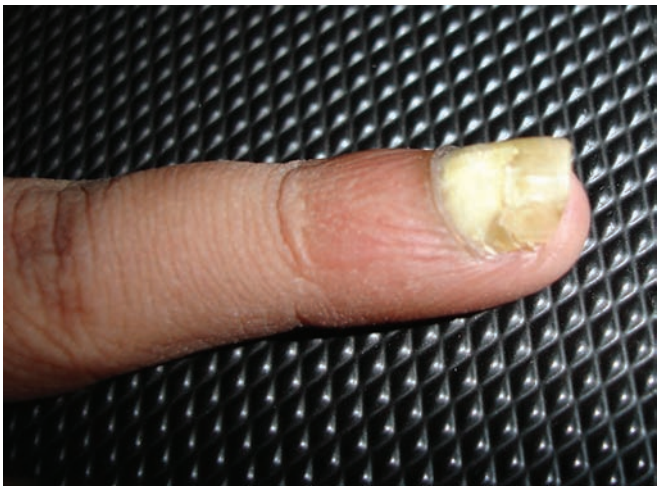

Fig. 16.24 White superficial onychomycosis

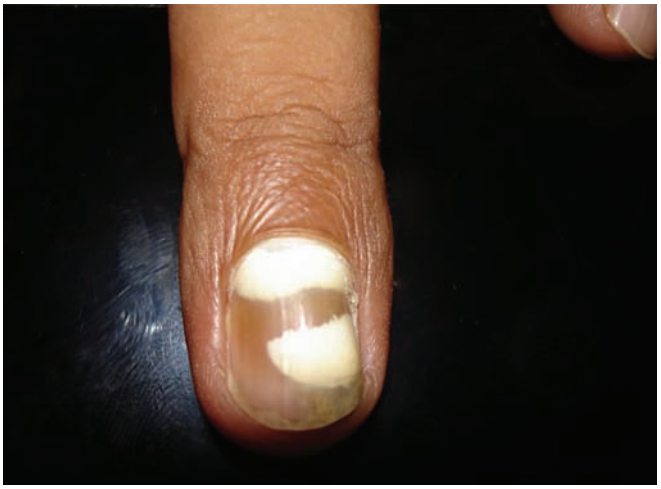

Fig. 16.25 Close-up

Some predisposing factors include dermatophytic infection in the family, Down's syndrome, diabetes mellitus and immunosuppression. Clinically the toenails are more commonly involved and the presentation is asymmetrical. Associated findings of tinea pedis and tinea corporis may be there. The nails are dry, thickened, scaly and lusterless.

Onychomycosis must be differentiated from psoriasis, lichen planus, trachyonychia and pachyonychia congenita. A KOH preparation usually establishes the diagnosis and culture will help to determine the species. Treatment can be tried with systemic and topical antifungals. Manual debridement and filing of nails can be done to remove pressure points causing pain.

17

Acne, Rosacea and Hidradenitis Suppurativa

Acne is a chronic infection and inflammation of pilosebaceous apparatus which manifests as comedones and inflammatory papules, nodules and pustules.

VARIOUS TYPES OF ACNE

- Neonatal acne
- Infantile acne
- Juvenile acne
- Senile acne
- *Occupational acne*
  - Chloracne
  - Chemical acne
- Mechanical acne
- Acne excoriee des Jeunes Filles
- Acne conglobata
- Acne fulminans
- Pyoderma faciale
- Acne with solid facial edema
- PAPA syndrome
- SAPHO syndrome
- Acne with associated endocrinological abnormalities: polycystic ovarian disease and congenital adrenal hyperplasia
- *Acneiform eruptions:*
  - Steroid folliculitis
  - Drug induced acne
  - Gram-negative folliculitis
  - Radiation acne
  - Tropical acne
  - Acne estivalis
  - Pseudoacne of nasal crease
  - Apert syndrome.

ACNE VULGARIS (Figs 17.1 and 17.2E)

Acne vulgaris (vulgaris means common) is basically a disease of oily skin which manifests for the first time in adolescence. Faulty keratinization of pilosebaceous duct, infection by *Corynebacterium Propionibacterium acnes* and increased androgen hormonal activity are incriminated in the pathogenesis of acne. Majority of lesions are seen over face and to some extent over back and upper arms. Lesions are in the forms of comedo (open or black and closed or white), inflammatory erythematous papules, nodules and pustules. In very severe cases big cysts, abscess or inter-communicating sinus tracts can be seen. The lesions heal with ice peck scars or pox-like scars. However, scarring is more common when the lesions are fiddled with. Large hypertrophic scars are seen in nodulocystic lesions. Patients of acne often have a oily skin and seborrhea and increased dandruff due to colonization of the scalp by *Pityrosporum* yeast.

Management

The management of acne vulgaris is divided into topical therapy, systemic therapy, acne surgery and counseling. For topical treatment various antibacterial and anti-inflammatory

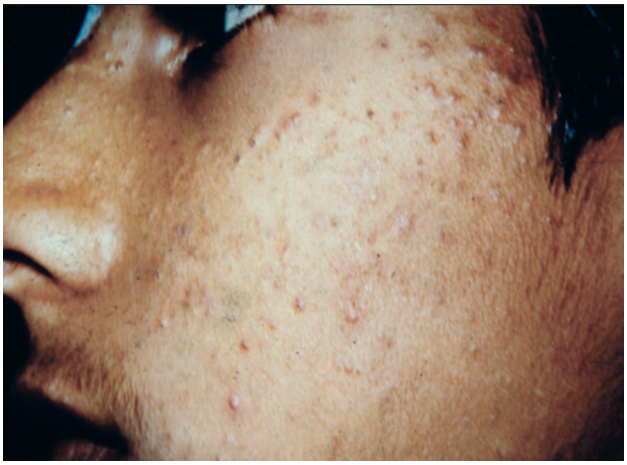

Fig. 17.1 Erythematous papules and comedones in AV

"In three words I can sum up everything I've learned about life: it goes on."—Robert Frost

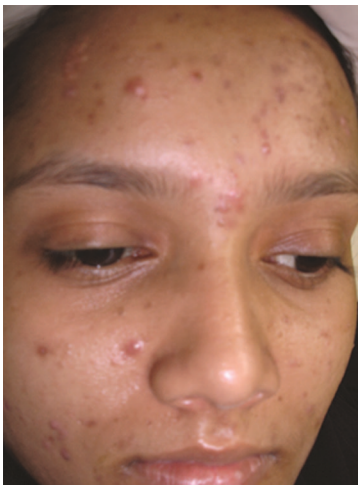

Fig. 17.2 Lesions of acne vulgaris in a young girl

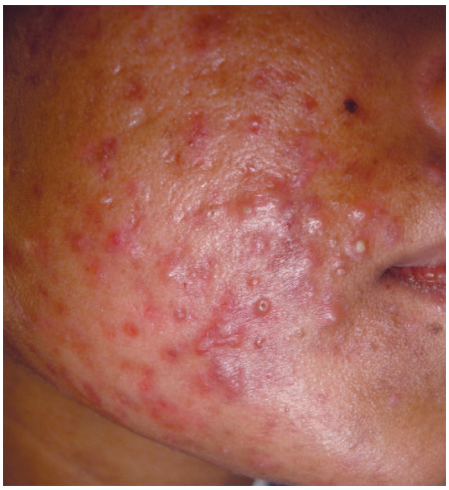

Fig. 17.2A Close up of severe acne

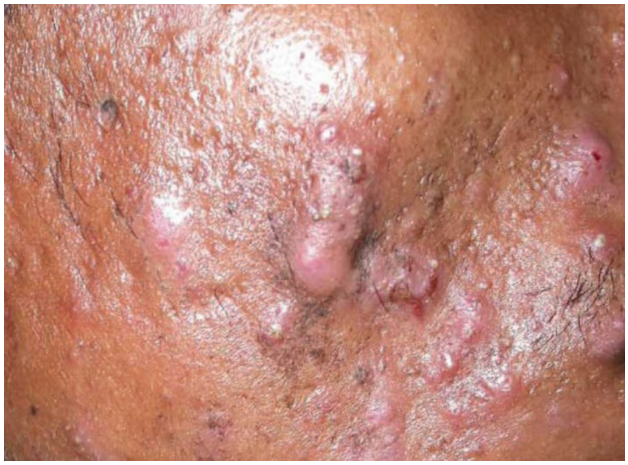

Fig. 17.2B Keloidal lesions in acne

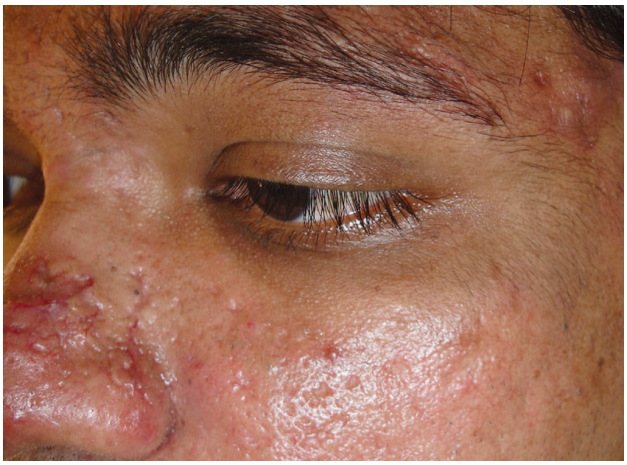

Fig. 17.2C Acne scars

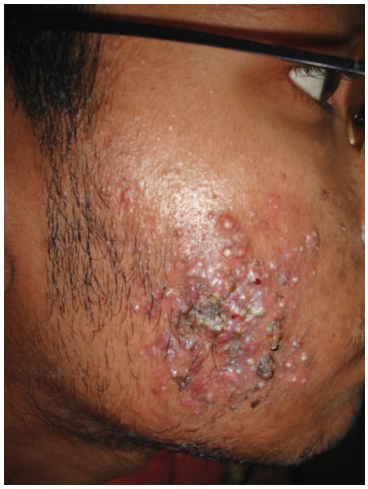

Fig. 17.2D Papules, nodules and pustules of severe acne

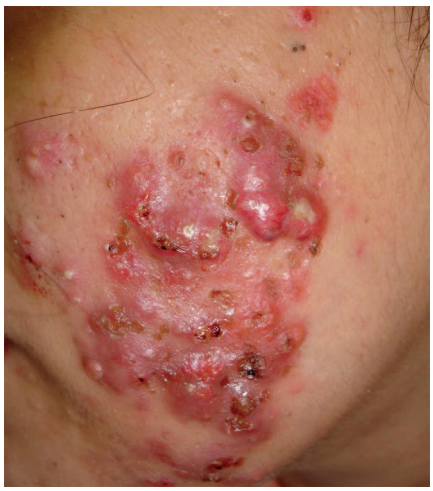

Fig. 17.2E Nodulocystic acne, close-up

"Imagination is more important than knowledge."—Albert Einstein

agents are benzoyl peroxide (2-10%), erythromycin (2%), clindamycin (1%) or recently available azelaic acid (10%, 20%). Various comedolytic agents are topical tretinoin (0.025%, 0.05%, 0.01%), adapalene (1%) or tazarotene (0.05%).

Various systemic drugs are used in moderate to severe acne. These are tetracycline (250–500 mg 6 hourly), doxycycline (100 mg daily) for 8–12 weeks. Erythromycin (250 mg 6 hourly), azithromycin (500 mg daily for 3 days every month) is also useful for long term suppression of inflammatory acne. A recent drug is isotretinoin, a vitamin A derivative. It is chosen for severe nodulocystic acne. It is given at a dose of 0.5–1 mg/kg/day for 3–4 months. However, this is better to be avoided in prepubertal boys and girls as it can retard growth by causing early closure of the epiphysis. In adolescent girls with evidence of excess androgen hormone, antiandrogens like cyproterone acetate and spironolactone may be useful. Comedo expression in the simplest surgical procedure by which both black and white comedones can be expressed out. The topical medications subsequently work better. For acne scars, various surgical techniques practised are punch elevation, microdermabrasion, dermabrasion, lifting of scars by injection of fillers, LASER surgery, etc. Since the adolescent boys and girls with acne suffers from lots of stress and strain, their counseling and reassurance is an important aspect of management of acne.

ACNEIFORM ERUPTIONS (Figs 17.3A to C)

Acneiform eruption is a specific subset of dermatosis that resembles acne vulgaris and is characterized by follicular papules and pustules. Drug induced acneiform eruption is typified by monomorphic pattern, lack of comedones, unusual location beyond the seborrheic areas, an unusual age of onset, resistance to conventional therapy and temporal relationship with drug therapy. The commonly implicated drugs are:

- *Hormones:*
  - Corticosteroids
  - Testosterone and anabolic steroid
  - Oral contraceptives
- *Halogens:*
  - Iodides in the form of radio-opaque contrast media, potassium iodide
  - Bromides (propantheline bromide)
- *Immunomodulators:* Cyclosporine, sirolimus
- *Neuropsychotherapeutic drugs:*
  - Antiepileptic medications
  - Lithium
  - Aripiprazole
  - Tricyclic antidepressants
  - Selective serotonin reuptake inhibitors
- *Anti-tubercular drugs:*
  - Isoniazid
  - Rifampicin
  - Ethionamide
- *Vitamins:* B_1, B_6, B_{12}

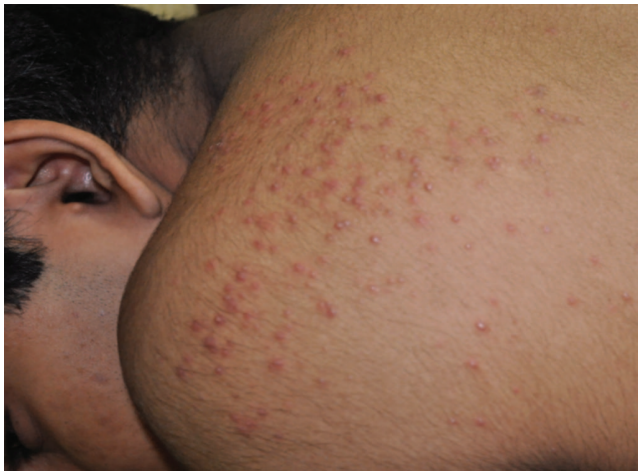

Fig. 17.3A Acneiform eruptions over back in an adolescent boy

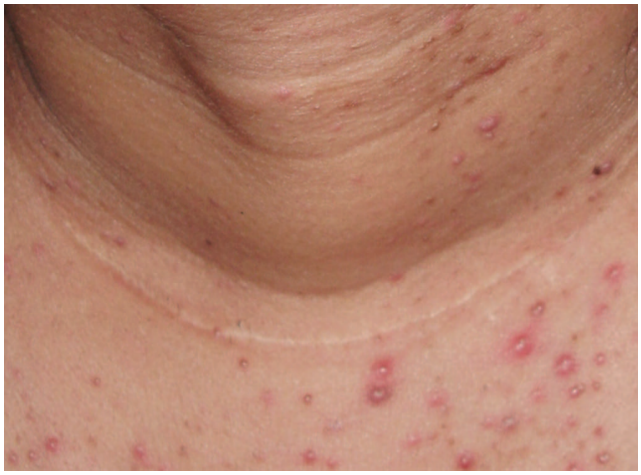

Fig. 17.3B Acneiform eruptions over chest

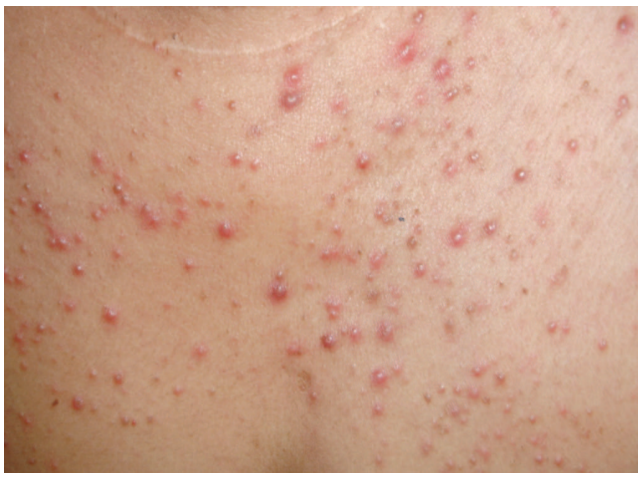

Fig. 17.3C Close-up of acneiform lesions

- *Cytostatic drugs:*
  - Actinomycin D
  - Azathioprine
  - Thiouracil
- Epidermal growth factor receptor inhibitors including monoclonal antibodies (cetuximab and panitumumab) and tyrosinase kinase inhibitors (Gefitinib)
- *Miscellaneous:*
  - Dantrolene
  - Quinidine
  - Antiretroviral therapy
  - PUVA therapy
- *Hormones:*
  - Corticosteroids
  - Testosterone and anabolic steroid
  - Oral contraceptives
- *Halogens:*
  - Iodides in the form of radio-opaque contrast media, potassium iodide
  - Bromides (propantheline bromide)
- *Immunomodulators:* Cyclosporine, sirolimus
- *Neuropsychotherapeutic drugs:*
  - Antiepileptic medications
  - Lithium
  - Aripiprazole
  - Tricyclic antidepressants
  - Selective serotonin reuptake inhibitors
- *Anti-tubercular drugs:*
  - Isoniazid
  - Rifampicin
  - Ethionamide
- *Vitamins:* B_1, B_6, B_{12}
- *Cytostatic drugs:*
  - Actinomycin D
  - Azathioprine
  - Thiouracil
- Epidermal growth factor receptor inhibitors including monoclonal antibodies (cetuximab and panitumumab) and tyrosinase kinase inhibitors (Gefitinib)
- *Miscellaneous:*
  - Dantrolene
  - Quinidine
  - Antiretroviral therapy
  - PUVA therapy.

Treatment

Apart from reassurance and counseling, no treatment is required for this condition.

PERIORAL DERMATITIS (Figs 17.3D and E)

Perioral dermatitis is characterized by papulo-pustular eruption over an erythematous base which classically involves perioral and periorbital region. As the disease evolves fine but prominent scaling becomes evident. Following improvement after few weeks erythema persists. Itching is not a prominent feature. Patients usually complain of uncomfortable burning sensation of the affected area. Lesions typically spare a narrow zone of approximate 5 mm around vermilion border of the lip in case of perioral involvement. Pathogenesis is not fully understood. Several factors have been implicated as causative agent starting from fluorinated topical steroid, fluorinated tooth paste, sunlight, cosmetics and infection with demodex and candida and oral contraceptive pills. But exact role of these etiological factors is yet to establish. Treatment is frustrating for the physician. Oral tetracycline or erythromycin, topical erythromycin, metronidazole or clindamycin can be tried. Topical tacrolimus ointment has some encouraging result. Importance of avoidance of aggravating factors cannot be underestimated.

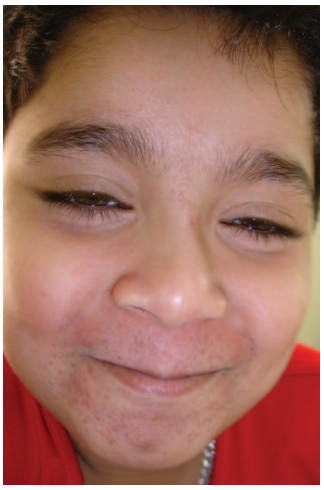

Fig. 17.3D Perioral dermatitis

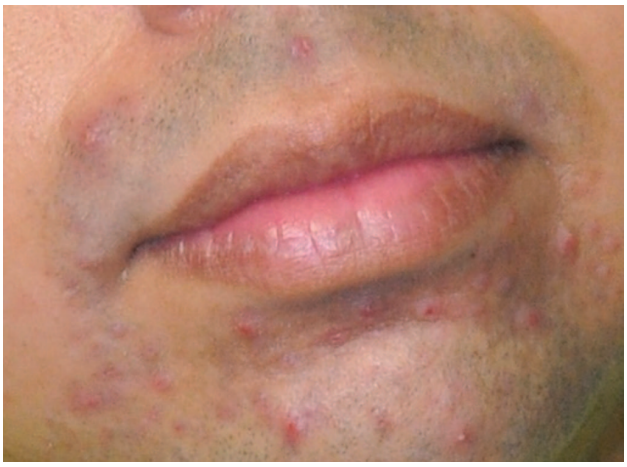

Fig. 17.3E Perioral dermatitis, note inflammatory acneiform papules

In this regard physicians should keep in mind that periorifical granulomatous dermatitis is a distinct entity from perioral dermatitis seen in prepubertal children. This entity clinically characterized by grouped papules in perioral, periorbital and perinasal area and histologically by sarcoidal granuloma. Treatment options are same as above.

ACNE EXCORIÉE (Figs 17.4A to D)

Acne excoriée is a form of acne most frequently seen in adolescent girls and often associated with various degrees of emotional stress. The condition can be occasionally seen in boys, but to a laser degree. Excoriating or squeezing of acne lesions may vary from mild irritation to severe scarring and occasional gross mutilation. In the mild forms, a simple explanation and local therapy may be all that is required to control the situation. In severe forms intensive psychiatric therapy may be required to control the underlying psychiatric basis of this disorder.

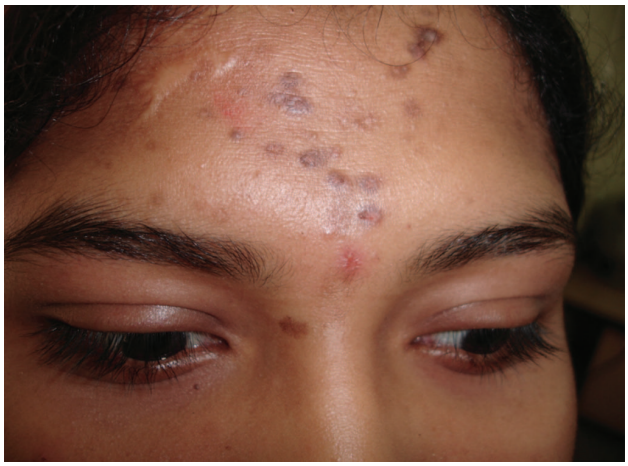

Fig. 17.4A Acne excoriée, note excoriated papules, post inflammatory hyperpigmentation

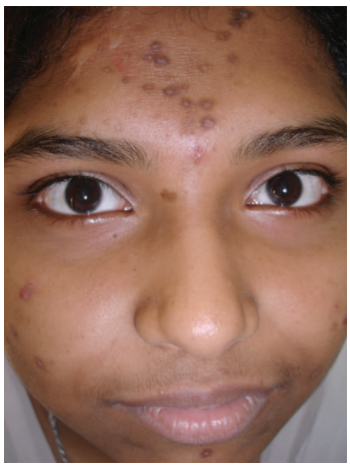

Fig. 17.4B Acne excoriée, note post inflammatory hyperpigmentation

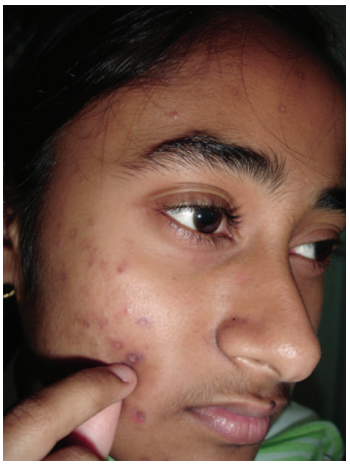

Fig. 17.4C Acne excoriée in a young girl

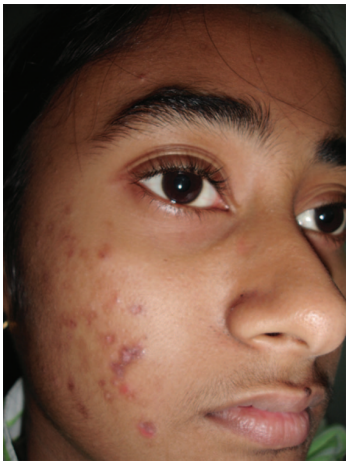

Fig. 17.4D Acne excoriée, note excoriation marks and hyperpigmentation

ACNE KELOIDALIS NUCHAE (Figs 17.4E and F)

It is a condition seen commonly in the African-American people of the younger age group, over the occipital scalp and posterior neck. It is characterized by follicular papules and pustules which later become keloidal. It is a misnomer as there is no relation to acne and histopathology does not reveal keloid formation. Unlike acne it is never characterized by the presence of comedones.

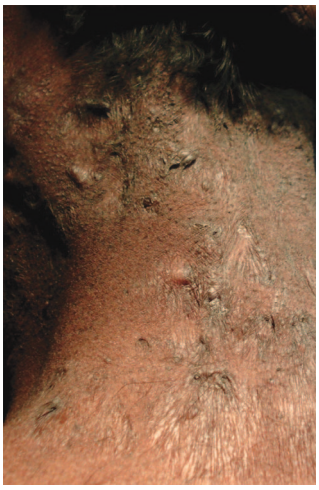

Fig. 17.4E Acne keloidalis nuchae

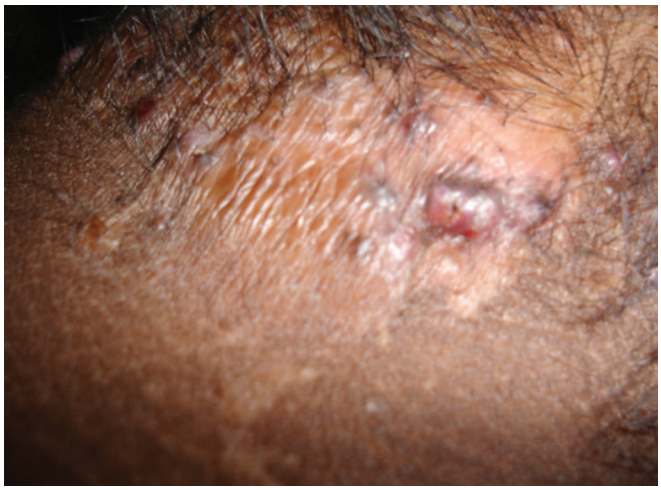

Fig. 17.4F Close-up

Etiopathogenesis

Although the etiology is not clear, it has been postulated to be a result of chronic irritation caused by the curly hair inciting an inflammatory response. Close shaving and chronic irritation has been implicated in the formation as well. Chronic low grade infection and an auto immune hypothesis have also been suggested.

It generally affects the younger age group ranging from 14 years to 25 years and has a male pre ponderance.

Cutaneous Examination

The lesions are characterized by skin colored to erythematous firm, dome shaped papules located in the occipital area or the nape of neck. Occasional pustules may also be seen. In the late stages there can be keloidal plaques arranged in a bandlike distribution. Scarring alopecia eventually ensues.

Differential Diagnosis

Folliculitis decalvans
Dissecting cellulitis of the scalp
Hidradenitis suppurativa
Acne conglobata.

Investigations

Bacterial culture is recommended in case of secondary infection.

Management

Intralesional triamcinolone acetonide, 5 fluorouracil and immunotherapy can be given.

Cryotherapy and radiotherapy has also proven to be successful.

Oral retinoids may also be tried.

ROSACEA (Figs 17.5 to 17.6A)

Rosacea is commonly confused with acne, a condition seen in late adolescence to adult age. The lesions are essentially the same as that of acne vulgaris but comedone formation is usually absent. Basic lesions are erythematous papules and pustules. Erythema is more pronounced as compared to acne vulgaris and pustules are plenty in number. Patients often complain of hot flushes over the face aggravated by hot drinks and hot and spicy food. Alcohol can aggravate the condition and photosensitivity is a usual feature. Localized lymphedema lead to formation of a bulbous swelling of the nose known as rhinophyma.

Treatment

Treatment of rosacea is basically two folds, topical and systemic. Topical metronidazole (0.75 to 1.5%) is a good anti-inflammatory and antibacterial agent. It is applied either in gel or cream form. Topical clindamycin (1%) and azelaic acid (10%) are also useful. Regular application of sunscreens with a SPF of 15 or a bit more should be emphasized as the condition may aggravate on exposure to sunlight. Lactocalamine application may also help for the same reason.

Various systemic agents useful for rosacea are tetracycline, doxycycline and metronidazole. The dose and durations is more or less same as in case of acne vulgaris. Various food and drinks are to be restricted as they can aggravate rosacea by

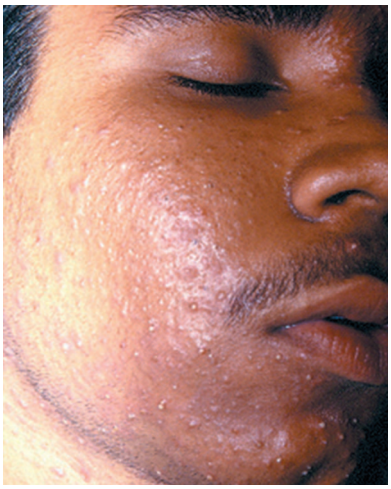

Fig. 17.5 Pustules and erythematous papules of rosacea over face in a boy aged 16 years

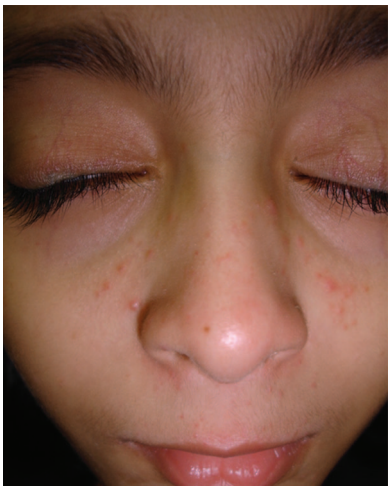

Fig. 17.5A Rosacea

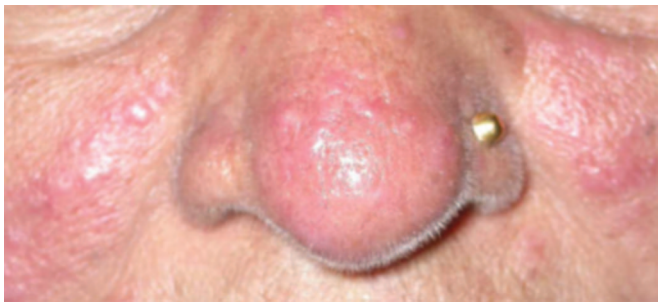

Fig. 17.5B Rosacea, note flushing and papules

causing vasodilatation. These are hot tea, coffee, hot food, cold drinks, tonics containing alcoholic beverages. Reassurance and counseling of the patients is extremely useful.

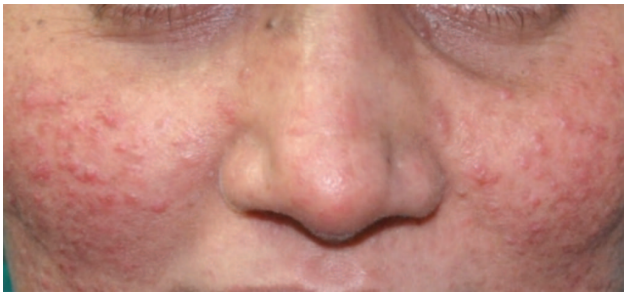

Fig. 17.6 Steroid induced rosacea (history of potent steroid application over face for many months)

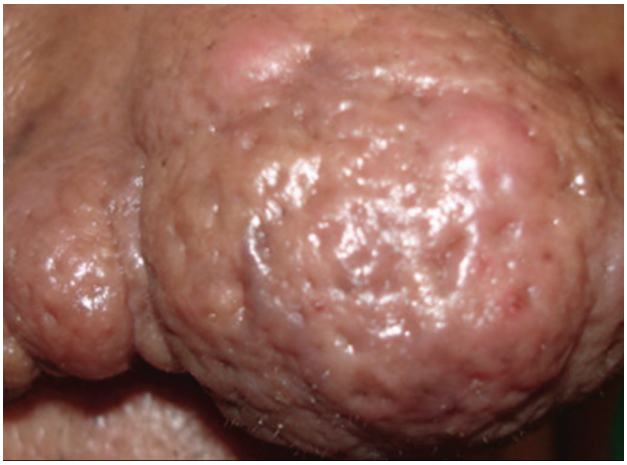

Fig. 17.6A Rhinophyma

Role of Rifaximin in Rosacea

Rosacea is characterized by persistent erythema of the convexities of face. Other manifestations are telangiectasia, flushing, erythematous papules and pustules and occasionally phymatous changes. Dysregulation of innate and adaptive immunity, neurovascular changes, chronic inflammation, and infections play an important role in the pathogenesis of rosacea. A new insight into the pathogenesis was suggested after the observation that there is an increased prevalence of small intestinal bacterial overgrowth (SIBO) in patients with rosacea than in controls. SIBO perpetuates rosacea by increasing the release of cytokines like TNF alpha, suppressing interleukin-17, and augmenting the TH 1-mediated immune response. This observation led to the use of a new therapeutic weapon for management of rosacea, Rifaximin. It is a semisynthetic antibiotic derived from a naturally occurring chemical Rifamycin which is produced by a bacterium called Streptomyces mediterrane. It was initially introduced for the treatment of traveller's diarrhea. It has demonstrated efficacy in irritable bowel syndrome and inflammatory bowel disease. Rifaximin acts in rosacea by suppressing gut flora.

"You only live once, but if you do it right, once is enough."—Mae West

When given in a dose of 400 mg three times daily for a period of 10–14 days, it led to significant improvement of skin lesions in patients with rosacea with coexistent SIBO. Common side effects associated are nausea, vomiting, bloating, urgency to defecate, fluid retention, allergic reaction and rarely pseudo-membranous colitis. Safety during pregnancy is yet to establish and it is not usually recommended in children below 12 years.

HIDRADENITIS SUPPURATIVA (Figs 17.7 to 17.8A)

Hidradenitis suppurativa is a chronic suppurative and cicatricial disease of the apocrine sweat glands in the axillary, inguinal and anogenital region. *Escherichia coli*, bacillus proteus, or *Pseudomonas aeruginosa* contaminates the flora.

In the early stages of hidradenitis suppurativa, sections of the skin show keratinous obstruction of the apocrine duct and the dilatation, and associated inflammatory changes. As the process becomes more chronic there is fibrosis and scarring with destruction of the apocrine gland, eccrine gland, and pilosebaceous apparatus. In the healing stage one sees deep tortuous invaginations of the epidermis filled with keratin and representing the sinus tracts.

Treatment

Optional therapy for hidradenitis suppurative depends on early and accurate diagnosis. Long-term antibiotics are to be given to control infection. Though different treatment modalities are available for this chronic, suppurative, cicatrical follicular disease, permanent cure is difficult. Treatment options can be broadly classified into medical and surgical. Among the topical measures maintenance of local hygine with antibacterial soap, chlorhexidine solution or bezoyl peroxide wash; use of topical aluminium chloride or botulinum toxin A if there is excessive sweating and prophylactic use of topical antibiotics such as clindamycin has some preventive value. Though the concept is well appreciated that HS is not a true infection and bacterial infection, if any is a secondary phenomenon; oral antibiotics are still considered to be important treatment modalities. Useful in this group are tetracyclines, sulfamethoxazole/trimethoprim, dapsone and clindamycin plus rifampicin combination.

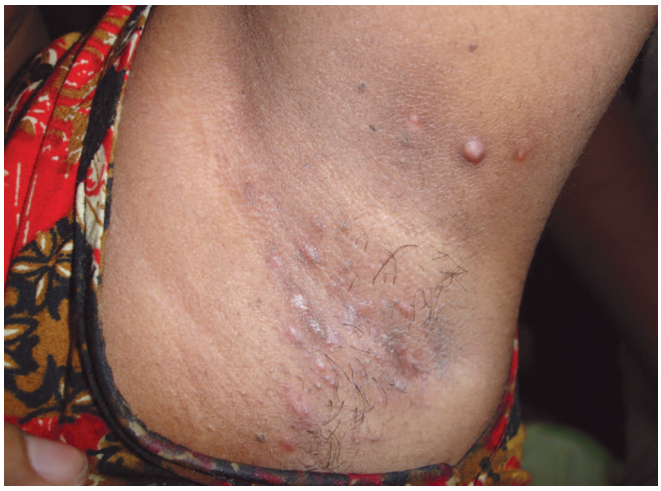

Fig. 17.7 Papules and nodules of hydradenitis suppurativa

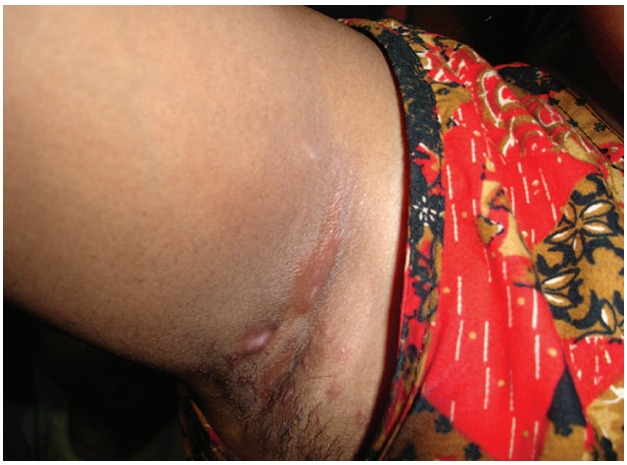

Fig. 17.8 Close-up of lesions

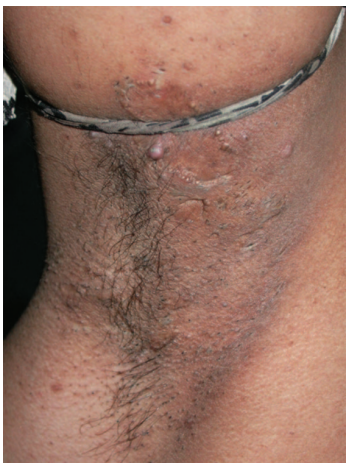

Fig. 17.8A Hidradenitis over axilla

Short course of oral prednisolone or intralesional triamcinolone can be use to control acute flare.

Oral retinoids such as isotretinoin/acetretin shows some encouraging result. The prerequisites are drug has to be used in high dose and for 1 year or more. In female cyproterone acetate, spironolactone and oral contraceptive pills and in

male or postmenopausal women finasteride are proved to be welcome adjuvant.

Other useful therapies are cyclosporine, infilximab, etanercept and photodynamic therapy.

Other modalities are intralesional corticosteroids, incision and drainage of abscesses in recalcitrant cases. Total excision of the affected region is required early in the disease. The use of broad spectrum antibiotics controls infection and elimination of the local factors might reverse the process, but in the chronic phase surgery remains the only curative mode of therapy. Repeated incision and drainage of abscesses and incomplete excision of infected tracts, however, are often harmful since they permit extension of the infections and an increase in fibrosis and tract formation. Advanced cases, therefore, have a more negative out look. In such cases the large and excised followed by coverage with a split thickness skin graft.

PITYROSPORUM FOLLICULITIS (Figs 17.9 and 17.10)

Pityrosporum folliculitis presents as follicular and extrafollicular papules, plaques and pustules over upper arms, back and shoulder. It is mostly seen young adult or adolescent boys and girls, more commonly in girls who tend to be slightly obese.

Etiology

It is thought to be a host reaction to M. furfur, which is a normal skin commensal.

Treatment

The condition does not respond to topical imidazole or oral fluconazole or itraconazole. Oral tetracycline or doxycycline has no role. Topical tretinoin has shown some response. Oral isotretinoin may be useful in some cases.

Natural History

The condition resolves spontaneously over a number of years. Reassurance and counseling of the children is important.

FOX FORDYCE'S DISEASE (Fig. 17.11)

It is a rare, chronic disease of apocrine gland bearing areas commonly affeting young women in the age group of 13 to 35 years. Preponderance in women may be attributed to the presence of more number of apocrine glands in them. The disease is characterized by intensely pruritic, small, firm, discrete, conical, flesh colored or slightly pigmented follicular

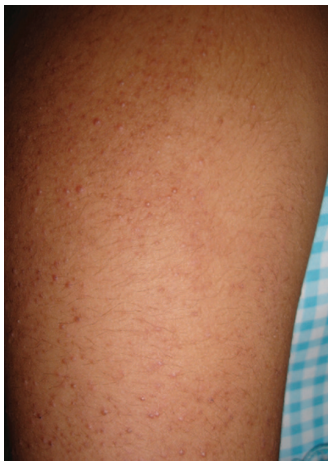

Fig. 17.9 Pityrosporum folliculitis in 9-year-old girl

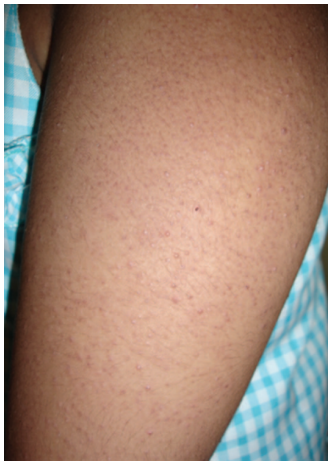

Fig. 17.10 Same girl, close-up of lesions

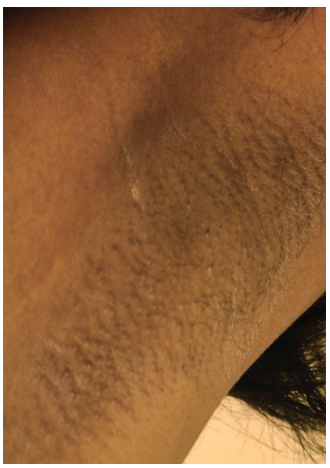

Fig. 17.11 Intensely itchy papules of Fox Fordyce's disease in a 16-year-old girl

papules distributed chiefly in axillae, areola and pubis; though other apocrine gland bearing areas such as umbilicus, labia majora, perineum, medial thigh and hairy chest may be involved. Intense paroxysmal pruritus aggravated by the agents who increase apocrine sweat such as physical, emotional stress and intradermal injection of medications is typical of this entity. But usually apocrine sweat and odor become absent in case of extensive lesions. Sparse hair of the affected areas may be due to excessive scratching. Pathogenesis of this disorder is not fully understood. Reports of familial cases indicate that role of genetic factors could not be underestimated. Patients usually improve during pregnancy and after menopause; endocrinal factors may have some role. Important histologial findings are lymphocytic infiltrate around upper third of hair follicles and upper dermal blood vessel, infundibular spongiosis at the entrance of apocrine duct and presence of foam cells. Various treatment modalities have been tried, none proved to be satisfactory starting from topical steroid and calcineurin inhibitors, intralesional steroid, oral retinoids and phototherapy and so on. Electrocoagulation, excision and liposuction of the affected area have some favorable outcome.

18

Adverse Drug Eruptions

Various adverse cutaneous drug reactions can be classified as:

- *Nonimmune cutaneous reactions:* Photosensitivity eruptions pigmentation changes, warfarin necrosis of skin, pruritus etc.
- *Immune-mediated cutaneous reactions:* It can be either
  - *Milder or benign:* Maculopapular eruptions, urticarial rash, angioedema, fixed drug eruptions.
    Or
  - *Severe rash:* Vasculitis, acute generalized exanthematous pustulosis (AGEP), drug reaction with eosinophilia and systemic symptoms (DRESS) Stevens-Johnson syndrome (SJS), toxic epidermal necrolysis (TEN).

Drugs reactions can also be divided considering dose relatedness, timing, and patient susceptibility (DoTS). Dose relatedness points to the doses above, below, or the common therapeutic range (toxic, hypersusceptibility, and collateral adverse reactions). The significance of time relatedness considers time between first use and the appearance of the adverse reaction and hence are—immediate, first dose, early, intermediate, late, and delayed. The role of susceptibility factors consider several factors that enhance the susceptibility to the adverse reaction like—genetic, age, gender, physiological changes, exogenous drugs, and diseases.

EPIDEMIOLOGY AND THE ROLE OF RISK FACTORS

Adverse cutaneous drug reactions (ACDR) are now quite common, and some can be lethal and life threatening. Reactions to different drugs affect almost about 3% of patients admitted in hospitals. Reaction rates from different studies show a range from 0–8% and are more for antimicrobials and for anti HIV drugs. In a study by the author and co-workers on ADR up to 18 years of age showed that 26% patients had a maculopapular rash, 22% a fixed drug eruption (FDE), 20% erythema multiforme (EM), 12% toxic epidermal necrolysis, TEN 10% Stevens-Johnson syndrome (SJS), 6% urticaria, and 4% erythroderma. Cotrimoxazole, was the most common antibacterial responsible for eruptions and antiepileptics were the most common drugs in EM, TEN, and SJS.

The risk of reaction increases with the number of drugs taken, age of the patient and viral infections. Patients at risk are those with transplants, HIV infection, and those suffering from collagen vascular diseases. Drugs with higher molecular weight and structural complexity are likely to produce a higher incidence of drug reactions. Genetic ability of an individual to detoxify toxic metabolites predispose to the development of drug reaction. HLA genes HLA-B*1502 predispose to Carbamazepine-associated SJS and TEN and HLA-B*5701 to Abacavir hypersensitivity syndrome.

ETIOPATHOGENESIS

In drug reactions, in many cases the mechanism of action is unknown. Drug eruptions due to hypersensitivity reaction relies on an immune mechanism. Reactions on account of nonimmunological mechanism are more common. Drugs, may behave as haptens by combining with peptides and hence become immunogenic. Immunologic reactions result from IgE-dependent, immune complex-initiated, cytotoxic, or cellular immune mechanisms. The four Coombs' and Gell immune mechanisms may have there involvement.

Gell and Coombs Classification of Immunological Reactions

Delineates 4 types of immunological reactions:

Type I: Acute IgE-mediated reactions that cause mast cell degranulation like anaphylactic and urticarial reactions.

Type II: Cytotoxic reactions, due to antigen-antibody interactions leading to production of anaphylotoxin (C5a),

"Good artists copy; great artists steal."—TS Eliot

polymorphonuclear leukocytes aggregation, and tissue injury by hydrolytic neutrophil enzymes as in vasculitis.

Type III: Gell and Coomb 6 types now delayed immune complex reactions, where in antigen-antibody complexes are produced and accumulate in tissues as in maculopapular lesions.

Type IV: Cell-mediated or delayed hypersensitivity reactions where T-lymphocyte sensitization is brought about by a hapten-protein complex as in contact dermatitis.

Type V: Autoimmune disease, receptor mediated nonimmunologic reactions occur in the form of nonimmunologic activation of effector pathways, overdosage, cumulative toxicity, interactions between drugs, metabolic alterations. Urticaria, photosensitivity eruptions, erythema multiforme, pigmentation, morbilliform reactions, fixed drug reactions, toxic epidermal necrolysis, and bullous reactions are some of the clinical manifestations. Nonimmunologic activation of effector pathways is also an important mechanism. Drugs release mediators from mast cells and precipitate anaphylaxis or urticaria. Some drugs may activate complement in absence of antibody. Phototoxicity starts when the drug/chromophore absorbs radiation to elicit a reaction.

Severe cutaneous adverse reactions encompass drug reaction with eosinophilia and systemic symptoms (DRESS) or drug-induced hypersensitivity syndrome (DIHS) and Stevens-Johnson syndrome (SJS)/toxic epidermal necrolysis (TEN). The interlink between HLA alleles and these syndromes, including abacavir-hypersensitivity reaction, allopurinol DRESS/DIHS and SJS/TEN, and SJS/TEN with amine anticonvulsants. HLA associations help in prevention through screening. HLA-B*5701 routine genetic screening test to prevent abacavir hypersensitivity provides the initiation for further such tests. The role of genetic screening to identify patients at potential risk for severe cutaneous adverse drug reactions is now well established. These may be fatal and idiosyncratic as in the cases of Stevens–Johnson syndrome and toxic epidermal necrolysis overlap and drug reaction with eosinophilia and systemic symptoms (DRESS). Advanced research in genomics have identified genes that have increased propencity to cause adverse drug reactions specific to drug and phenotype.

Commonly offending drugs are variable in diverse ethnic populations. Stevens–Johnson syndrome and toxic epidermal necrolysis are mostly found to be precipitated by nonsteroidal anti-inflammatory drugs (NSAIDs) and sulphonamides in the Western literature whereas carbamazepine is found to be the major implicated agent for Stevens–Johnson syndrome in Southeast Asia. The role of carbamazepine in the west is more in causation of drug-induced hypersensitivity syndrome Allopurinol often plays the causal role in SJS but has no obvious ethnic bias. Pharmacogenetic studies now point to an association between human leukocyte antigen (HLA) alleles and drug hypersensitivity. HLA typing has significantly reduced the incidence of abacavir hypersensitivity on account of its association with HLA-B*5701. Susceptability to nevirapine hypersensitivity was noted in Caucasian Australians having HLA-DRB1*0101 with high CD4+ T-cell counts carbamazepine hypersensitivity and HLA-B*1502 has been observed in Han Chinese and allopurinol-induced severe cutaneous adverse reactions are positive for HLA-B*5801.

Considering the linkage of HLA-B*1502 and carbamazepine, HLA-B*1502 allele was found in 100% of people with carbamazepine-induced Steven–Johnson syndrome/toxic epidermal necrolysis, and only 3% of carbamazepine-tolerant people in a study from Taiwan. The same was further substantiated in cohort of Chinese descent originating from different geographic regions. This association was not found among people with European descent. The allele hence is ethnically relevant. Allele with functional effect in the pathogenesis of reaction will be observed consistently in populations. The variability of Chinese and European population may be due to the fact that pharmacogenetic studies have positive results in a population with a high incidence of such an allele. HLA-B*1502 allele is 4.8–12.8% in Southeast Asians in contrast to 0–0.1% noted in white people. The increased susceptibility of disease from genetic polymorphism is influenced by the prevalence as noted in HLA-B*1502 having lower incidence in Caucasians.

Stevens-Johnson syndrome is mostly polygenic. Polymorphisms in the proapoptotic gene Fas-L, the toll-like receptor 3 gene and the IL-4 receptor/IL-13 signaling pathway is documented in most studies. Screening for HLA-B*1502 in a high-risk population has a 100% sensitivity and 97% specificity for carbamazepine-induced overlapping Stevens–Johnson syndrome and toxic epidermal necrolysis. A high-resolution genetic testing using a sequence-specific primer assay for this allele from blood or buccal swabs is now in vogue.

Associating HLA-B*5801 and allopurinol in a study involving Han Chinese participants revealed the presence of the HLA-B*5801 allele in all patients with allopurinol associated severe cutaneous adverse drug reactions. HLA-B*5801 allele, in comparison to HLA-B*1502, is equally distributed in ethnic groups. The allele may be established by high-resolution, sequence-based HLA genotyping which is quite an expensive method.

Stevens–Johnson syndrome and its association with HLA-B molecules indicate an obvious role in its causation. This presents the drug to CD8 cells resulting in clonal expansion of CD8 cytotoxic lymphocytes. This cytotoxic effector response leads to apoptosis of keratinocytes. These pathways are not specific to overlapping Stevens–Johnson syndrome and toxic epidermal necrolysis. It has been found that granulysin, a cytolytic protein from CD8 cells, occurs in blister fluid in significant levels and correlates disease activity.

DIAGNOSTIC WORK UP

The drug history forms the cornerstone in the diagnosis and allergology examination and tests further substantiate it. Prick, intradermal and patch tests are the common forms of allergy tests. Specific IgE level is a popular *in vitro* method for immediate reaction detection. Basophil activation test and lymphocyte proliferation assays also add to the investigation basket. Some cases need provocation tests for a complete work up.

On completion of a thorough clinical history, patients with drug allergy are tested. An accurate medication history, details of recent medication, over-the-counter medicines, herbal and homeopathic preparations, vaccines or contrast media has to be documented. A common feature of NIRs is that in many cases symptoms appear 24–48 hours after drug intake, the time of onset of symptoms is vital in the evaluation process. Characteristic time lags between onset of treatment and reaction are: 4–14 days for maculopapular eruptions, 7–21 days for SJS/TEN, 14–48 days for DRESS. Fixed drug reactions and generalized exanthematous pustulosis often occur early (within 48 hours).

On the basis of the drugs suspected, patients may undertake skin tests like prick tests, intradermal tests, *in vitro* tests and allergen challenges. Topical medications usually need patch tests for confirmation. Patients having severe drug reaction like toxic epidermal necrolysis are not subjected to drug challenge for the risk serious outcomes.

The laboratory findings in serious drug-induced cutaneouseruptions are: eosinophil count > 1000/μL, lymphocytosis with atypical lymphocytes and abnormal liver function test results. Tests for IgE are available for the drugs like penicillins, cephalosporins, peptide and protein drugs (insulin). In some patients, such as antiretroviral therapy in AIDS, the need for HLA typing before initiating abacavir is routinely recommended. Skin tests like intradermal tests with delayed-reading and cutaneous patch tests are the usual modality. Patch test for drug is easily executed with almost any available drug. Intradermal tests has the advantage of higher sensitivity but has technical and procedural complexities. The use of intradermal and patch tests for confirmation of NIRs to betalactams, has yielded a sensitivity of 2.6% as a positive reaction to patch tests in 8 of 298 patients tested with phenoxymethyl penicillin. In some recent studies 37.8% and 9% positive results were noted and so it pointed to the fact that sensitivity of skin test is low as with beta lactam induced exanthema. The usefulness of patch testing was again established in reactions by cardiovascular or antiepileptic drugs in similar studies.

Drug provocation tests are useful on account of the fact that intradermal or patch testing has low sensitivity, some patients are given the drug to confirm a causal association. Provocation testing is an useful method, however a very careful administration in a specialized center is recommended. This test is generally not recommended and contraindicated in cases of severe eruptions.

In-vitro diagnostic tests like the lymphocyte transformation test banks on the principle-T cells can proliferate when exposed to a specific antigen, this theory has been utilized to detect T-cell sensitization to a drug. This test has sensitivity rates of 60–70% and relatively low specificity (85%). Role of dendritic cells in amoxicillin-specific lymphocyte proliferation studies showed dendritic cells improved LTT sensitivity.

Immunohistochemistry—skin biopsy from the acute reaction site with immunohistochemistry data help in the investigation of the immunologic mechanisms involved and not the drug involved. Mononuclear cell infiltrate composed mainly of activated T cells expressing DR antigens, CD69 activation markers, is an usual finding.

MACULOPAPULAR ERUPTIONS (Figs 18.1 to 18.1C)

Also known as morbilliform or exanthematous eruptions. It is one of the most common types of drug eruptions encountered in pediatric age group. It can be mediated by type I, type II, or type IV hypersensitivity reactions, type II being the most common. The average incubation period is 7–10 days but the onset of rash may be as late as 2nd or 3rd week. The incubation period varies with the type of hypersensitivity reaction associated, e.g. within few minutes to hours is type I, 24 hours to 3–4 weeks in type III reaction, 48–72 hours in type IV reaction.

Fig. 18.1 Maculo-papular eruptions over trunk in an adolescent boy

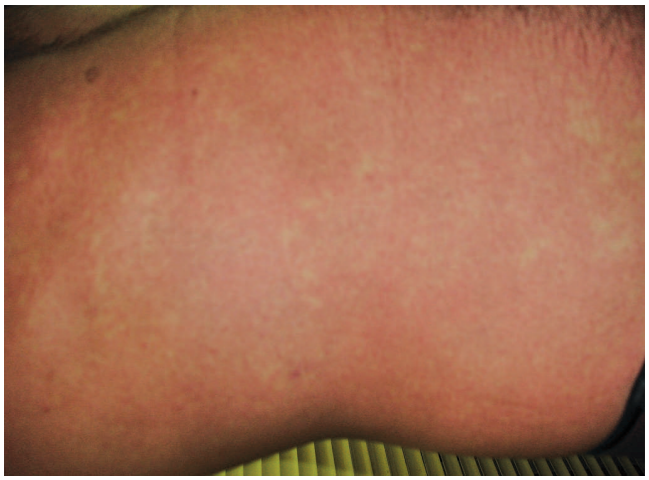

Fig. 18.1A Maculopapular rash, close-up

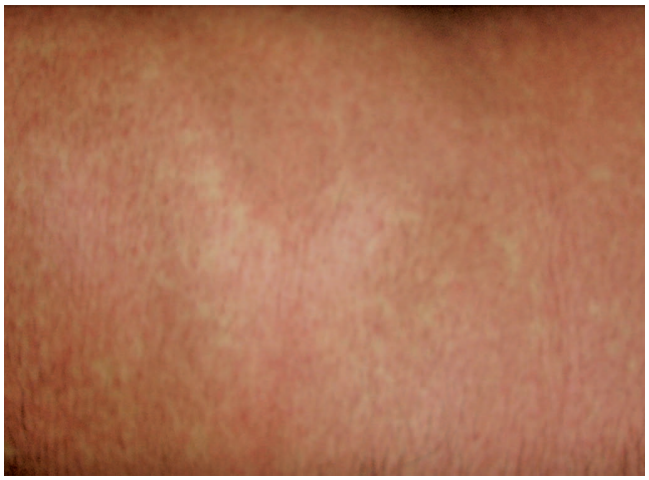

Fig. 18.1B Maculopapular rash

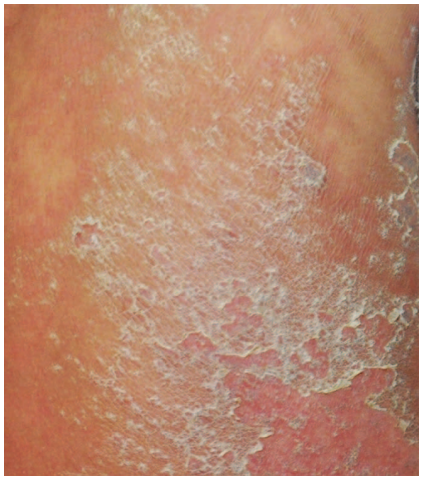

Fig. 18.1C Subsiding maculopapular rash, note scaling

Differential Diagnosis

Various viral exanthems often resemble maculopapular drug rash. Involvement of mucosae, conjunctiva leucopenia are features suggestive of viral exanthem. In drug induced cases eosinophilia in peripheral blood is usually observed.

Drug Responsible

Drugs commonly responsible for maculopapular eruptions are penicillins, ampicillin, amoxycillins, carbamazepine, cotrimoxazole, chlorpromazine, antitubercular agents, NSAIDs, etc.

Treatment

Withdrawal of the drug usually leads to resolution of rash. However, if the patient is on life saving drugs and one of them is suspected, the drug can be continued still. When maculopapular eruptions may present as a part of serum sickness, withdrawal of the incriminated/suspected drug is mandatory. For associated itching, oral antihistamine is prescribed. Topical lactocalamine is applied over the rash twice a day till the rash starts exfoliating. The rash subsides with fine branny scales which ultimately leave behind hypo or hyperpigmentation. The rash may recur on rechallenge.

FIXED DRUG ERUPTION (Figs 18.2 to 18.4B)

It is a characteristic type of drug eruption presenting as itchy hyperpigmented macule/patches of skin following intake of some drug(s). On taking the same or chemically similar drug(s) of drug, the rash relapses suggesting a reactivation of the hypersensitivity. Apart from the skin, mucosae can also be involved in fixed drug eruption.

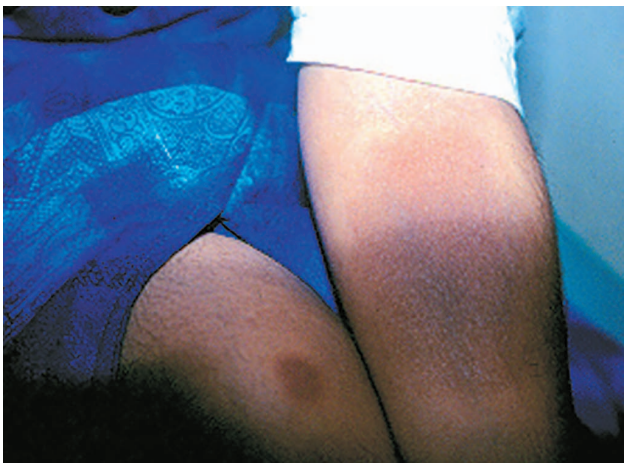

Fig. 18.2 Hyperpigmented patch of fixed drug eruption

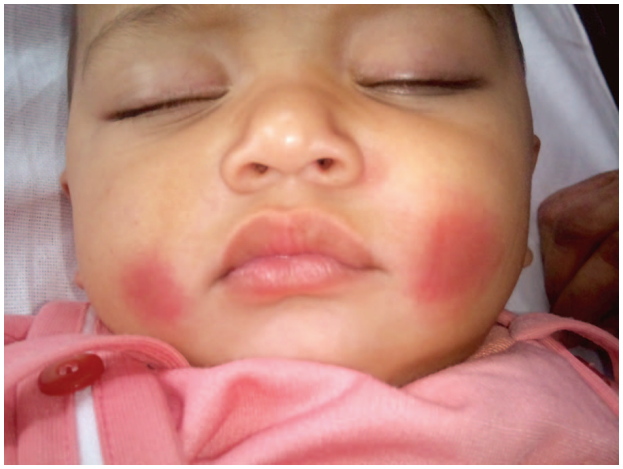

Fig. 18.2A Fixed drug eruption over cheek in an infant. Note bilateral symmetrical lesions

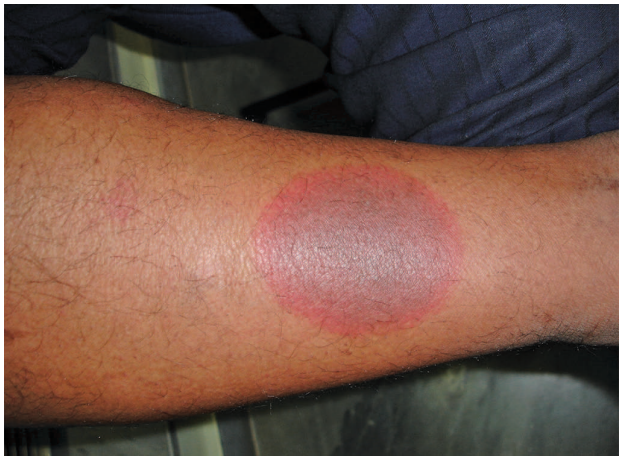

Fig. 18.2B Fixed drug eruption, note central hyperpigmentation with rim of erythema

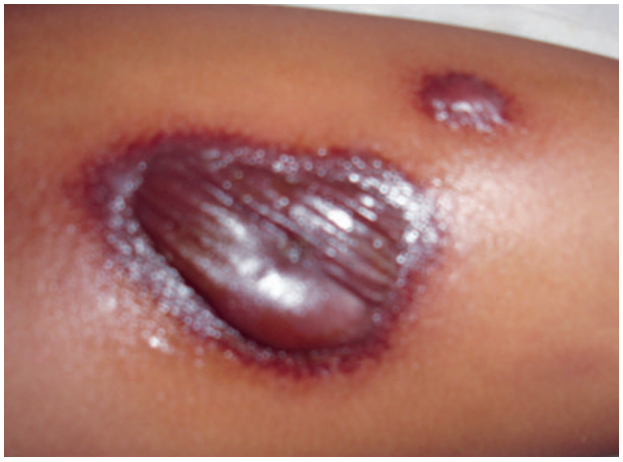

Fig. 18.3 Bullous fixed drug eruption over thigh

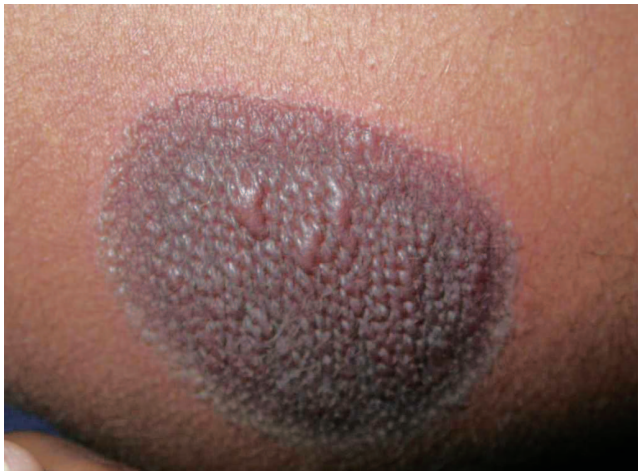

Fig. 18.3A Bullous fixed drug eruption, collapsing bulla

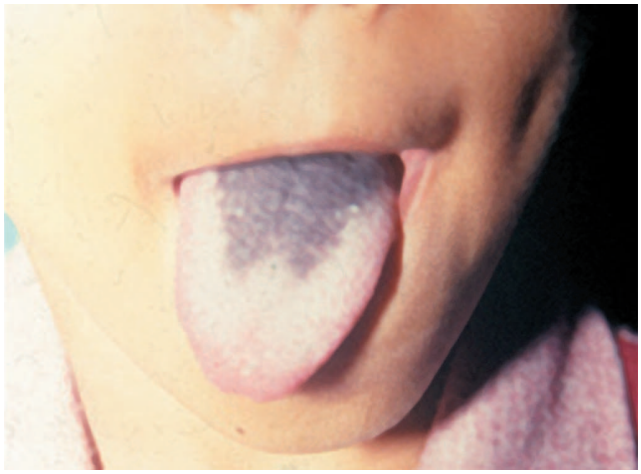

Fig. 18.4 Fixed drug eruption over tongue (rare presentation)

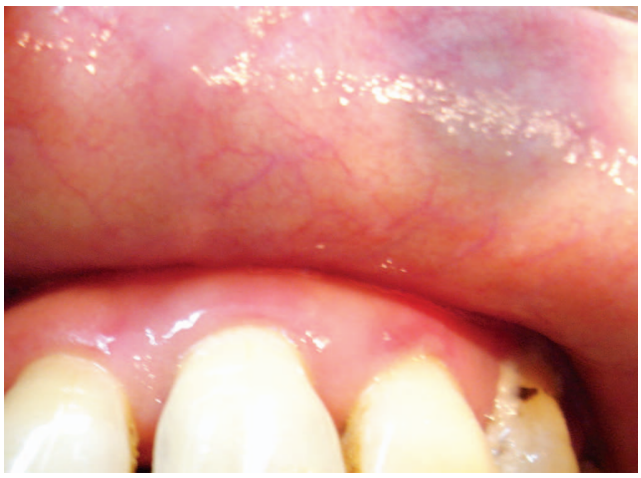

Fig. 18.4A Oral mucosal fixed drug eruption

"Life is like riding a bicycle. To keep your balance, you must keep moving."—Albert Einstein

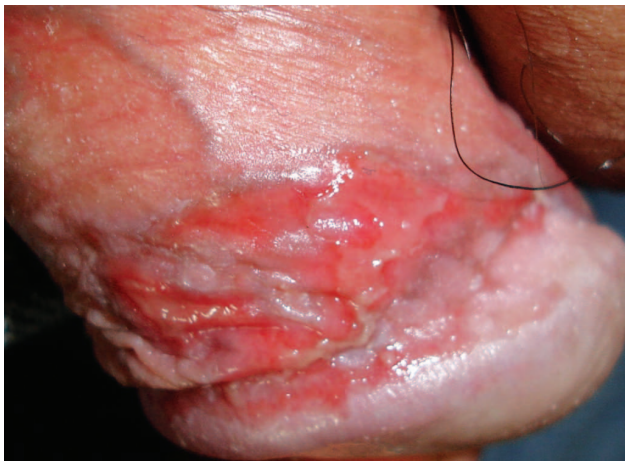

Fig. 18.4B Fixed drug eruption over glans penis in an adolescent boy

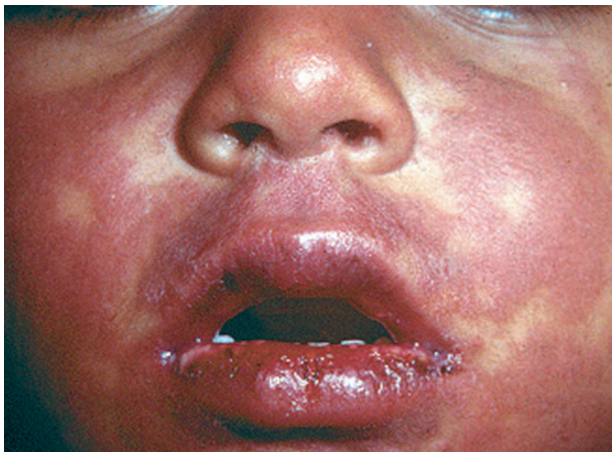

Fig. 18.5 Blochy erythema with erosion of lips in erythema multiforme

Drug Responsible

Common drugs causing FDE include sulphonamides, tetracyclines, metronidazole, tinidazole, fluoroquinolones, barbiturates, NSAIDs, etc. Oral rechallenge is usually done with half of the strength of a single dose of a drug.

Treatment

Advice regarding avoidance of the drug is very important. The postinflammatory hyperpigmentation may take 6 months to 3 years or even more to subside. Topical 2% hydroquinone may be used over these pigmented patches for 6 months to 2 years.

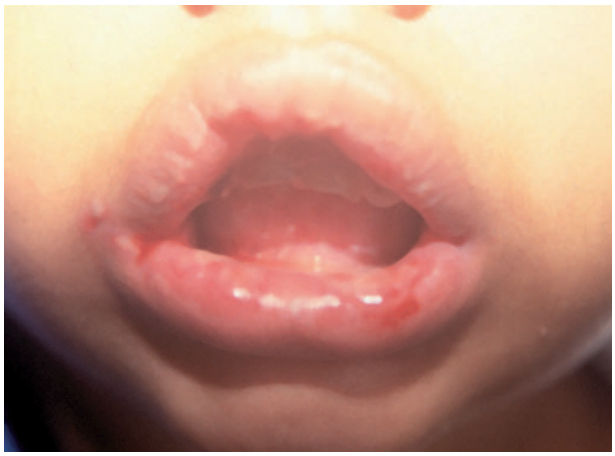

Fig. 18.6 Erosion of lips in erythema multiforme

ERYTHEMA MULTIFORME (Figs 18.5 to 18.9)

As the nomenclature suggests, the rash manifests in various morphological forms, e.g. macular, papular, classical iris or target lesions, vesicular, bullous, etc. Drug induced erythema multiforme can downgrade to Stevens-Johnson syndrome (SJS) or toxic epidermal necrolysis (TEN). It can be part of type II, type III, or type IV reaction. As far as cases of only erythema multiforme are concerned, there are other causes also, e.g. upper respiratory tract viral infection, bacterial infection, collagen vascular diseases, etc. Drug induced erythema multiforme or toxic epidermal necrolysis develops within weeks after initiation of therapy. After re-exposure, the reaction may begin within hours.

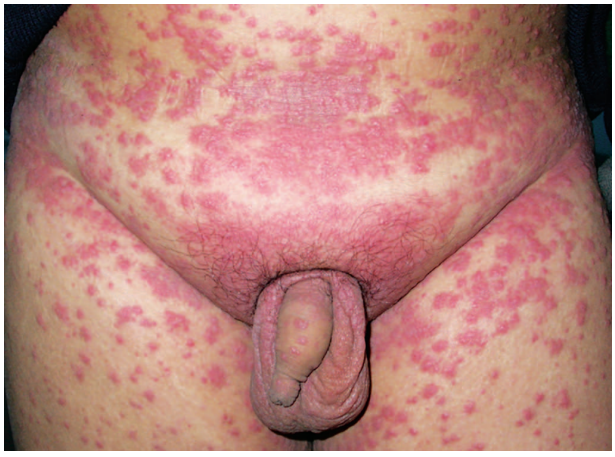

Fig. 18.7 Erythematous papules over lower trunk and thigh in a case of erythema multiforme

STEVENS–JOHNSON SYNDROME (Figs 18.10 to 18.12A)

It is a severe and occasionally fatal drug eruption, some times develop downgrading from erythema multiforme, while

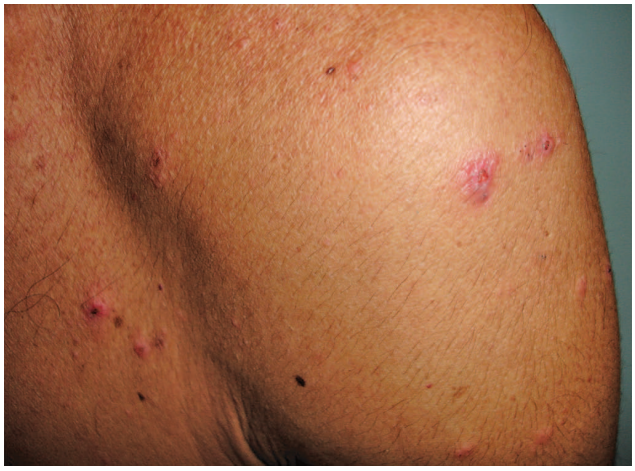

Fig. 18.7A Target lesions of erythema multiforme

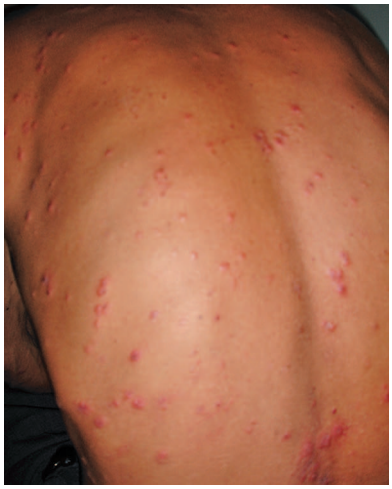

Fig. 18.7B erythema multiforme lesions over back

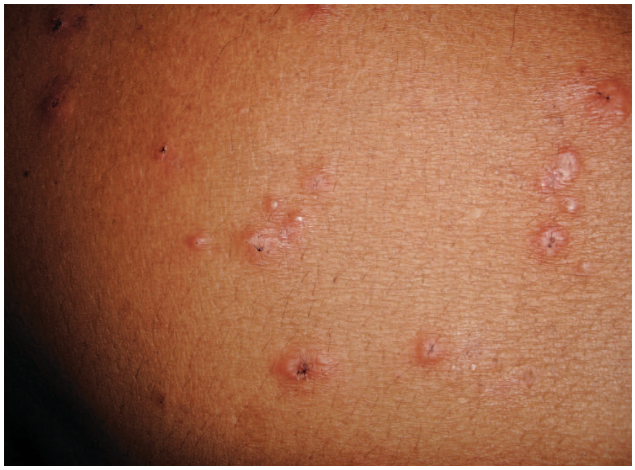

Fig. 18.7C Close-up

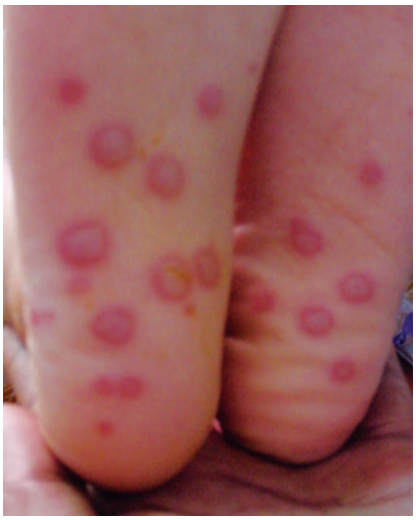

Fig. 18.8 Erythema multiforme lesions over soles

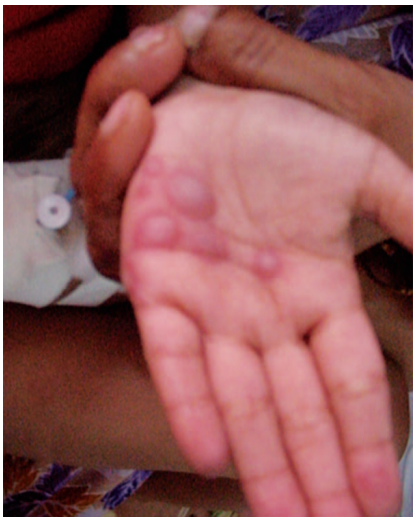

Fig. 18.8A Palmar lesions in erythema multiforme

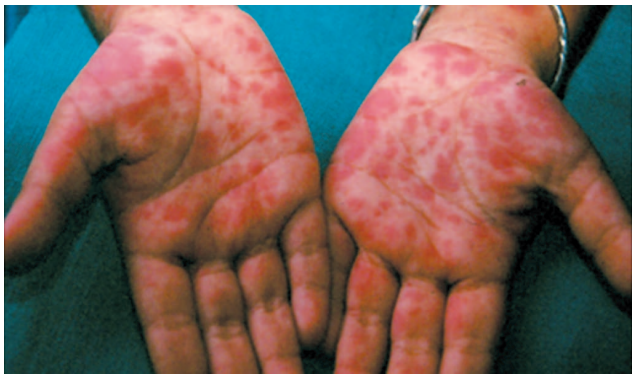

Fig. 18.9 Target lesions of erythema multiforme over palms

"A little knowledge is a dangerous thing. So is a lot."—Albert Einstein

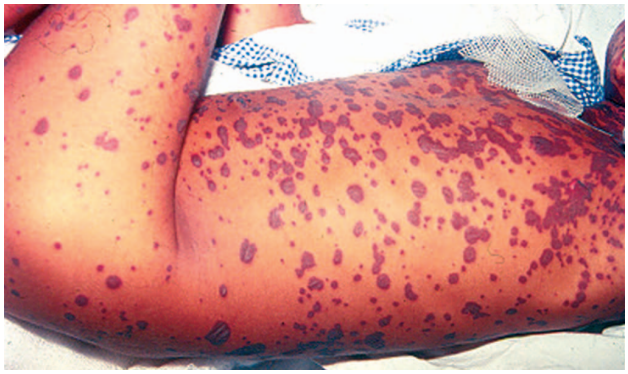

Fig. 18.10 Lesions of erythema multiforme developing vesicles, downgrading to Stevens–Johnson syndrome

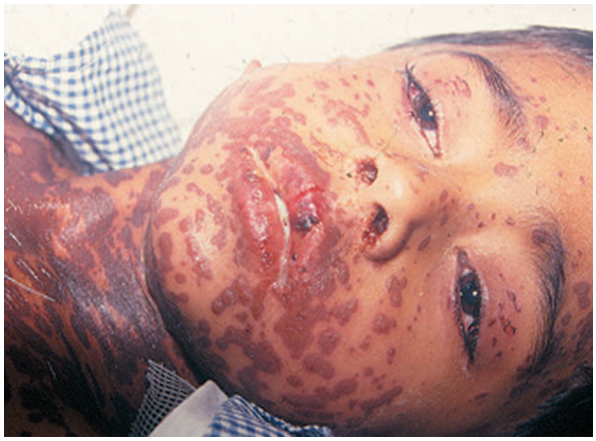

Fig. 18.11 Crusting in Stevens–Johnson syndrome (during recovery)

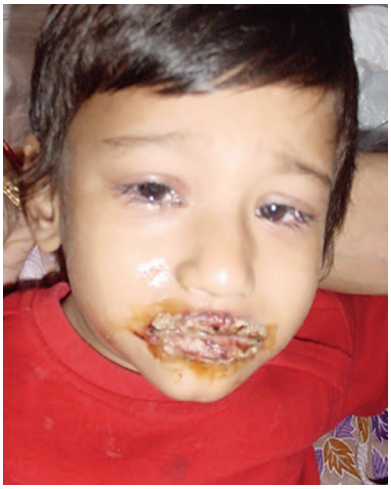

Fig. 18.12 Stevens–Johnson syndrome with oral erosion and crusting of lips

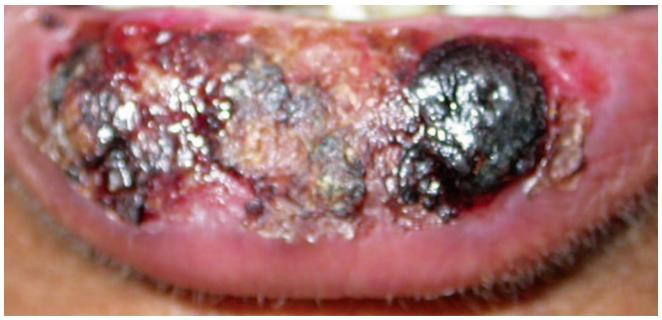

Fig. 18.12A Close-up of crusting of lips

on other occasions develop as such. It is usually explosive in onset with associated fever, malaise, myalgia, headache, arthralgia, injection of conjunctivae. Oral ulceration and erosion of lips are early features. Bullae, usually hemorrhagic, develop extensively all over the body, subsequently rupture to leave large areas of erosions. The patients usually run high grade fever and look seriously ill.

Drug Responsible

The drugs commonly implicated are penicillins, phenytoin sodium, carbamazepine, barbiturates, NSAIDs, tetracyclines, sulphonamides, isoniazide, rifampicin, ibuprofen, nimesulide, etc.

TOXIC EPIDERMAL NECROLYSIS (LYELL'S SYNDROME) (Figs 18.13 to 18.14A)

The condition is fairly uncommon in children as compared to adults. It is a serious and fatal rapidly progressive eruption of skin following intake of drug which leads to a picture like burn. It can rarely follow bacterial or viral infections, vaccination or radiotherapy.

Drug induced TEN usually develop within 48–72 hours after intake of a drug. However, in some cases it may take 2–3 weeks and this is seen with anticonvulsants and antitubercular drugs. The rash rapidly progresses to involve larger areas of the body. The skin becomes very tender because of necrolysis. High fever and associated symptoms are usual accompaniment. Mucosal involvement is not as common as SJS syndrome but there may be involvement of eyes, oral mucosa, genitalia. The condition resembles second degree burn and is associated with fever, vomiting, loose motion and often chest pain. The condition may become life-threatening within hours of its onset.

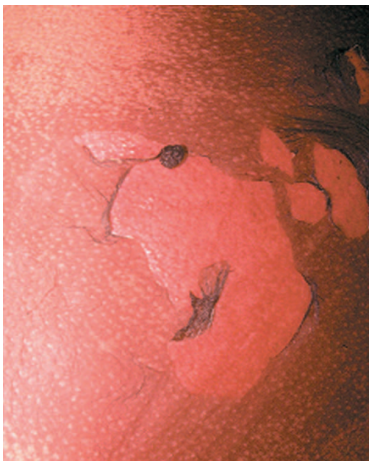

Fig. 18.13 Necrolysis showing easy peeling of skin in SJS/TEN (Nikolsky's sign)

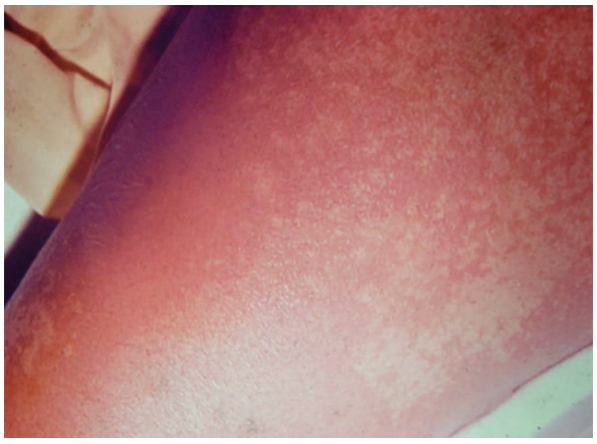

Fig. 18.14 Measles like eruption in early toxic epidermal necrolysis

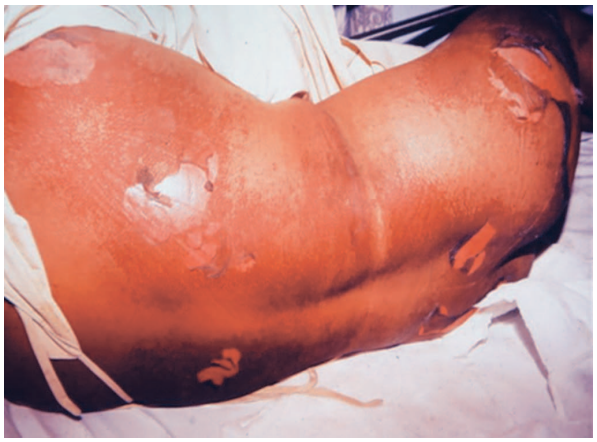

Fig. 18.14A Nikolsky's sign positive in a case of epidermal necrolysis

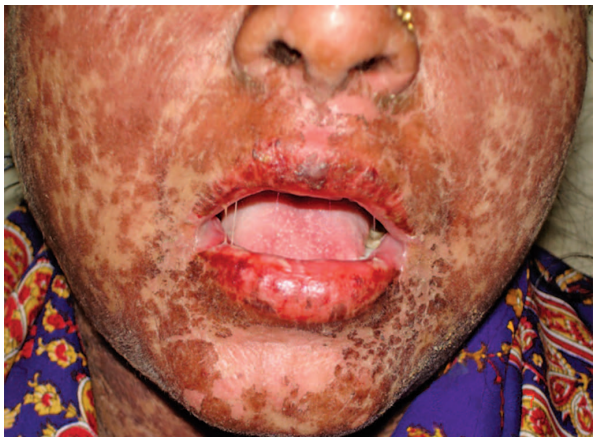

Fig. 18.14B Epidermal necrolysis, note erosion of lips but no crusting

Drug Responsible

Commonly implicated drugs are cotrimoxazole, sulphonamides, tetracyclines, isoniazide, hydantoin, carbamazepine barbiturates, phenothiazines, etc.

MANAGEMENT PROTOCOL FOR SJS-TEN

The fact that Stevens-Johnson syndrome and toxic epidermal necrolysis are due to dermal cell apoptosis, intravenous immunoglobulin is advocated to block apoptosis via the Fas pathway. Studies on the use of intravenous immunoglobulin in toxic epidermal necrolysis have reported good results. A study of ten consecutive patients with TEN of moderate severity were treated with different doses of IVIG (0.2–0.75 g/kg of body weight per day for four consecutive days). There was recovery in all cases. Blood transfusion in cases of SJS and TEN helps in many ways as—toxic metabolites, cytotoxic T cells and autoantibodies get diluted by hemotransfusion, supplies immunoglobulins to fight infections. A benefit of plasmapheresis for treatment of TEN/SJS is also reported. Cyclophosphamide was also claimed to produce good results. A retrospective comparative study showed cyclosporin was safe and produced good re-epithelialization rate and a lower mortality. Tumor necrosis factor is a mediator of cell death in toxic epidermal necrolysis, and control of the progression of toxic epidermal necrolysis with intravenous anti-tumor necrosis factor antibody infliximab yielded better outcomes.

SERUM SICKNESS (Fig. 18.15)

Serum sickness, an allergic reaction originally noted following administration of serum of horse or rabbit origin and is now frequently observed with administration of drugs like penicillins, other antibiotics, thiouracils, p-amino

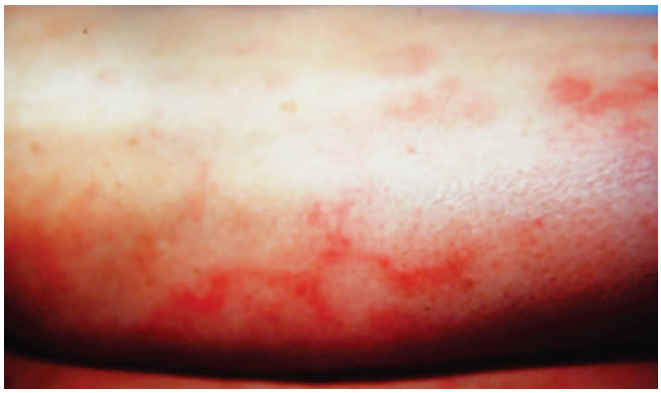

Fig. 18.15 Annular erythematous urticarial lesions of serum sickness

salicylic acid, sulfonamides, etc. It is mediated by circulating antigen-antibody complexes in which IgG is the predominant immunoglobulin. Following exposure to antigen, after 8–14 days in case of nonsensitized individuals and still earlier in presensitized persons, serum sickness is manifested by urticaria, malaise, fever, lymphadenopathy, splenomegaly and swollen and tender joints. Localized or generalized edema is common. Skin eruptions, the most common and characteristic features are present in over 80% patients. The rash is urticarial in 90% cases. However, morbilliform and scarlitiniform eruptions, erythema multiforme, erythema nodosum and vasculitic purpura may be seen less commonly. Serum sickness may be a self-limiting disease that subsides within 2–3 weeks. Rarely fatal, death may occur due to coronary artery vasculitis or severe neuropathy.

Treatment

The condition is treated with adrenaline, antihistamines and analgesics. Hydroxyzine, is the most effective antihistamine in children for this condition. It is administered in a dose of 2 mg/kg/24 hour in 3–4 divided doses. Systemic corticosteroids are given in more severe cases. Tracheostomy may be life saving in severe glottic edema.

DRESS SYNDROME (Figs 8.15A and B)

DRESS, the acronym of drug reaction with eosinophilia and systemic symptoms is also referred to as DIDMOHS (drug-induced delayed multi-organ hypersensitivity syndrome) or drug hypersensitivity syndrome. This distinct type of adverse drug reaction was initially described in association with aromatic anticonvulsants (phenytoin, carbamazepine, phenobarbital, lamotrigine and primidone). Other culprit drugs are sulfonamides, dapsone, minocycline, terbinafine, azathioprine, allopurinol, gold derivatives, cyclosporine,

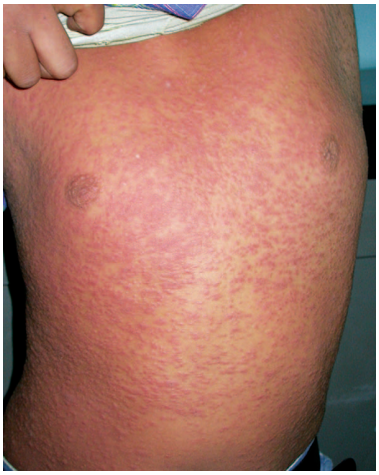

Fig. 18.15A Maculo-papular rash of DRESS syndrome

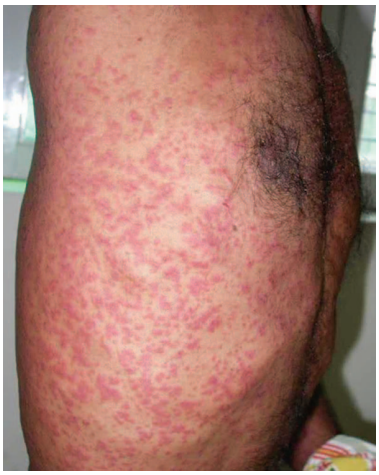

Fig. 18.15B Close-up of DRESS syndrome rash

captopril, diltiazem, metronidazole, nonsteroidal anti-inflammatory drugs and the antiretrovirals like nevirapine and abacavir etc. The triad of fever, skin rash and symptomatic or asymptomatic internal organ involvement characterizes this specific entity. The incidence is approximately 1 in 1,000 to 1 in 10,000 exposures. Reactions classically begin 1 week to 8 weeks after initiation of therapy, but in previously sensitized individual it appears within one day of rechallenge. It affects various organ and organ systems; skin, liver and hematological system being most commonly targeted. It presents with high, spiking fever followed in 1–2 days by other manifestations. Skin lesions are most commonly exanthematic and rarely generalized follicular pustules or more severe skin reactions, such as erythroderma, erythema multiforme, Stevens-Johnson syndrome or toxic epidermal necrolysis may occur. Facial and periorbital edema is a characteristic sign of potentially serious reaction. Other manifestations are tender

local or generalized lymphadenopathy, conjunctivitis and various internal organ involvements in the form of hepatitis, nephritis, pneumonitis, neutrophilia, eosinophilia, atypical lymphocytosis, blood dyscrasias, hemolytic anemia and changes in immunoglobulin levelsoral ulceration, exudative tonsillitis, oral ulcers, strawberry tongue, flu-like symptoms, myopathy, disseminated intravascular coagulopathy, pharyngitis, hypotension, pancreatitis, myocarditis, myositis, meningitis, parotitis, orchitis, arthralgia and thyroiditis. Late onset hypothyroidism has also been reported. Course is variable; with early diagnosis, outcome is favorable though not always. Fatality is mainly due to fulminant hepatitis.

Pathogenesis is multifactorial. Several factors act in concert in the causation and expression of this disease entity. Possible mechanisms explaining the pathogenesis are formation of drug metabolites and inherited defect in detoxification of such intermediates, intercurrent disease processes and concurrent active viral infection (HIV, HHV 6/7, and EBV). Altered cytokine profile including raised level of interleukin 5 has also been suggested as a probable predisposing factor.

Diagnosis is mainly clinical, aided by histopathology, lymphocyte toxicity assay, patch test. This entity should be distinguished from other mimicking conditions like other cutaneous drug reactions, viral exanthem, lymphoma or pseudolymphoma, collagen vascular diseases, serum sickness-like reaction, Kawasaki disease, hypereosinophilic syndrome etc. main stay of therapy is discontinuation of the offending agent followed by systemic evaluation with necessary laboratory tests to ascertain degree of internal involvement. Antihitamines and topical steroids give symptomatic relief. Role of systemic steroids is controversial, although it gives encouraging result in case of toxic epidermal necrolysis and severe hepatitis. Other therapeutic aids that can be tried are plasmapheresis, intravenous immunoglobulin. Patients developing DRESS due to one aromatic anticonvulsant should be advised to avoid other arene oxide-producing anticonvulsants as cross-reactivity is seen in 80% cases.

TOXIC PALMAR ERYTHEMA AND FISSURING OF PALMS (Figs 18.16 to 18.18)

Toxic palmar and plantar erythema is a common dermatological reaction associated with specific cytotoxic chemotherapy. It is also called as palmo-plantar erythrodysesthesia (PPE) or hand foot syndrome. The incidence depends on the drug therapy, dosage and route of administration.

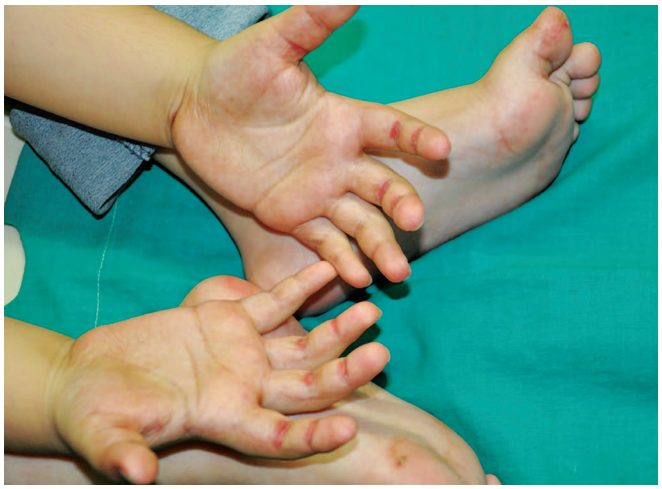

Fig. 18.16 Toxic palmoplantar erythema due to 6 mercaptopurine therapy in 5-year-old boy suffering from B cell lymphoma

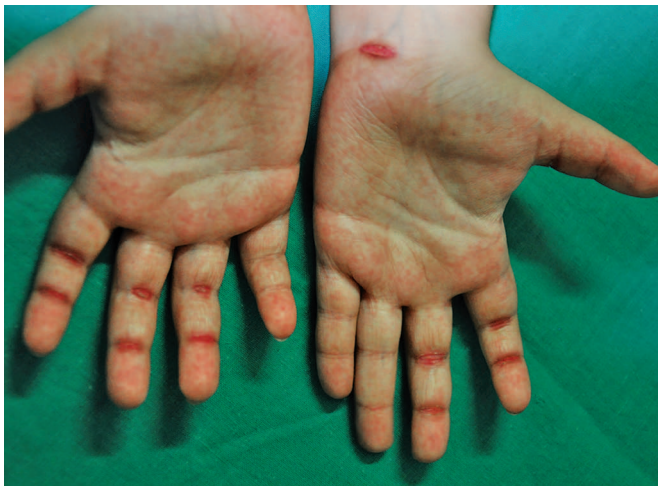

Fig. 18.17 Same boy, palms showing erythema and fissuring over interdigital spaces of fingers

Pathogenesis

The pathogenesis is still not clear. The common cytotoxic drugs known to cause this reactions are mercaptopurine, 5-fluorouracil, doxorubicin, docetaxel, capecitabine, vinorelbine, gemcitabine and sorafenib. Various school of thoughts have been proposed like deposition of drug in epidermis and dermal of palms and soles where there is rich vascular networks, rapid cell division rate in palms and soles, gravitational forces, increased drug concentration in the eccrine glands of palms and soles.

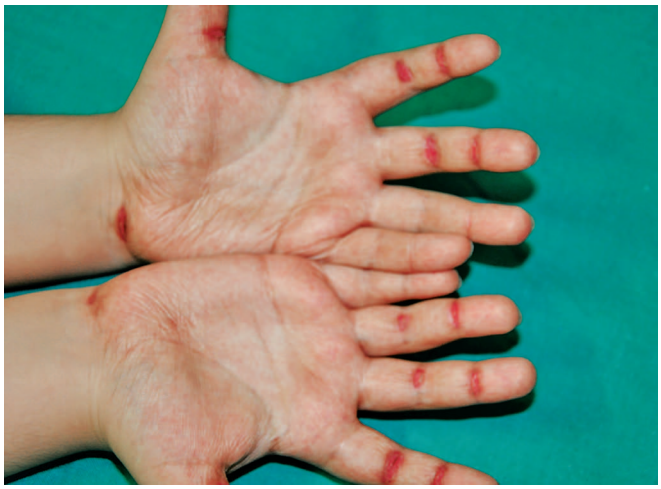

Fig. 18.18 Close-up of palms

Clinical Features

Clinical manifestations vary from mild to severe forms. Initially there are prodromal symptoms of tingling, burning and dysesthesia. Later there is erythema of palms, fingers and soles which later progress to dryness and desquamation. Papules, ulceration, edema, fissuring of the creases may occur. Rarely sensory impairement, paresthesia, pruritus have been reported. The National Centre Institute has graded the severity of toxic rash as shown in Table 18.1.

Table 18.1 Grading of toxic palmar erythema

Grade	*Clinical symptoms*
1	Minimal skin changes (erythema, edema, hyperkeratosis) without pain.
2	Skin changes (peeling, blister, bleeding, edema, hyperkeratosis) with pain not interfering with function.
3	Severe skin changes with pain interfering with function.

Diagnosis

It should be differentiated from neutrophilic eccrine hidradenitis, palmoplantar hidradenitis, and erythema multiforme. Strong suspicion and awareness of this condition will help to diagnose the condition.

Treatment

Discontinuation of chemotherapy is necessary if the toxic reaction is in grade 2 or 3. Some advocate 50% of dose adjustment if it is grade 2. Topical emollients and steroids can be given in grade 1. Oral pyridoxine at doses 800 mg daily has given good results in many studies. Other therapies tried are cyclo-oxygenase 2 inhibitors, oral vitamin E and systemic steroids with variable response.

19

Striae and Scars

IDIOPATHIC STRIAE DISTENSAE (Figs 19.1 to 19.3A)

Striae are visible linear scars which form in areas of dermal damage produced by stretching of skin. In children striae develop readily at puberty. Adolescent striae may first develop soon after the appearance of pubic hair. The most common sites are the outer aspect of the thighs and the lumbosacral region in boys, and the thighs, buttocks, and breasts in girls. Early lesions may be raised and irritable but they soon become flat, smooth and livid red or bluish in color. Their surface may be finely wrinkled. They are commonly irregularly linear, several centimeters long and 1–10 mm wide. After some years, they fade and become inconspicuous. The striae in Cushing's syndrome or those induced by steroid therapy may be larger and more widely distributed.

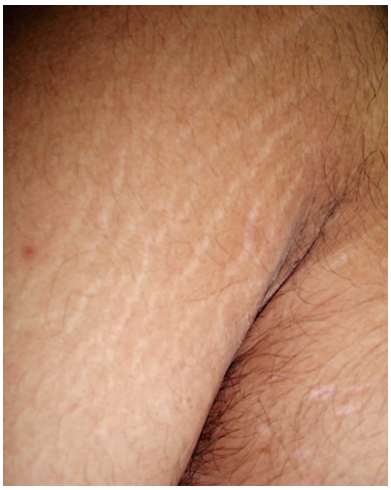

Fig. 19.1 Whitish atrophic lines of idiopathic striae distensae over axilla

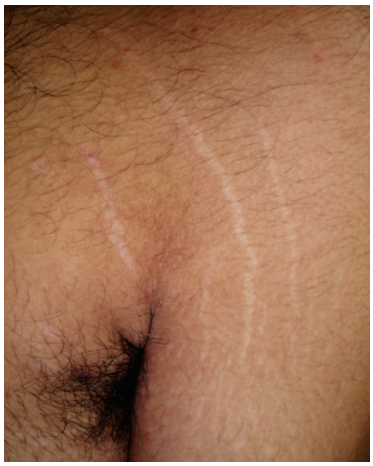

Fig. 19.2 Close-up of idiopathic striae distensae

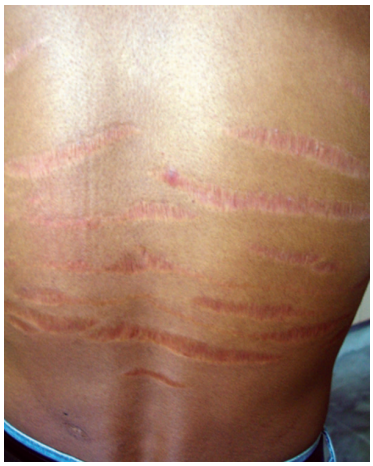

Fig. 19.3 Idiopathic striae distensae over back in an adolescent boy

"There is only one good, knowledge, and one evil, ignorance."—Socrates

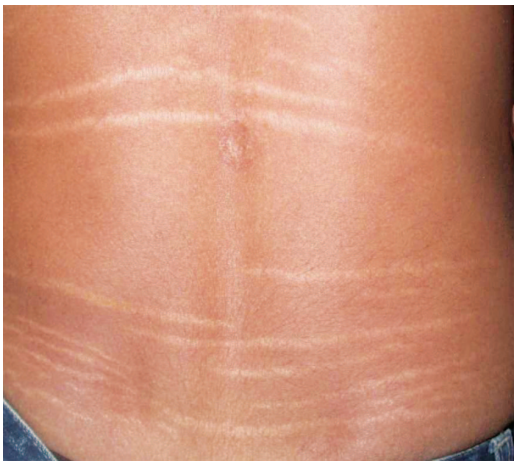

Fig. 19.3A Idiopathic striae distensae (close-up) over back in an adolescent boy

Natural History

Most striae which appear during late childhood or adolescence tend to become less prominent with time.

Treatment

Topical tretinoin (0.025% or 0.05%) once daily for 3 to 6 months may help in some patients. Weight reduction and avoidance of extreme stretching of skin are advised.

HYPERTROPHIC SCAR (Figs 19.3B to D)

Hypertrophic scars are overgrowth of fibrous tissue in the dermis and are considered to be an aberration of the wound healing process. Clinically hypertrophic scar can be differentiated from keloid based on the following features; lack of claw like projections, confinement to the site of original injury, spontaneous regression over time, spontaneous occurrence even without injury and improvement after appropriate surgery. Hypertrophic scars are usually asymptomatic like keloids but pain, pruritus, burning sensation or tenderness may be the presenting complaint. Histopathological differentiating points from keloid are lack of thick, pale, glassy and hyalinized collagen bundle arranged unidirectionally.

Pathophysiology is poorly understood. Any form of injury to the deep dermis such as surgery, ear piercing, burn, foreign body reaction, acne vulgaris and herpes zoster predispose to hypertrophy. Adverse wound healing factors such as improper wound closer, hematoma formation, excessive tension or infection of the wound also contribute to the same. The basic defect is imbalance of anabolic and catabolic process of wound healing leading to excessive production of collagen, fibronectin and proteoglycan under the influence of mainly TGF-β.

Fig. 19.3B Hypertrophic scars

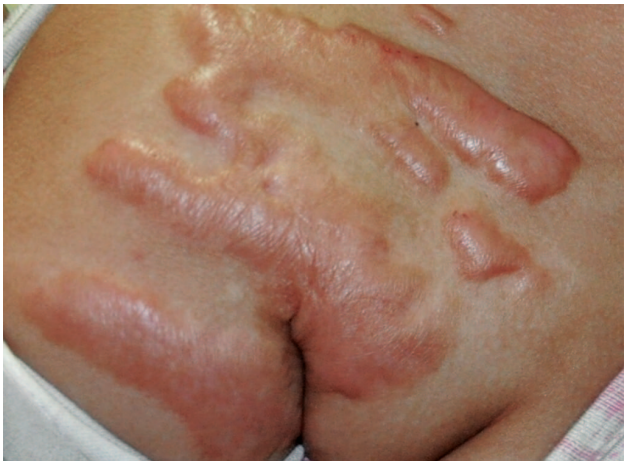

Fig. 19.3C Multiple hypertrophic scars over sacral area

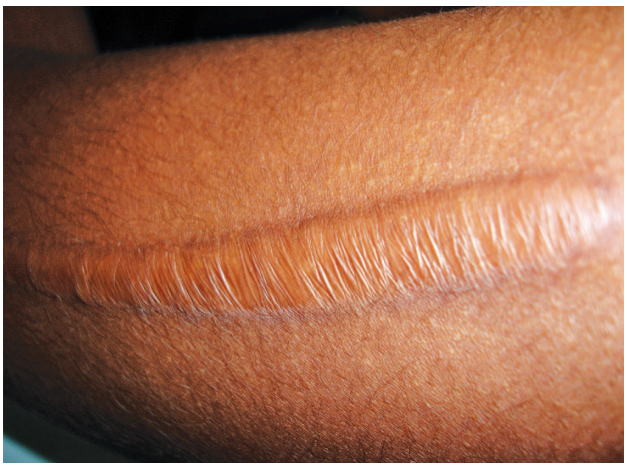

Fig. 19.3D Close up of hypertrophic scar

Preventive measures are very important regarding keloid and hypertrophic scar including avoidance of nonessential cosmetic procedures, minimal tension during wound closure,

and avoidance of incision across joint line and proper wound care.

Several treatment modalities have been tried including intralesional injection of steroid alone or in combination with 5-flurouracil, cryotherapy, compression therapy, silicone gel sheet, intralesional INF-2α, pulsed dye laser, verapamil, ACE inhibitors, imiquimod and retinoic acid.

KELOID (Figs 19.4 to 19.4C)

A keloid is a benign, well-demarcated area of fibrous tissue over growth that extends beyond the original defect. A hypertrophic scar is similar but remains confined to the initial defect and tend to resolve with time. Both hypertrophic scars and keloids become raised and thickened within 3-4 weeks of the provocative stimulus. The lesions become a firm, pink or red plaque, which may grow for months or years. Lesions often assume a dumbbell configuration, but sometimes become bizarre and irregular. The surface of a keloid becomes smoother and rounder extending beyond the area of the original lesion. It is often irritable, hypersensitive and sometimes exquisitely tender. Keloids tend to regress after several years.

Treatment

Intralesional triamcinolone acetonide injection every 3–4 weeks helps regression of keloid as well as alleviation of associated itching. Antihistamine ketotifen alleviates itching as well as said to be suppressing growth of fibroblasts of keloids to some extent. However, since it is strongly sedative, is to be given at night. Other treatment modalities are cryotherapy with liquid nitrogen, application of silicone gel sheet, topical application of heparin, allantoin, etc.

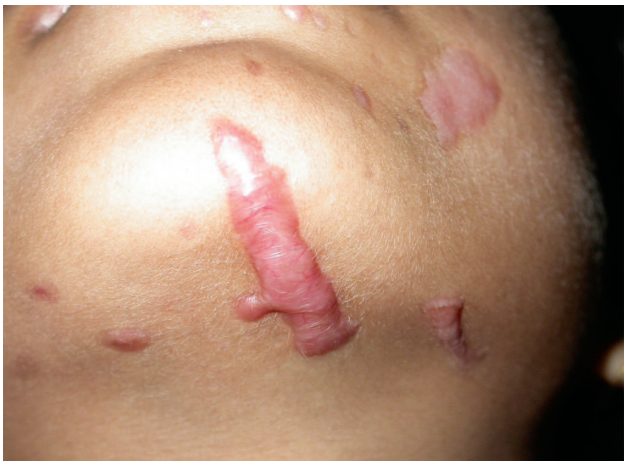

Fig. 19.4A Keloid over chin

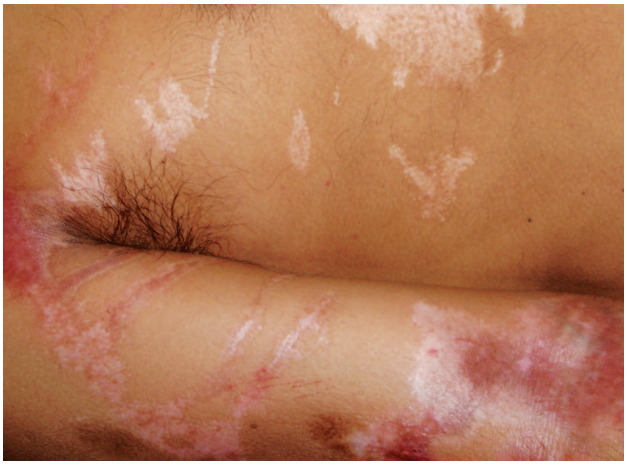

Fig. 19.4B Post-burn keloid

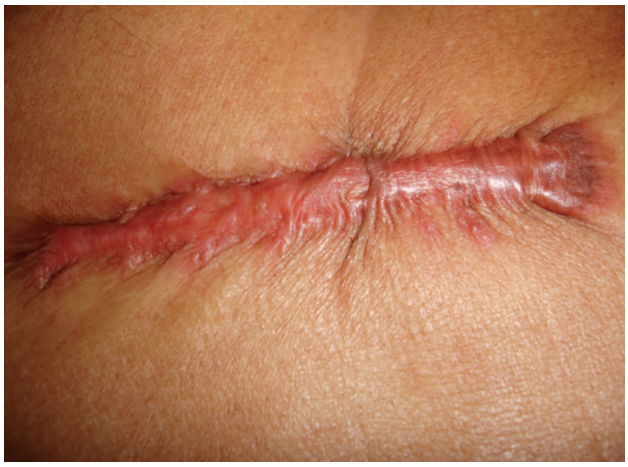

Fig. 19.4 Keloid over abdomen

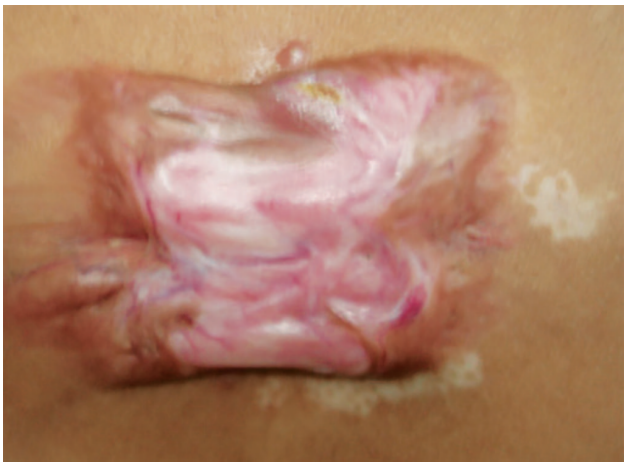

Fig. 19.4C Keloid over chest, a very common site

"Life must be understood backward. But it must be lived forward."—Søren Kierkegaard

TOPICAL STEROID INDUCED CUTANEOUS ATROPHY (Figs 19.5 to 19.6)

Atrophy of the local site of application of a potent topical steroid is not uncommon. Atrophy is mostly seen over face and flexors when a potent topical steroid is applied for a considerable period of time. In most of the cases atrophy is associated with hypopigmentation/depigmentation and telangiectasia. The atrophy can be permanent or irreversible.

VERMICULATE ATROPHODERMA OF THE FACE (Figs 19.7 and 19.8)

Atrophoderma are a group of disorders involving atrophy of skin. The different types are—follicular atrophoderma, vermiculate atrophoderma, atrophoderma of Pasini and Pierini and linear atrophoderma. In vermiculate atrophoderma (syn. Honeycomb atrophy/folliculitis ulerythematosa reticulata) there are bilateral atrophic pits in a reticular fashion on cheeks. The disease has an autosomal dominant mode of inheritance with an onset within 5–12 years of age in childhood. It is now recognized as a part of the keratosis pilaris syndrome. It may be associated with other conditions like neurofibromatosis, oligophrenia, congenital heart block, Down's syndrome. There have been reports of association with cataracts in unilateral lesions.

Clinically there are symmetrically distributed multiple areas of atrophy, 1–3 mm in size, with intervening normal skin, giving a honeycomb or worm like appearance. Common sites

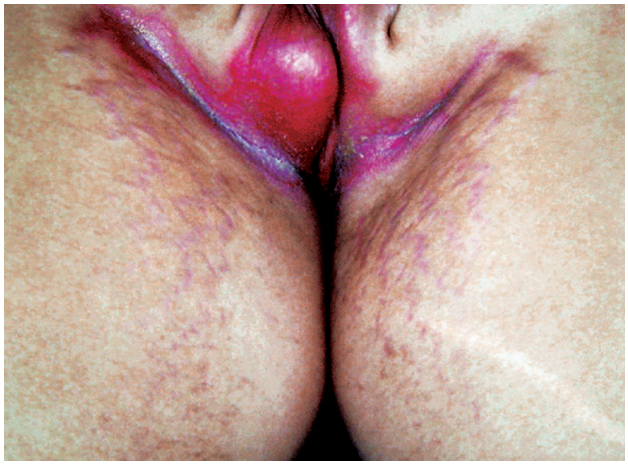

Fig. 19.5 Steroid induced atrophy of skin over thighs

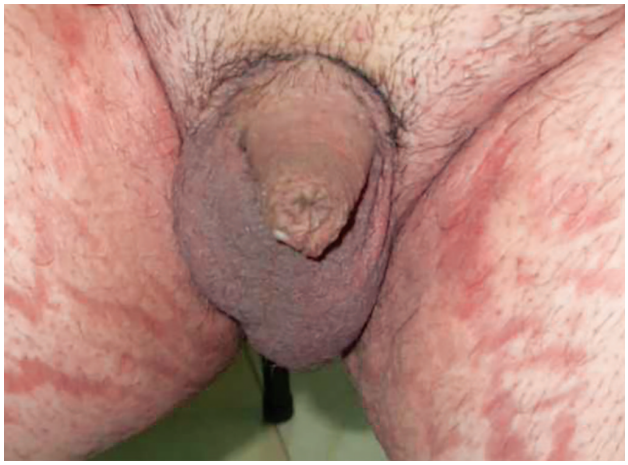

Fig. 19.5A Potent topical steroid-induced atrophy of skin over groin

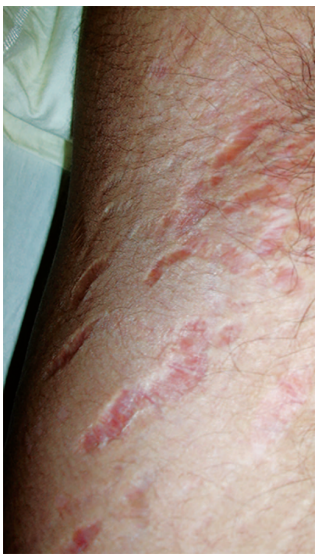

Fig. 19.6 Steroid induced skin atrophy over axilla

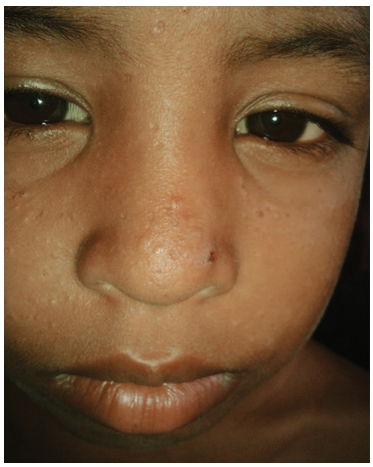

Fig. 19.7 Vermiculate atrophy of face in a 5-year-old boy

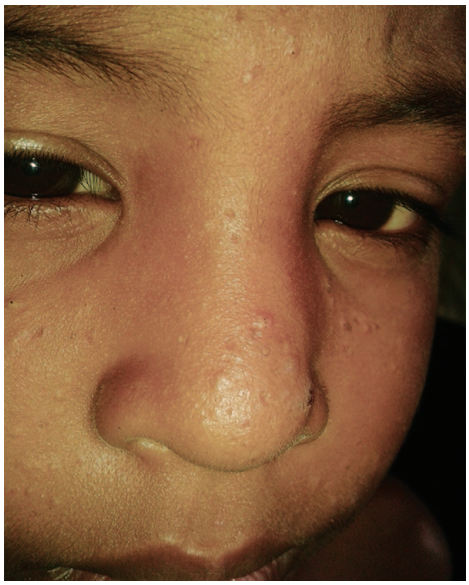

Fig. 19.8 Same boy, close-up of face

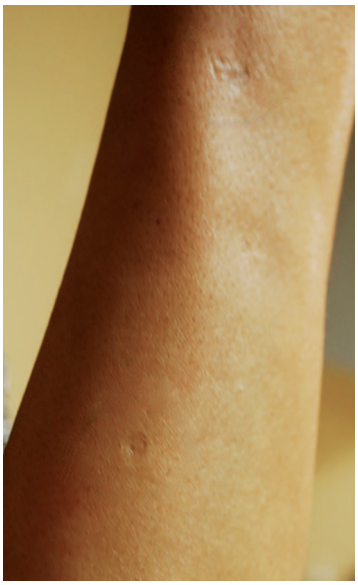

Fig. 19.9 Primary anetoderma over forearm

include the cheeks and pre-auricular areas but the forehead and ears may also be involved. The pathophysiology behind the lesions is possibly a late reaction to inflammation wherein reticulate or honeycomb atrophy develops around follicular plugging. When the follicular plugs are shed, atrophy results from the widely dilated hair follicles.

Histopathologic findings include atrophy of the epidermis, dilated capillaries and mononuclear cell infiltrate around the vessels with basophilic degeneration of collagen with edema. Some hair follicles may be dilated, tortuous and hyperkeratotic with occasional horn cysts. Treatment is unsatisfactory and sometimes lesions spontaneously regress or improve over time. Dermabrasion and laser therapy have been tried with variable success.

ANETODERMA (Fig. 19.9)

It is a term derived from a Greek word which means relaxed skin. It represents and idiopathic atrophic condition leading to oval-rounded outpouchings of soft lax skin. The pathogenesis is unknown but immune mechanisms have been implicated.

Anetodema can be divided into primary and secondary types. The causes for secondary anetoderma includes lichen planus, antiphospholipid antibody syndrome, leprosy, sarcoidosis, tuberculosis, acne, varicella and pilomatricoma to name a few.

Primary anetoderma can be further divided into two types:

1. *Jadassohn-Pellizary type:* In this condition the lesions are preceded by inflammation. Females are more commonly affected than males. The onset is generally in the teens, however, patients up to the age of thirty years can be affected. The lesion starts as a red spot followed by depression with atrophy, wrinkling and herniation.
2. *Schweninger-Buzzi type:* This type of primary anetoderma is not preceded by any inflammation. It presents with sudden appearance of large number of bluish white macular lesions which are protruberant. Females are more commonly affected than males. This condition is slowly progressive.

Anetoderma has been described in premature infant after using gel electrocardiography and it has been postulated that the lesions occur due to local hypoxia and pressure from the electrodes.

Drugs like penicillamine has also been implicated in the causation of anetoderma.

Reccurrent eye dermatitis leads to blepharochalasis.

So far no therapy has been effective in this condition.

20

Miscellaneous Dermatoses

ACANTHOSIS NIGRICANS (AN) (Figs 20.1 and 20.2B)

Acanthosis nigricans is characterized by hyperkeratosis, pigmentations and the affected skin is covered by papillomatous elevations which give it a velvety texture. It is classified into six main types each of which is now believed to be associated with insulin resistance. They are:

i. Hereditary benign acanthosis nigricans.
ii. Benign acanthosis nigricans.
iii. Pseudoacanthosis nigricans.
iv. Drug-induced acanthosis nigricans.
v. Malignant acanthosis nigricans.
vi. Nevoid acanthosis nigricans.

It starts as pigmentation, dryness and roughness of the skin which in the affected areas is grey-brown or black, palpably thickened and covered by small papillomatous elevations which give it a velvety texture. Gradually, the surface becomes mamillated or rugose and larger warty excrescences develop. The sites most commonly involved are the axillae, the back and sides of the neck, the anogenital region and the groins.

Benign Forms

The skin lesions may be present at birth but usually develop during childhood or puberty. They may be unilateral and usually less severe than the malignant forms. Distal extremities are usually spared and the oral mucous membranes are rarely involved. The condition progresses very slowly, tends to become more severe at puberty and then regresses in some patients and remains stationary in others.

Malignant Forms

The lesions are more severe and more extensive. Pigmentation is more prominent and is not confined to hyperkeratotic areas. Thickening of the palms is frequent and the nails may be brittle or ridged. Hair loss may occur. Irritation is common. The mucous membranes and mucocutaneous junctions

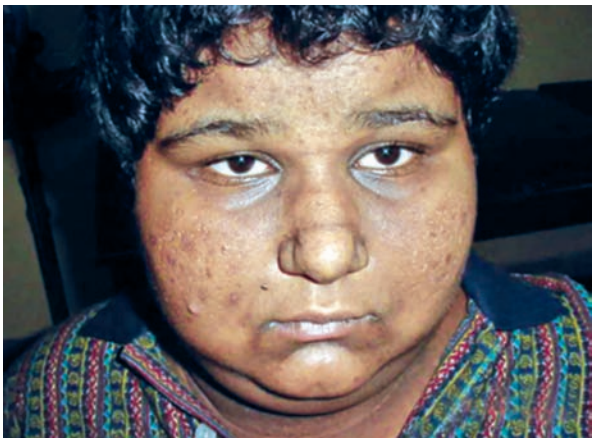

Fig. 20.1 Acanthosis nigricans over face

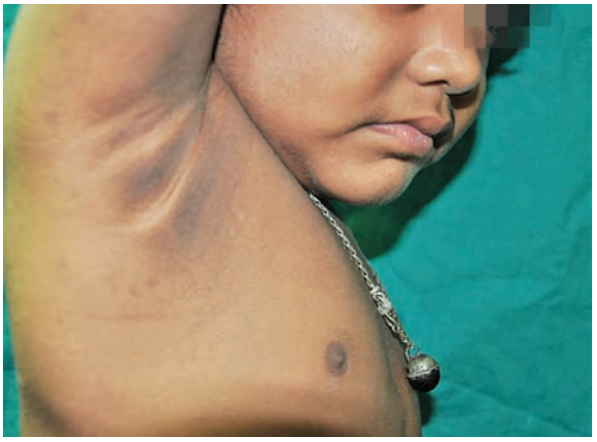

Fig. 20.1A Acanthosis nigricans

"Whatever is reasonable is true, and whatever is true is reasonable."—GWF Hegel

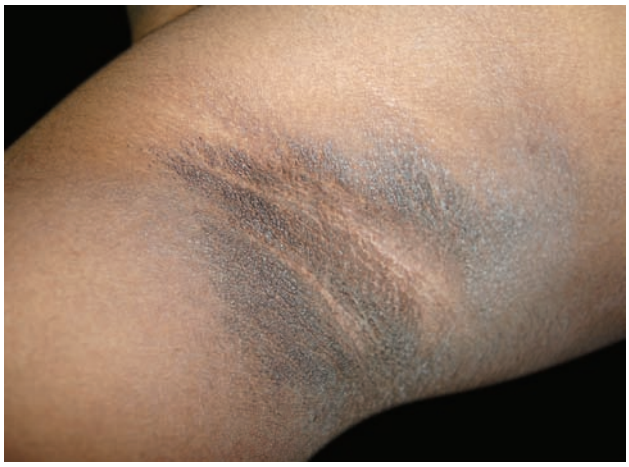

Fig. 20.2 Acanthosis nigricans, close-up

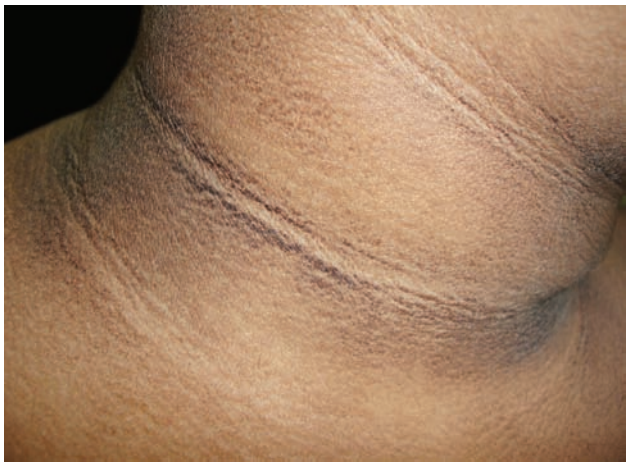

Fig. 20.2A AN over neck

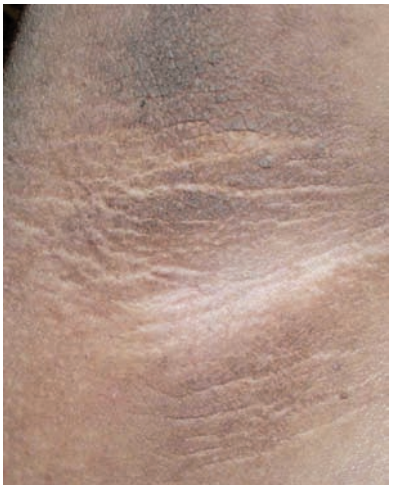

Fig. 20.2B Pseudo AN in an obese girl

are involved in at least 50 percent of the cases, and warty papillomatous thickening around the lips and eyes may be a presenting symptom. The onset of the acanthosis nigricans may precede other symptoms by as long as 5 years but the interval is usually considerably shorter. Removal of the tumor may be associated with regression of the clinical signs but relapses are common.

Natural History

Many tumors have been reported including bladder, kidney, bile duct, thyroid esophagus, bronchus and rectum.

It is important to exclude associated endocrine disorder or internal malignancy by thorough clinical examination and necessary investigations. Associated obesity or endocrinopathy, if any, needs to be addressed.

Treatment

Topical retinoic acid (0.025% to 0.1%) either alone or in combination with salicylic acid or lactic acid in emollient base applied daily at night for 2–6 months usually helps to reduce the intensity of pigmentation as well as thickening of the skin. The areas need to be cleaned regularly at the time of bathing with cotton balls or loofah. It is to be remembered that melanocyte or melanin has got no role to play in the pigmentation of AN. Hence, demelanizing creams containing 2 percent hydroquinone is of no use in such conditions. Topical steroids are better avoided as their applications over body folds can lead to development of atrophic striae and telangiectasiae. Oral metformin and topical tazarotene are newer agents which have been found useful for in some cases.

DYSKERATOSIS CONGENITA (Figs 20.3 to 20.6)

It is a rare X-linked recessive disorder characterized by atrophy and pigmentation of the skin, nail dystrophy, leukoplakia, bone-marrow failure and a predisposition to malignancy. The nails become dystrophic and are shed between the ages 5–13 years. Pigmentary changes appear simultaneously or 2–3 years after the nail changes and takes the form of fine, reticulate, gray-brown pigmentation on the neck, thighs and trunk. The skin is atrophic with numerous telangiectasiae. The lesions of mucous membranes take the form of blisters and erosion on the lingual and buccal mucous membranes succeeded by irregular patches of leukoplakia.

Natural History

The incidence of carcinoma in the areas of leukoplakia is high. The prognosis is poor.

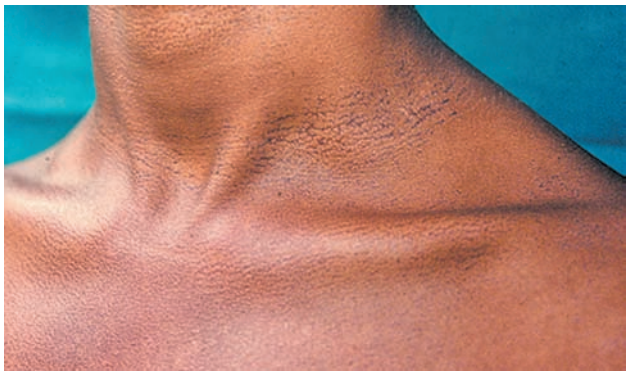

Fig. 20.3 Close-up of pigmentation in the same patient

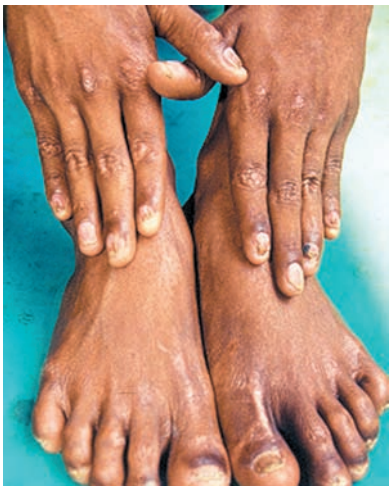

Fig. 20.4 Dystrophy of all the 20 nails in dyskeratosis congenital

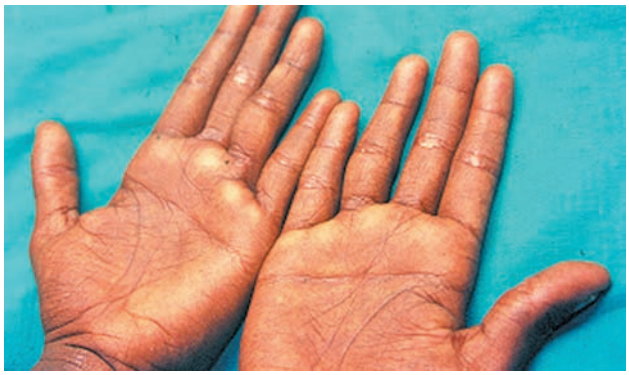

Fig. 20.5 Loss of palmar ridges in dyskeratosis congenita

Treatment

Counseling of patients and early detection of malignancies are all that can be offered to these patients. In case malignancy is detected, a pediatric oncologist's consultation should be sought.

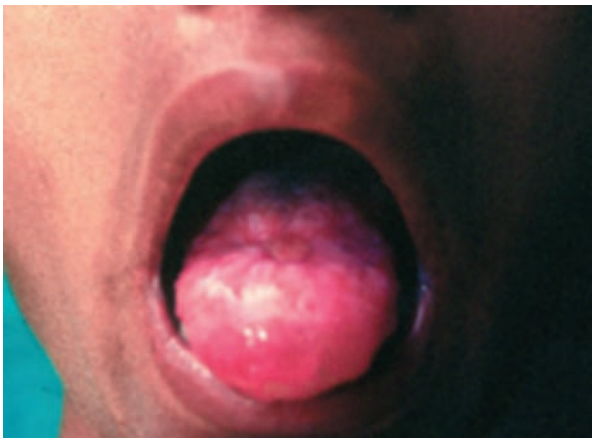

Fig. 20.6 Leucoplakia (premalignant) in the same boy

WISKOTT-ALDRICH SYNDROME (Figs 20.7A to 20.8A)

This is a X-linked recessive disorder characterized by thrombocytopenic purpura, eczema and recurrent infections. This triad becomes apparent during the first six months of life. Bloody diarrhea, epistaxis and cutaneous petechiae are particularly common. Eczema usually appears during the first month, most commonly affects the scalp, face, flexures and napkin area and is essentially indistinguishable from atopic eczema apart from the frequent presence of purpura and excessive bleeding from excoriations.

Management

Genetic counseling and reassurance of the parents form the cornerstone of management. For eczematous eruptions, topical corticosteroids are used along with emollients. For excruciating pruritus, antihistamines like cetirizine or hydroxyzine are prescribed. Rotational oral antibiotics are to be prescribed to prevent secondary infection from scratching. Periodic blood or fresh platelet transfusion or plasma transfusion often helps these children. Allogenic bone narrow transplantation following ablation of bone marrow with chemotherapeutic agents help to prolong their lifespan.

INFANTILE DIGITAL FIBROMATOSIS (IDF) (Figs 20.9 to 20.12)

This is a benign tumor of myofibroblasts that presents clinically as firm, smooth, pink or flesh colored nodules on one or more fingers or toes at birth or develops at any age up to the third year. The thumbs and great toes are spared. The swellings are present on the extensor aspects or the side of the terminal phalanges and are firmly attached to the skin.

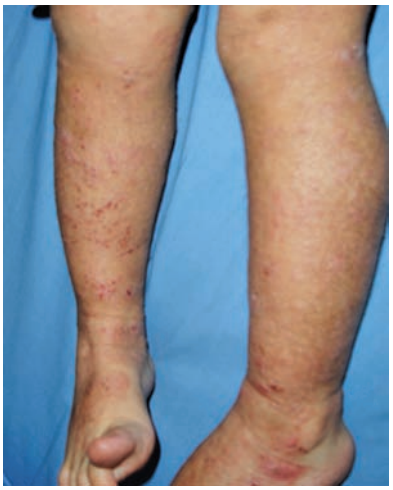

Fig. 20.7A Eczematous lesions with hemorrhagic crusts in a 3-year-old boy with Wiscott-Aldrich syndrome

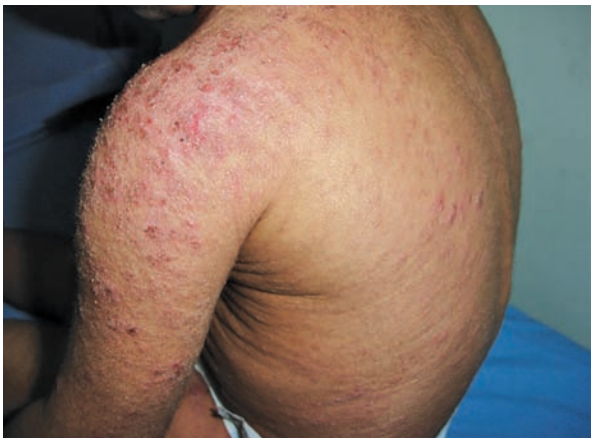

Fig. 20.7B Upper arm and back in Wiscott-Aldrich syndrome

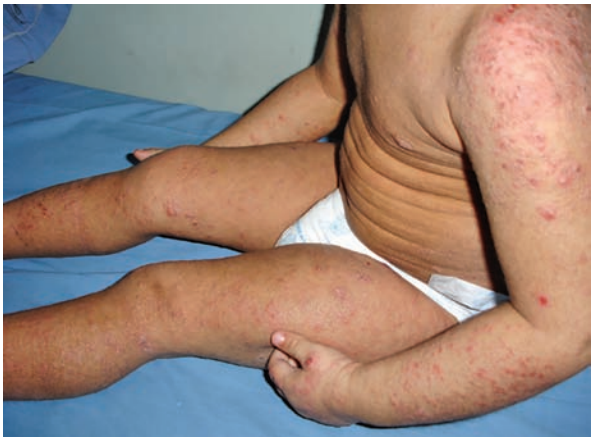

Fig. 20.7C Involvement of upper arms, thighs and legs in Wiscott-Aldrich syndrome. Note excoriation and hemorrhagic lesions

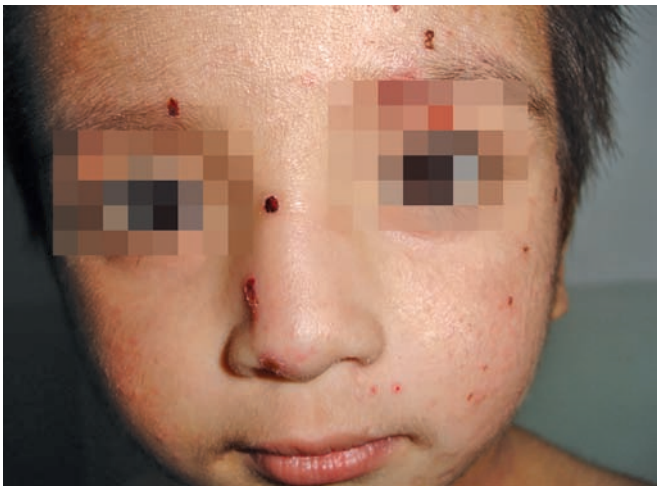

Fig. 20.7D Hemorrhagic papules over face in Wiscott-Aldrich syndrome

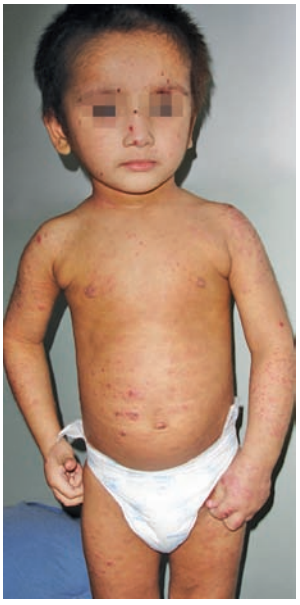

Fig. 20.8 Eczematous lesions of Wiskott-Aldrich syndrome in a 2-year-old boy

Natural History

Spontaneous regression may occur in 2–3 months.

Treatment

Explaining the condition to the parents and reassuring them are extremely important. They should be clearly told about the chances of spontaneous resolution of some of the lesions. This can avoid unnecessary and untimely surgery in them.

"Man is born free, but is everywhere in chains."—Jean-Jacques Rousseau

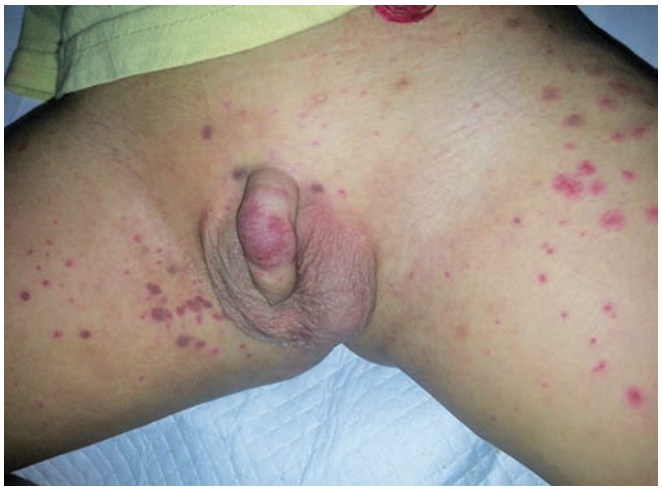

Fig. 20.8A Hemorrhagic lesions of WAS

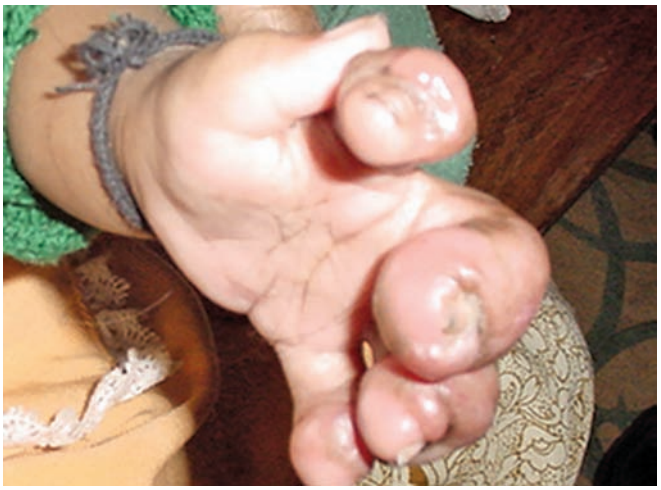

Fig. 20.11 Close-up of IDF lesions

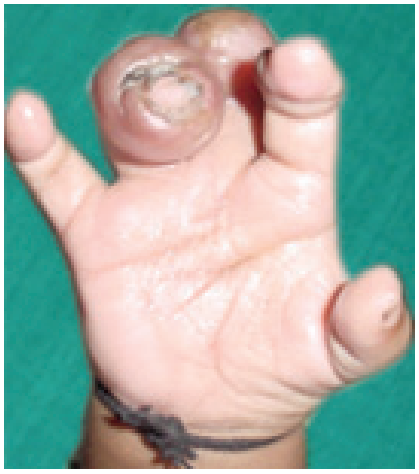

Fig. 20.9 Erythematous scaly papulonodules, note sparing of thumb

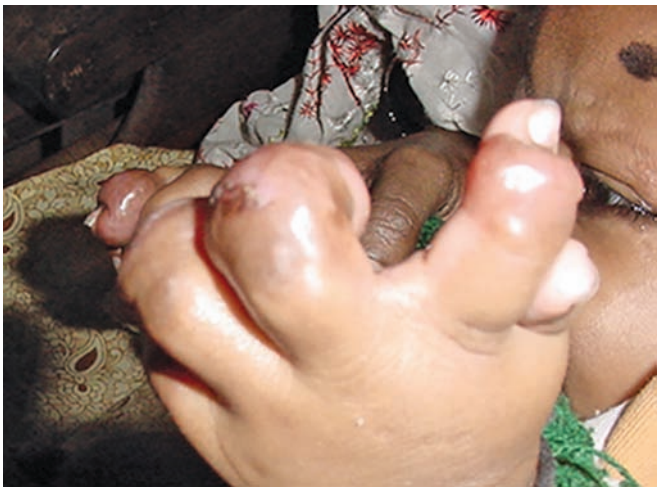

Fig. 20.12 Sparing of thumb—close-up

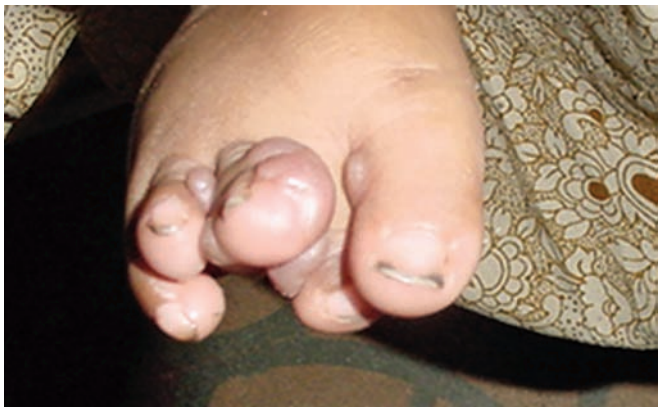

Fig. 20.10 Erythematous scaly papulonodule; note sparing of great toe

ERYTHEMA NODOSUM (Figs 20.13 to 20.15)

Erythema nodosum represents a delayed cell-mediated hypersensitivity syndrome characterized by red, tender nodular lesions that usually occur on the pretibial surface of the legs and occasionally on the other areas of skin where subcutaneous fat is present.

Etiology

In children streptococcal and other respiratory tract infections and primary tuberculosis are the most common causes of erythema nodosum. Other disorders which can precipitate erythema nodosum are leprosy, coccidioidomycosis, histoplasmosis, leishmaniasis, cat-scratch disease, *Mycobacterium*

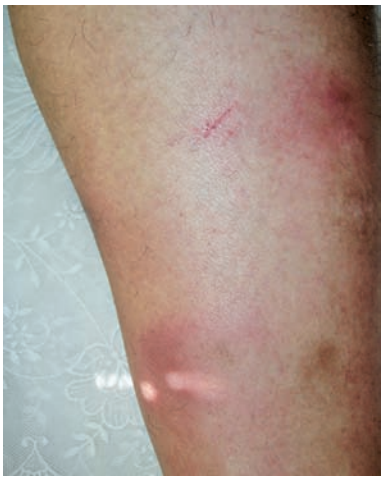

Fig. 20.13 Erythema nodosum, close-up

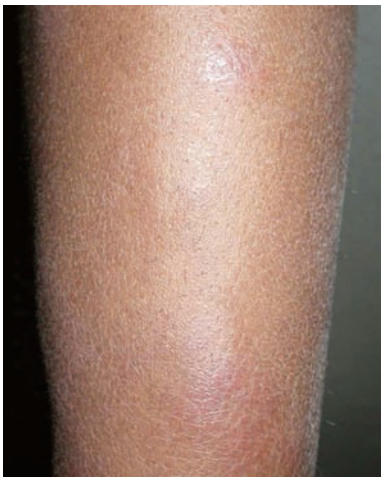

Fig. 20.14 EN over legs

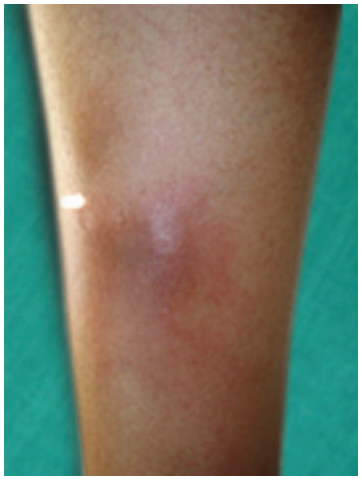

Fig. 20.15 Close-up of erythema nodosum

marinum infection and fungal infections. Noninfectious causes of EN are sarcoidosis, Behçet's disease, ulcerative colitis, regional ileitis and internal malignancies.

Drugs Responsible

Reactions to various drugs like sulphonamides, phenytoin, iodides, bromides (present in some cough syrups) and some hormonal preparations containing estrogen and progesterone.

Although a disease of adulthood, EN can occur in children older than 10 years. Girls are slightly more affected than the boys. Lesions, which are 1–1.5 cm in diameter, occur symmetrically, usually over the shins, occasionally on the knees, ankles, thighs, extensor aspects of the arms, the face and neck and rarely on the palms. Initially, red in color these warm and tender nodules develop a purplish bruise like appearance. The lesions last for 3–6 weeks. Recurrences may occur over a period of weeks to months but attacks are seldom recurrent and arthralgia may precede, coincide or follow the development of eruptions.

Treatment

The management is directed at the identification and treatment of the underlying cause. Bed rest with elevation of the patient's legs helps reduce pain and edema. Salicylates and other NSAIDs may reduce the pain and inflammation. Intralesional corticosteroids frequently cause rapid involution of individual lesion. In persistent and recurrent eruptions, oral corticosteroids may be beneficial.

FRICTIONAL LICHENOID DERMATITIS (FLD) (Figs 20.16 and 20.17)

This presents in young children or adolescents as pinhead-sized pale or white papules or warty lesions on the knees, elbows and dorsal surface of the hands. The condition is mildly pruritic and has been more common in spring and summer. The probable etiology is friction from floor, walls, sand or any other rough surfaces and many of these children are atopic. The condition often recurs in childhood.

Treatment

The condition is treated with either a mildly potent topical steroid or tar ointment.

SWEET'S SYNDROME (Figs 20.18 to 20.19)

This is also known as acute febrile neutrophilic dermatosis.

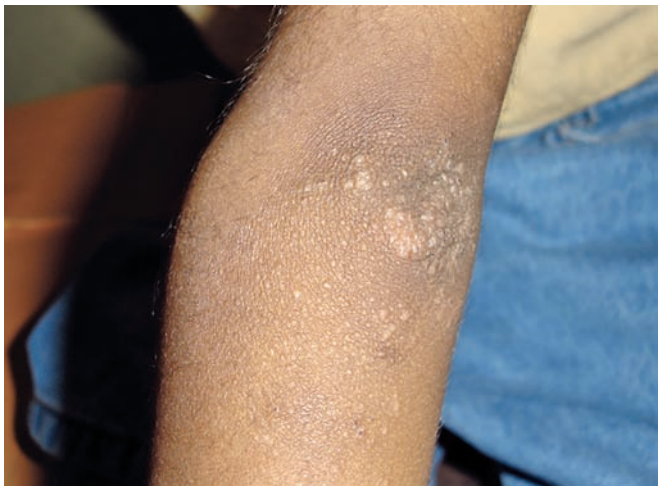

Fig. 20.16 Lichenoid skin colored papules of FLD over elbow

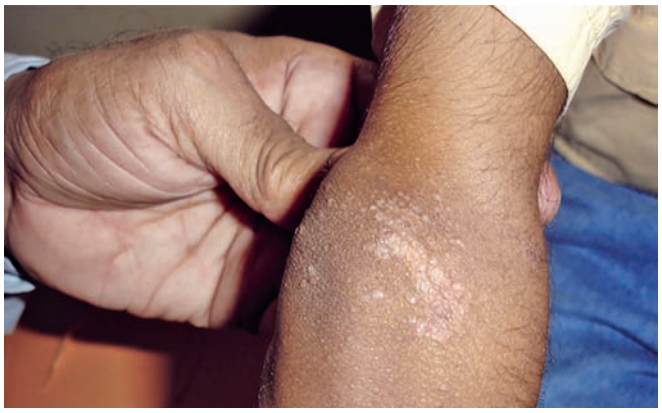

Fig. 20.17 Close-up of FLD lesions over elbow

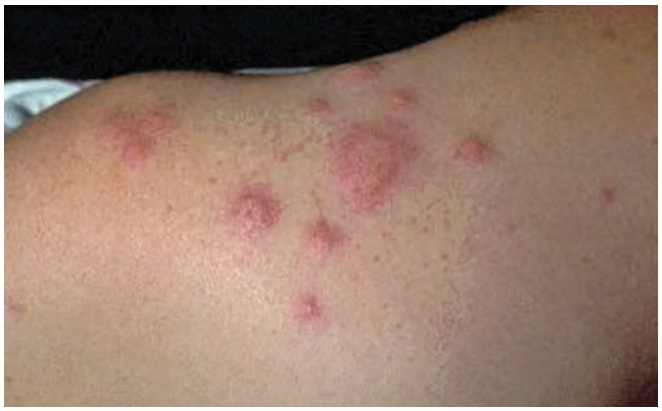

Fig. 20.18 Erythematous to plum colored plaques of Sweet's syndrome

It is an uncommon disorder characterized by painful papules, nodules and plaques on the limbs, face and neck accompanied by fever and neutrophilic leukocytosis. It is most frequent in women but has also been reported in children. It perhaps represents a hypersensitive reaction to bacterial, viral antigen. Or, it may be an immunologic response to leukemic or preleukemic state or other malignancies. Patients usually have a spiky fever associated with characteristic skin eruptions. Elevated plaques measuring 1 cm or more in diameter, distributed asymmetrically and tend to develop partial clearing resulting in an arcuate configuration. The lesions are indurated, red-to-plum colored and heal without scarring. Leukocytosis ranging from 15,000 to 20,000 is common and 80–90% cells comprise of neutrophils. Polyarthralgia and polyarthritis of large joints have been reported in 15–20% of patients.

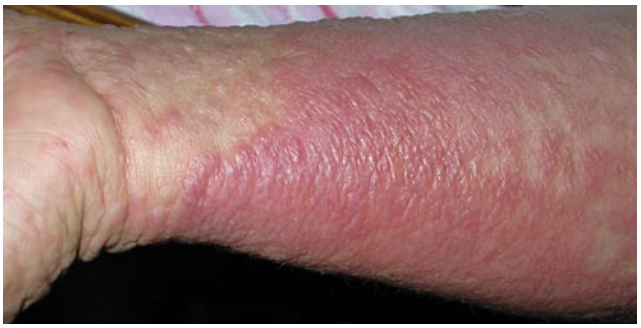

Fig. 20.18A Sweet's syndrome

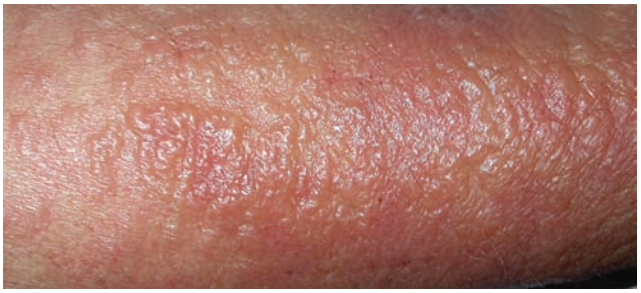

Fig. 20.19 Close-up of Sweet's syndrome

Treatment

Treatment is with systemic corticosteroids (2 mg/kg/day up to a dosage of 30–60 mg/day of prednisolone or its equivalent/day for 10 days). Once the patient responds, the dose is tapered gradually over 1–2 months in an effort to prevent recurrences. Potassium iodide, clofazimine, colchicine and dapsone have also been used with success.

PALMOPLANTAR HYPERHIDROSIS (Figs 20.20 and 20.21)

Hyperhidrosis may be classified as primary or secondary. Primary hyperhidrosis is diagnosed often ruling out all

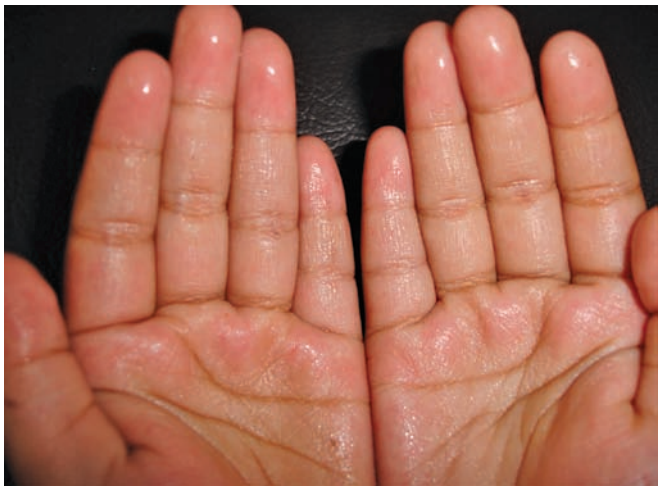

Fig. 20.20 Palmoplantar hyperhidrosis

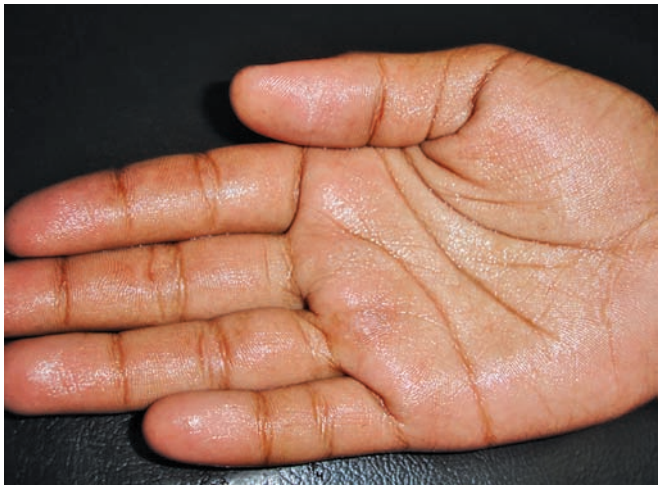

Fig. 20.21 Palmoplantar hyperhidrosis, close-up

other causes of secondary hyperhidrosis. Palmoplantar hyperhidrosis comes under the purview of localized hyperhidrosis. Emotional activity or stress increases sweating over palms and soles. Sometimes, it may be the manifestation of deep-seated mental disturbances. The sweating of palms and soles may be either phasic or continuous. The phasic hyperhidrosis is precipitated by emotional stress and strain and there is no difference in summer and winter. This type of hyperhidrosis is often complained by children and/or their parents during examinations as they face difficulty in holding pen in their hands. The continuous hyperhidrosis is more distressing in summer. Often palmoplantar hyperhidrosis is associated with axillary hyperhidrosis. In some cases, there may be underlying thyrotoxicosis which needs to be ruled out.

Treatment

Explanation of the nature of the condition and reassurance is all that is necessary in many patients with hyperhidrosis. It is important to tell the children and their parents that it is going to improve slowly over many years. Various topical agents used are 1% formalin, 10% glutaraldehyde, 20% Aluminium chloride soaking for 15–20 minutes twice/day for 4–6 weeks. One of the more satisfactory method of controlling continuous hyperhidrosis is by iontophoresis, either using tap water or anticholinergic drugs, e.g. glycopyrronium bromide.

Of late botulinum toxin injection into the palms have been shown to reduce hyperhidrosis and the effect may last up to 6 month or even more. However, this is a painful and costly procedure. Various systemic anticholinergic atropine-like drugs are occasionally used to treat hyperhidrosis. However, their systemic adverse effects out weigh their efficacy. In very frustrating cases, even surgical methods like sympathectomy may be undertaken.

MILIA (Figs 20.22 to 20.24)

Milia are small epidermal inclusion cysts within the dermis. They are multiple, 1–2 mm, whitish, hard globoid lesions arising spontaneously over face. In children and young adults they arise following trauma or friction. Vigorous scrubbing and rubbing of face can lead to formation of milia. In some diseases where there is damage to the dermoepidermal junction, milia may form. These are often seen at the margins of the healed lesions of CBDC, bullous pemphigoid, epidermolysis bullosa, etc.

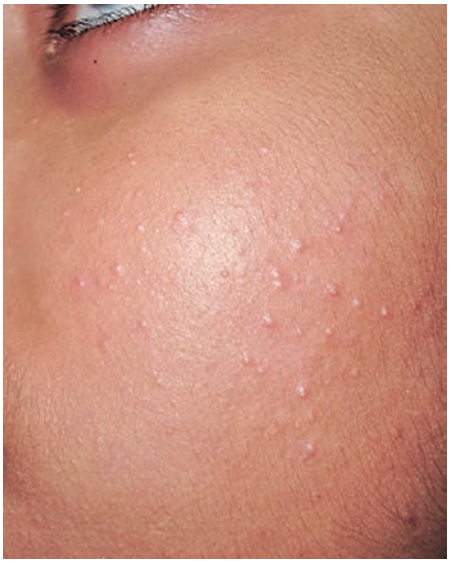

Fig. 20.22 Primary milia over cheek in a young girl

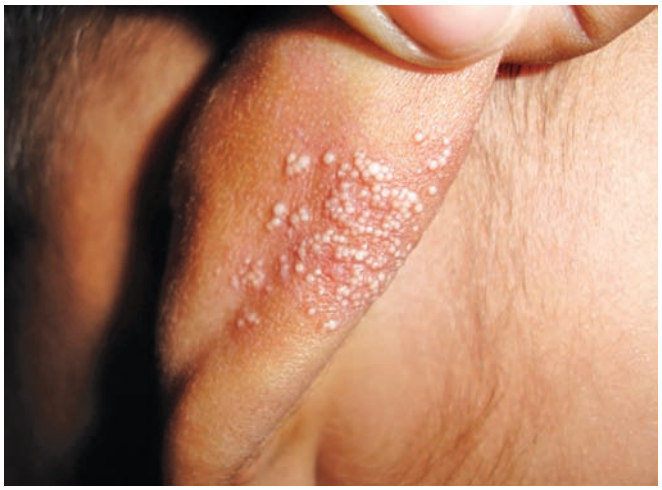

Fig. 20.23 Milia over pinna in a child with EB dystrophica

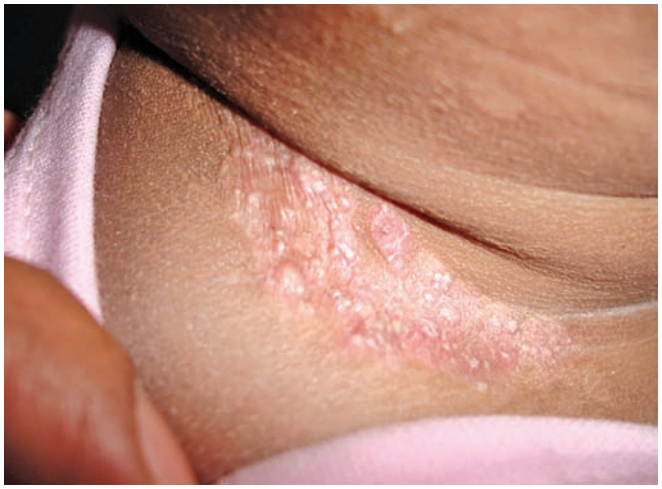

Fig. 20.24 Same child with milia at the border of a healed bolla of EB

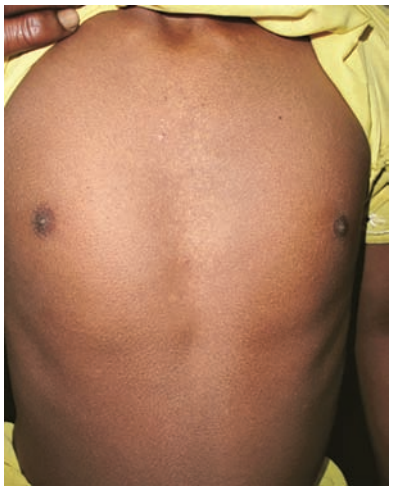

Fig. 20.25 Typical raindrop pigmentation in a young girl with chronic arsenic poisoning

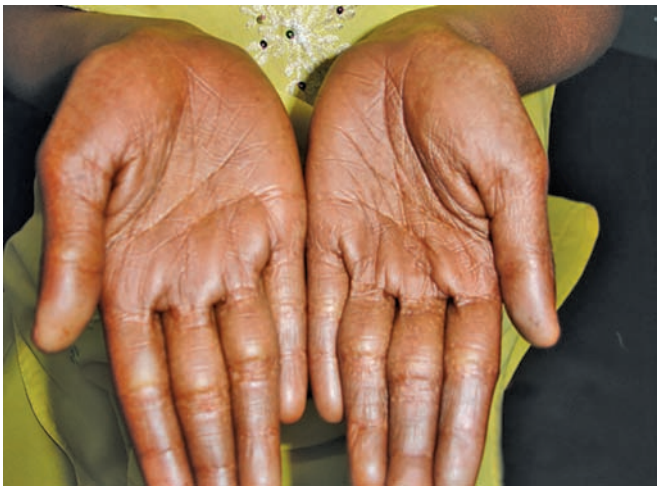

Fig. 20.26 Palmar pigmentation in chronic arsenic poisoning

Treatment

Milia can be expressed out with a fine needle (24 or 26G), or can be destroyed by light electrofulguration or electrodesiccation.

CHRONIC ARSENIC POISONING (Figs 20.25 to 20.28)

Etiology and Epidemiology

Prolonged ingestion of inorganic arsenic may result in diffuse pigmentation, most intense on the trunk. Where macular areas of depigmentation within areas of hyperpigmentation produce the distinctive raindrop appearance. Many cases also show arsenical keratoses, but the severity of the two manifestations of arsenic poisoning is not necessarily proportionate and either may be present alone. Arsenic exposure in the first half of the 20th century was often caused by the ingestion of medical arsenic in the form of potassium arsenite (Fowler's solution) used to treat asthma and psoriasis. Today, arsenic exposure most frequently occurs because of high arsenic levels in well water from either natural sources or as a result of contamination from mining waste.

A considerable proportion of any population exposed to chronic arsenic intoxication develops keratosis. The frequency increases with the degree of intoxication and its tolerance. The condition is mostly reported from Bangladesh, West Bengal and Taiwan resulting from well water contamination.

Fig. 20.27 Pigmentation over fingers in chronic arsenic poisoning

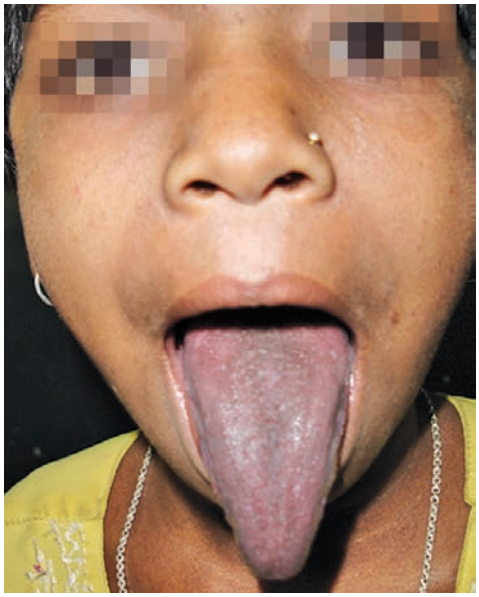

Fig. 20.28 Pigmentation of tongue in chronic arsenic poisoning

Clinical Features

The keratosis presents as corn-like punctate papules characteristically affecting the palms and soles. These gradually enlarge, thicken and increase in number. The fingers, back of the hands and more proximal parts of the extremities may be involved. Induration, inflammation and ulceration occur when the lesions become malignant. There may be areas of Bowen's disease in other sites and multiple BCCs, mainly of the trunk, may occur in association.

Differential Diagnoses

The palmar lesions have to be differentiated from the various types of punctate keratosis, e.g. disseminated punctate keratosis, Darier's disease, lichen planus, which usually have characteristic lesions elsewhere. Plantar warts differ in being papillomatous.

Treatment

The multiplicity of the keratoses makes treatment difficult. Where it is necessary the use of a keratolytic ointment and trimming down of the surface is helpful. Oral acitretin has been seen to be beneficial. All affected patients should be examined periodically for evidence of malignant change and for signs of visceral malignancy. Stoppage of drinking contaminated water from the well is to be advocated in the patient and the community at large.

FORDYCE'S SPOTS (Figs 20.29 and 20.30)

Fordyce's spot (Fordyce's condition, Fordyce's disease) is a commonly observed benign condition characterized by minute yellowish macules and globoid papules that may form large plaques. They are often symmetrical and generally found on the vermilion border of the lips and oral mucosa and, at the times, the glands penis or labia minora. The disorder is a manifestation of aberrant or ectopic sebaceous gland and is uncommon in young children. These become more apparent during adolescence. The disorder is asymptomatic. Explaining the condition and reassurance of the patients/parents is all that is necessary.

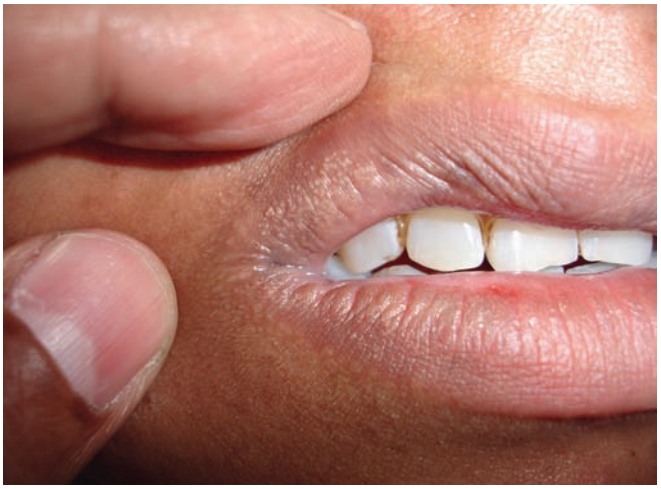

Fig. 20.29 Fordyce's spots over lips

"We do not see things as they are; we see things as we are."—Talmud

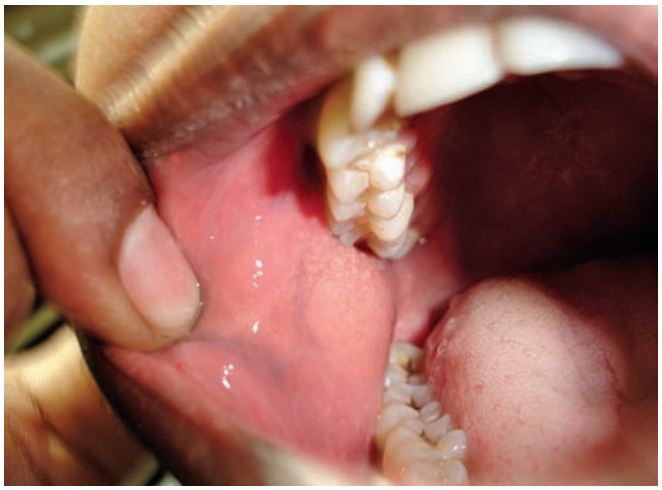

Fig. 20.30 Fordyce's spots over cheek mucosa

POLYMORPHOUS LIGHT ERUPTION (Figs 20.31 to 20.35A)

It is the most common of the idiopathic photosensitive disorders. It mostly occurs between 20 and 30 years of age and in lighter skin. However these days the author has been seeing quite a good number of children with polymorphous light eruption (PMLE). The exact etiology is not known but it is thought to a delayed hypersensitivity reaction to UV rays in the wavelength of 290 to 480 nm.

The lesions usually present as polymorphic lesions usually after 24–72 hours' intense exposure to sunlight. Often a history of playing in the ground for 6–8 hours a day or going on vacation to seaside is available from the children or parents. The lesions in Indian patients mostly manifest as hypopigmented macules of various size and shape over face or extensor of the arms and forearms. The lesions are mildly itchy and a history of slight burning feeling on exposure to sun is often available. The lesions are to be differentiated with pityriasis alba and pityriasis versicolor.

The treatment is avoidance of direct sunlight exposure, application of mild to moderately potent corticosteroids for 2–4 weeks. For itching, antihistamines may be given. Use of a good chemical sunscreen is mandatory throughout the day (even when not going out). In severe cases oral antioxidant containing betacarotene for months together is useful as an oral sunscreen. The condition often recurs and at times may be each year for few months. This may continue for a number of years. Therefore, children/parents are to be told about that and counseling is to be done.

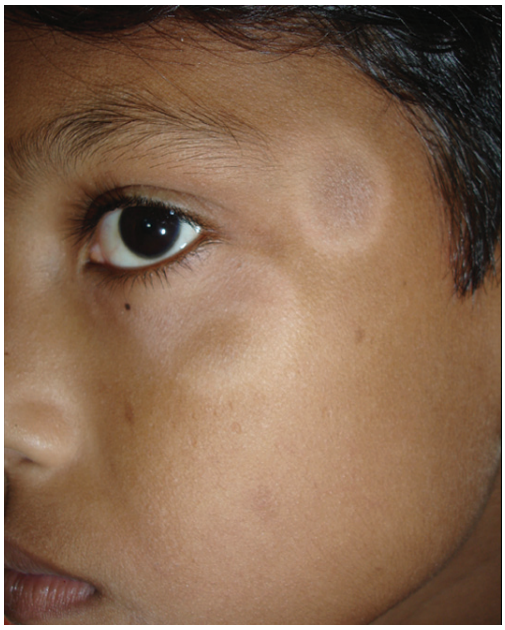

Fig. 20.31 Hypopigmented well circumscribed lesions of PMLE in a 7-year-old boy

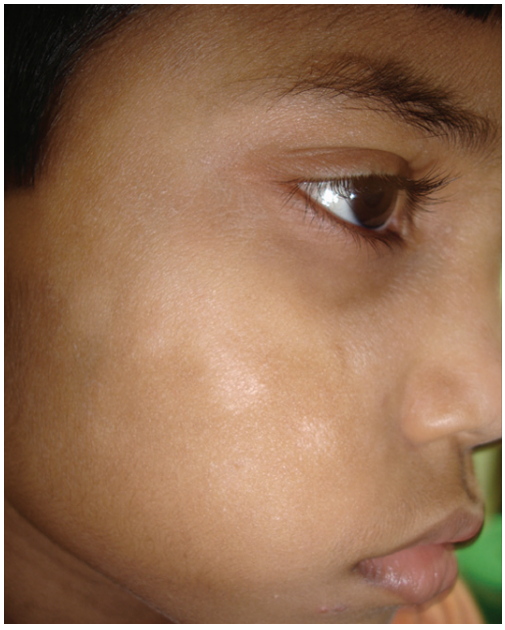

Fig. 20.32 More diffuse involvement of face by hypopigmented lesions in PMLE

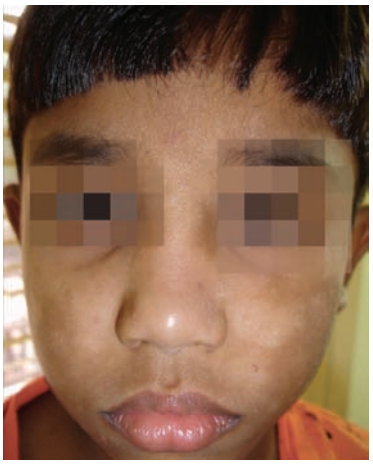

Fig. 20.33 Same boy with PMLE, note bilateral symmetrical involvement with hypopigmented lesions over photoexposed areas of face

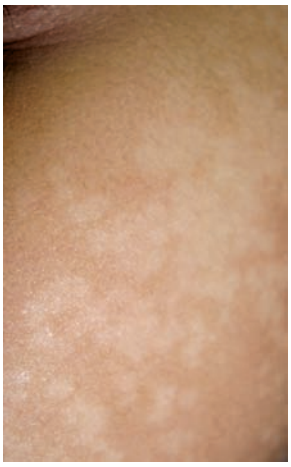

Fig. 20.34 Close-up of PMLE lesions over face

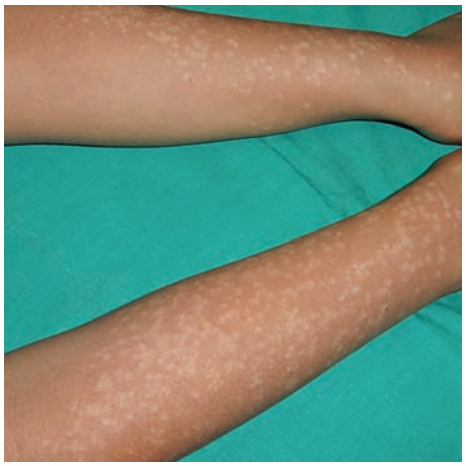

Fig. 20.35 PMLE over outer aspect of forearms

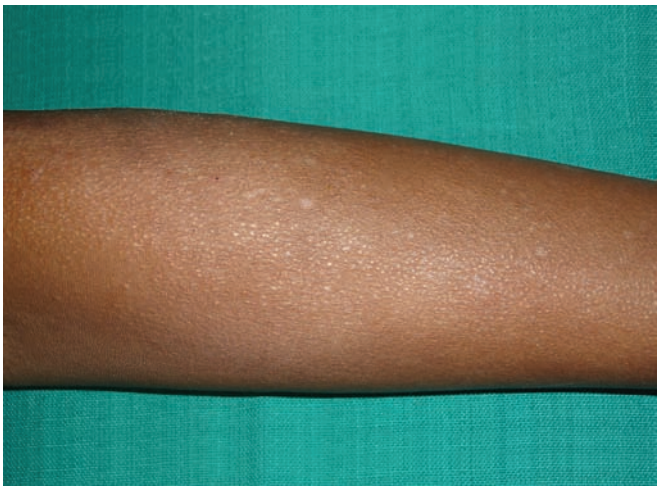

Fig. 20.35A Hypopigmented and lichenoid papules of PMLE

MELKERSSON-ROSENTHAL SYNDROME (Figs 20.36 to 20.39)

Melkersson-Rosenthal syndrome is a triad of orofacial edema, recurrent facial nerve palsy and scrotal tongue. It was described by Melkersson in 1928. It is rarely seen in children. Cheilitis granulomatosa is one component of this syndrome.

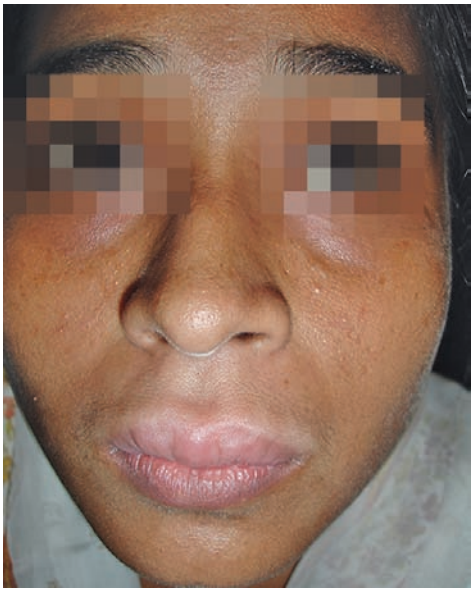

Fig. 20.36 Melkersson-Rosenthal syndrome, note swelling of lip (macrocheilia)

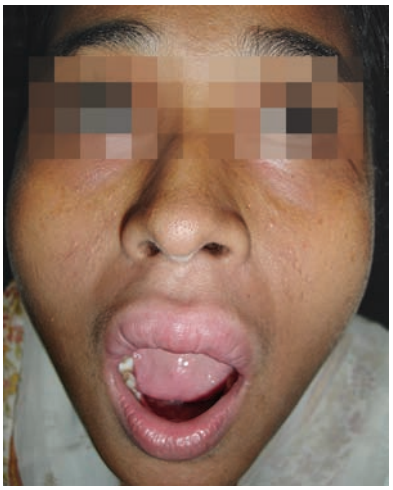

Fig. 20.37 Same boy with MR syndrome, note scrotal tongue

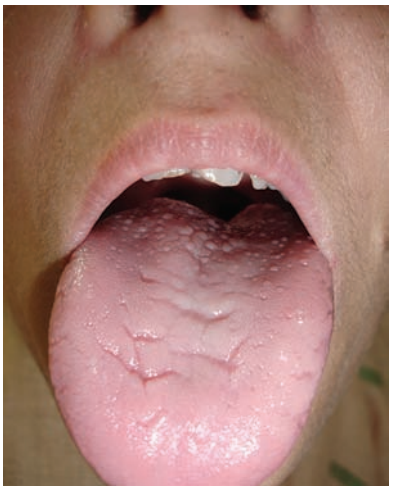

Fig. 20.38 Scrotal tongue in MR syndrome

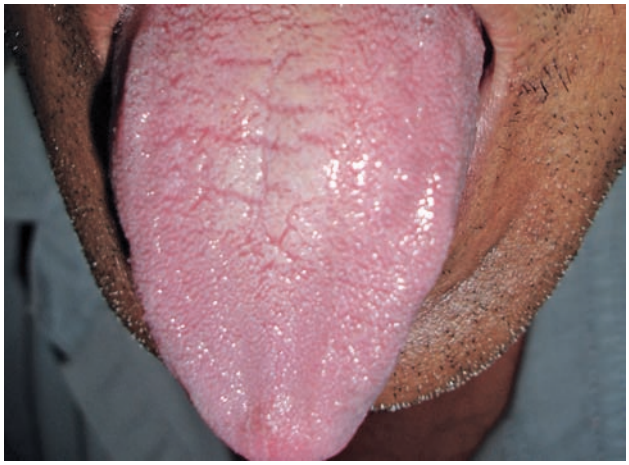

Fig. 20.39 Father of the boy having scrotal tongue

Etiology

The cause is exactly not known. Various etiology implicated are genetic factors, infective agents like *Toxoplasma gondii*, *Treponema palladium*, *Mycobacterium tuberculosis*, *Mycobacterium leprae*, herpes simplex and *Borrelia burgdorferi*. It is associated with Crohn's disease and sarcoidosis.

Clinical Features

Clinically, it presents as nonpainful swelling of lips, gradually the swelling becomes hard in consistency like rubber. Erythema, erosions, ulceration, vesicles and pustules may be present on oral cavity, vermillion border of lips, upper airways, gums, tongue, palate, pharynx and larynx. Mucosal cobblestone appearance can occur. Facial paralysis may be unilateral, bilateral, partial or complete. Fissured tongue is present only in 30% of pediatric cases.

Diagnosis

Diagnosis of this entity is mainly clinical. It should be differentiated from angioneurotic edema. Persistence of edema in between attacks and granulomatous pathology on skin biopsy confirms the diagnosis.

Treatment

Treatment is mainly symptomatic. Oral steroids, intralesional steroids, immunosuppressants, clofazimine, metronidazole, erythromycin have been tried with variable response. Cheiloplasty can be done.

DERMATITIS ARTEFACTA (Figs 20.40 and 20.41)

Dermatitis artefacta, a psychocutaneous disorder characterized by self-inflicted skin injury. This is a rare pathology with female preponderance. Here patients deny their role in causation. In most of the cases, clinical manifestations are caused by traumatic physical manipulation or by irritant application but at times it may be diverse and creative too.

The basic underlying pathogenesis in most of the cases is psychiatric. Proposed psychosocial factors associated with dermatitis artefacta are post-traumatic stress disorder, sexual abuse, borderline personality disorder, loss of parent, unstable body image, dissociative symptoms, child abuse, obsessive compulsive disorder, depression, psychosis and mental retardation. Though the purpose is to assume a sick role, obvious evidence of secondary gain is lacking in majority of the patients.

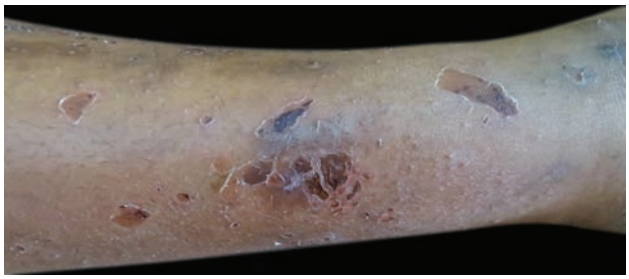

Fig. 20.40 Dermatitis artefacta, note bizarre size and shape of lesions

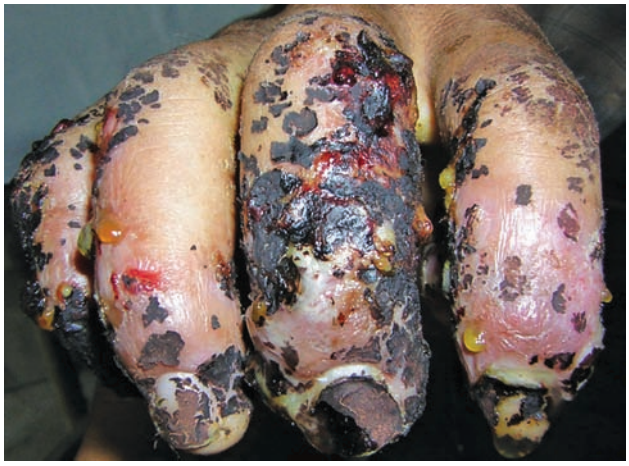

Fig. 20.41 Dermatitis artefacta over fingers

Characteristic clinical features are 'hollow history', strong denial by the patient of inflicting the lesions. Cutaneous lesions are bizarre shaped, oddly distributed with geographic borders and are usually restricted to the accessible parts. Some of the morphological patterns depending on the mode of injuries are blisters, excoriation, superficial erosion, abrasion, ulcer, erythema, edema, and ecchymoses.

Management requires a holistic approach with interdisciplinary coordination. As histopathology is inconclusive, thorough history and clinical examination are sole diagnostic tools. Diagnosis is confirmed by the observation that no new lesion appears at the protected area or when the patients are kept under 24 hours surveillance. Besides symptomatic treatment with positive measures; thorough psychiatric evaluation and proper pharmacotherapy or behavioral therapy as per requirement give promising result.

APHTHOUS ULCERS (Figs 20.42 to 20.45)

Recurrent aphthous stomatitis also known as aphthae, aphthous stomatitis and canker sores are the most common cause of mouth ulcers characterized by recurrent episodes

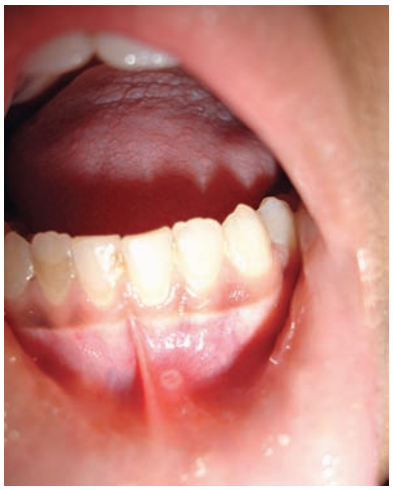

Fig. 20.42 Aphthous ulcer in a 4-year-old boy

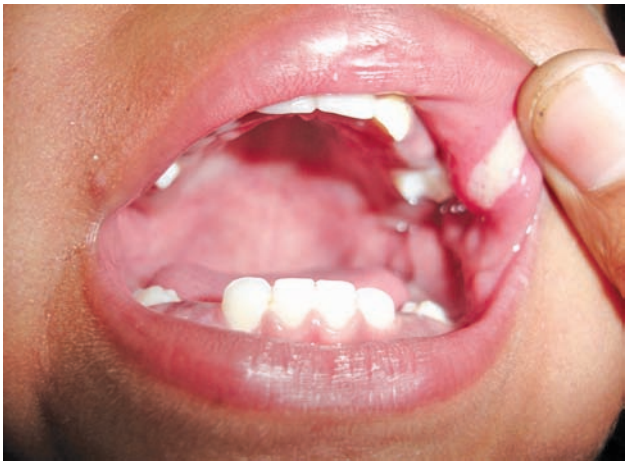

Fig. 20.43 Aphthous ulcer in a 3-year-old girl

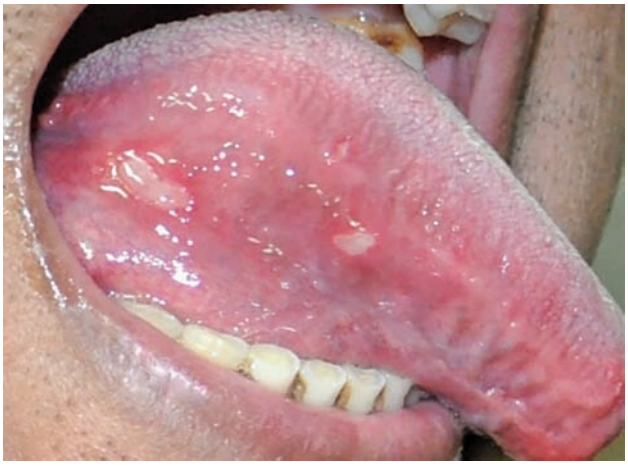

Fig. 20.44 Aphthous ulcer over tongue

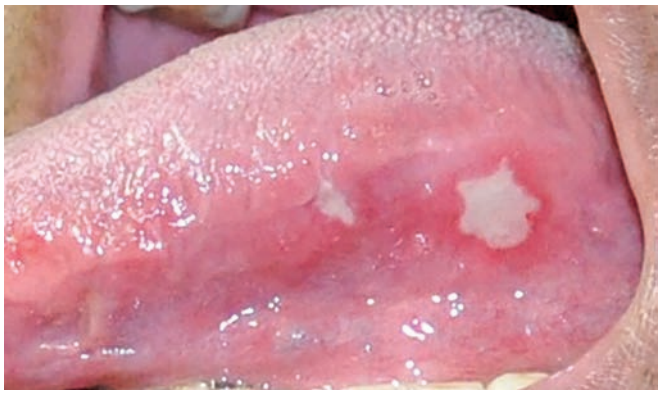

Fig. 20.45 Close-up of tongue lesion

of ulceration from childhood to adolescence each lasting from 1 to 4 weeks. A positive family history can be elicited in one-third of the cases. HLA A 2, HLA A11, HLA B12, HLA DR2 are the HLA associations seen. Nutritional causes like low serum iron or ferritin, deficiency of folate or vitamin B_{12} are implicated in the causation. Ulcers similar to aphthae are seen in disorders like Behçet's, Sweet's syndrome, HIV or immunodeficiency.

Typical presentation is the presence of multiple, round to oval well circumscribed ulcerations with an erythematous halo with yellow or gray flour. Minor aphthae also called as Mikulicz ulcers are seen in childhood or adolescence measuring 2–4 mm up to 6 in number occurring mainly in the nonkeratinized mucosa of the vestibule, labial, buccal mucosa and the floor of the mouth. They heal in up to 10 days. Major aphthae also called as Sutton's ulcers are larger than 10 mm and up to 3 cm in diameter, can involve any site and usually heal over a month with scarring. Herpetiform aphthae begin as intensely painful tiny ulcers that coalesce together to form plaques with a herpetiform configuration. Number can vary between 10 and 100. Any site can be affected but the most common site is the ventral aspect of the tongue. They usually heal within 10 days without scarring.

Treatment of aphthous ulcers is aimed at reducing pain and promoting rapid healing of the ulcers. Predisposing factors are corrected by improving oral hygiene by decreasing the bacterial counts by use of chlorhexidine mouthwashes, topical tetracycline or minocycline mouth rinses (to be carefully used in children because of swallowed can lead to permanent staining of teeth). To decrease the pain associated with the ulcers and to accelerate healing topical corticosteroids in an adherent vehicle such as carboxy-methylcellulose (orabase) are recommended. In severe cases systemic prednisolone can be tried. Other agents that are tried include sucralfate, colchicines, topical tacrolimus, Dapsone, levamisole, pentoxphylline and thalidomide in an attempt to induce remission.

BEHÇET'S DISEASE (Figs 20.46 and 20.47)

It is a chronic multisystem vasculitis involving the ocular, mucocutaneous, skeletal, gastrointestinal and neurological systems. Recurrent aphthous stomatitis is the defining feature of Behçet's disease seen in greater than 90% of the pediatric cases. Major, minor or herpetiform oral aphthae are seen preferentially over the gingival, mucus membrane of lips, buccal mucosa and tongue. Recurrent genital lesions are similar to the oral lesions and remit spontaneously in 1–2 weeks. The common sites are the scrotum and the base of the penis in the males and the vulval, vaginal and perianal mucosa in the females. Erythema nodosum like lesions, lesions resembling Sweet's syndrome, pyoderma gangrenosum or erythema multiforme like lesions may

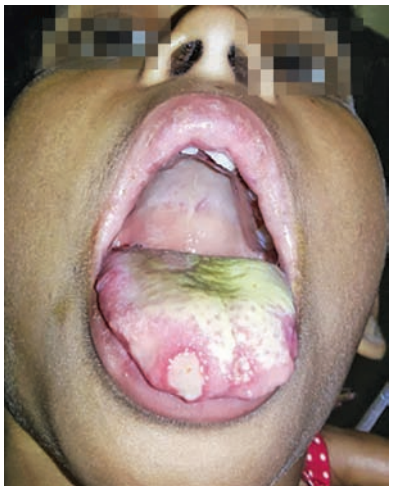

Fig. 20.46 Major aphthous ulcer over tongue in Behçet's disease

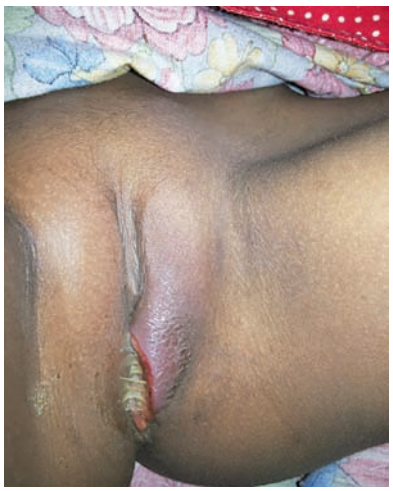

Fig. 20.47 Major aphthous ulcer over genitalia in Behçet's disease

"We are too weak to discover the truth by reason alone."—St Augustine

occur. Pathergy skin test is positive. Ocular symptoms ranging from simple photophobia to keratoconjunctivitis or uveitis are uncommon in pediatric patients. Nonerosive, asymmetric oligoarthritis; involvement of the arterial and venous vasculature causing episodes of thrombophlebitis and occlusion; neurological involvement with varying combinations of meningoencephalitis, acute myelitis, stroke or pseudotumor cerebri; gastrointestinal ulceration, myocarditis and cardiac vessel disease, pulmonary vasculitis, renal glomerulonephritis may occur. This syndrome should be suspected in any patient presenting with recurrent and severe oral ulceration. Systemic corticosteroids help control the disease. Other drugs that are used include chlorambucil, colchicines, cyclosporine, levamisole and azathioprine. No single form of therapy is uniformly effective. Combined drug therapy is more effective. Disorder has spontaneous exacerbation and remission.

RIETER'S DISEASE (Figs 20.48 and 20.52)

Rieter's disease is also known as classical triad of reactive arthritis with conjunctivitis, urethritis and diarrhea. It is perceived as a reactive response to previous infection causing immune mediated injury in a genetically predisposed patient who in most cases has a HLAB27 positive phenotype. The syndrome most commonly follows chlamydial urethritis with serotypes D to K or dysentery due to commonly *Salmonella*, *Shigella* or *Yersinia enterocolitica*. Any part of the syndrome may occur first.

Urethritis is usually bacterial in the initial stages and non bacterial in the late stages with associated symptoms being pyuria with painful micturation. One-third of the patients

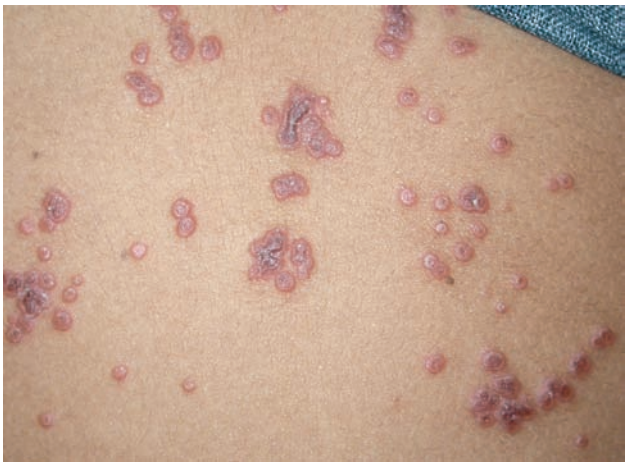

Fig. 20.49 Close-up of lesions

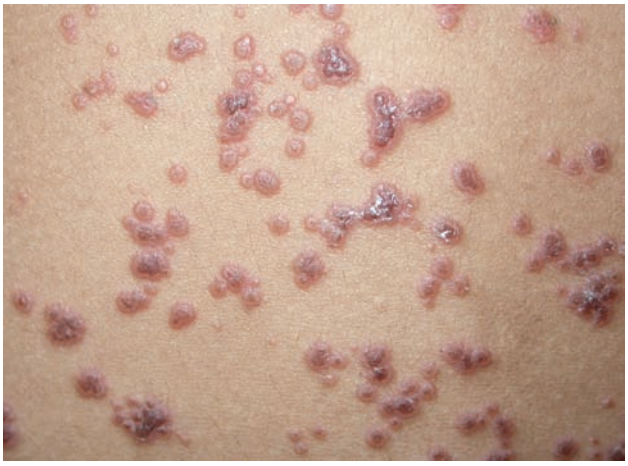

Fig. 20.50 Another view, same girl

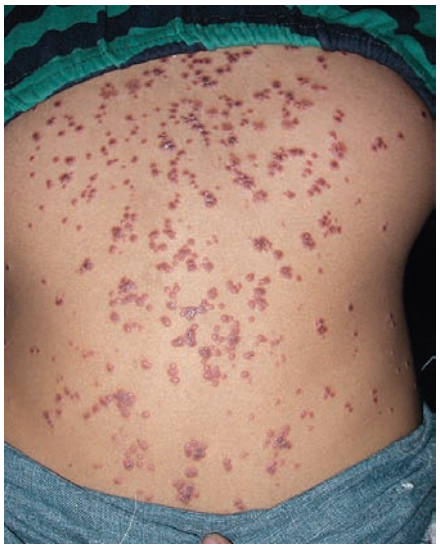

Fig. 20.48 Reiter's disease in a 18-year-old girl

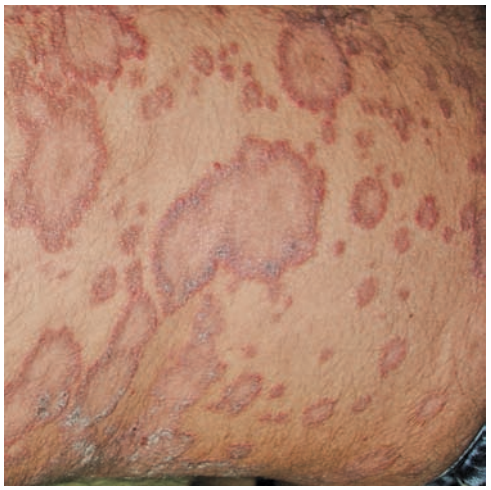

Fig. 20.51 Reiter's disease in a 17-year-old boy, close up. Note psoriasiform lesions

"If you understand, things are just as they are; if you do not understand, things are just as they are."—Zen proverb

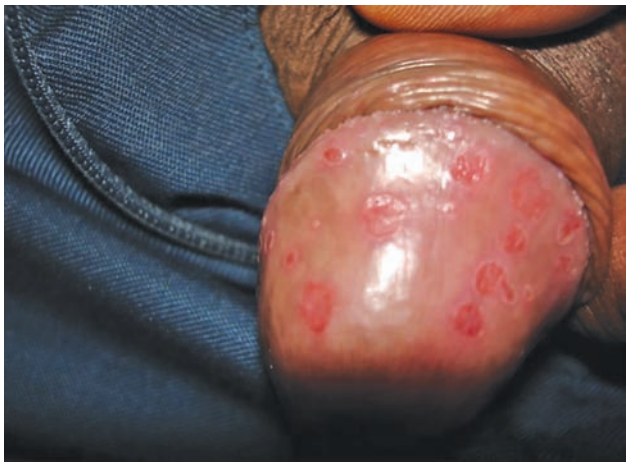

Fig. 20.52 Same boy, circinate balanitis

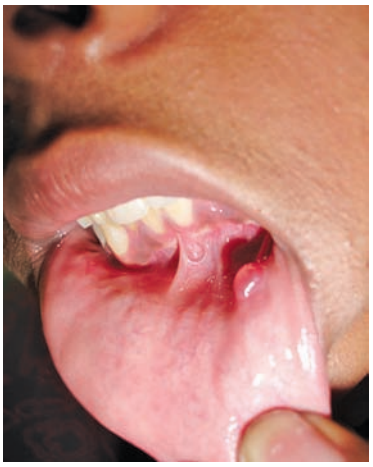

Fig 20.53 Mucosal cyst of lip

develop conjunctivitis which may be bulbar, tarsal or angular. It can be accompanied by superficial painful keratitis and iritis. Sudden onset asymmetric arthritis affecting the weight bearing and peripheral joints is a prominent feature. Sacroiliitis may develop in up to two-third of the cases, most of whom are HLAB27 positive. Dermatological lesions present as small hyperkeratotic crusted or pustular lesions of the palms, soles where it is called keratoderma blennorrhagica. Nails are usually thick, brittle with subungual hyperkeratosis. Mucosal involvement can be seen in the form of buccal, palatal, lingual mucosal erosions.

Mucocutaneous lesions are self limiting. Joint disease responds to rest and NSAIDs. Doxycycline is effective. In resistant cases, Methotrexate, Infliximab can be tried. Refractory skin lesions respond to Acitretin and Cyclosporine.

MUCOSAL CYST (Fig. 20.53)

Mucosal cysts are benign, mucous containing cystic lesions of the oral mucosa. They are also called as mucocele as they do not have an epithelial lining. Most of the mucocele are not true cysts. They arise following trauma to the minor salivary glands. Trauma is the main etiological factor for developing mucocele in children. The mucous extravasation phenomenon is the main histologic type in this age group.

Mucosal cyst is seen in all age groups but more commonly in younger age. It affects both male and females equally. They usually present as shiny, dome shaped papule or a tense fluid filled swelling which waxes and wanes for several months. There are two types of mucosal cyst; superficial and classic. Superficial mucosal cyst occurs immediately below the mucosa resulting in small translucent vesicles that rupture spontaneously to form ulcers. They are located on soft palate and buccal mucosa. Classic mucosal cyst occurs in the submucosa producing a well-defined dome-shaped papules. These are painless situated on the lower lips, cheeks, floor of mouth and palate. Upper lip is usually spared. Recurrences are common and may lead to fibrosis.

Management is usually reassurance to the parents. Cryotherapy and surgical removal of the cyst can be done.

GRANULOMA ANNULARE (Figs 20.54 and 20.55)

Granuloma annulare is a common childhood dermatosis characterized by grouped dermal papules arranged in an annular or ringed fashion. The term was introduced by Radcliff-Crocker in 1902. The exact cause is unknown and pathogenesis is poorly understood. The localized annular and subcutaneous form is common in children and young adults but the disease is rare in infancy. Generalized forms are more common in adults. The various predisposing factors include nonspecific trauma (since lesions are mostly frequently located in extremities), infections and immunizations (infections with varicella-zoster virus, hepatitis B, hepatitis C, HIV virus, immunization for tetanus, diphtheria, etc.), sun exposure, drugs (gold, diclofenac, amlodipine, etc.), endocrinal disorders (diabetes mellitus, thyroid) and malignancies.

Clinically the child presents with asymptomatic papules arranged in an annular fashion commonly over the extremities like dorsa of hands and feet. The lesions enlarge centrifugally with central clearing. They are often treated for dermatophytic infection without success. Children commonly present with localized and subcutaneous forms. In the localized form skin colored to slightly red papules appear over the extremities without scaling or epidermal change which enlarge peripherally to form annular or arcuate lesions. Multiple lesions may be present. An umbilicated form has also been described. The subcutaneous form is seen as a subcutaneous swelling in the lower legs in the pretibial region.

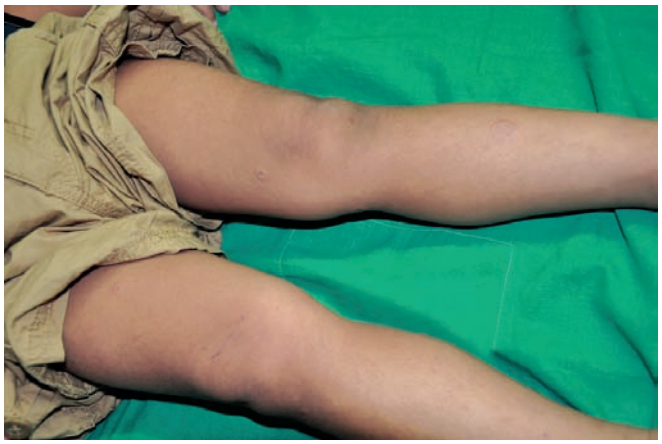

Fig. 20.54 Granuloma annulare over legs

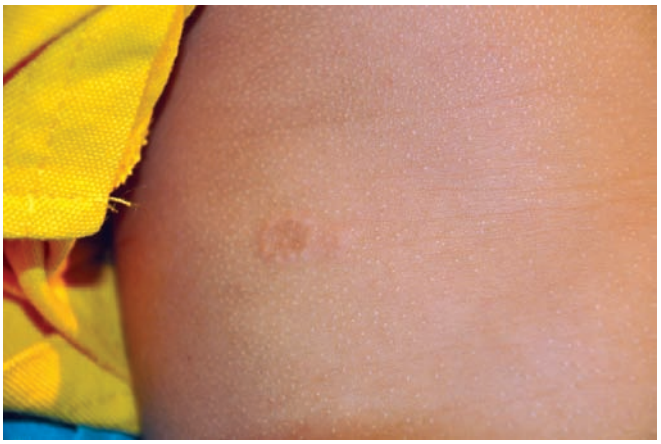

Fig. 20.54C Single lesion of GA, note beaded margin

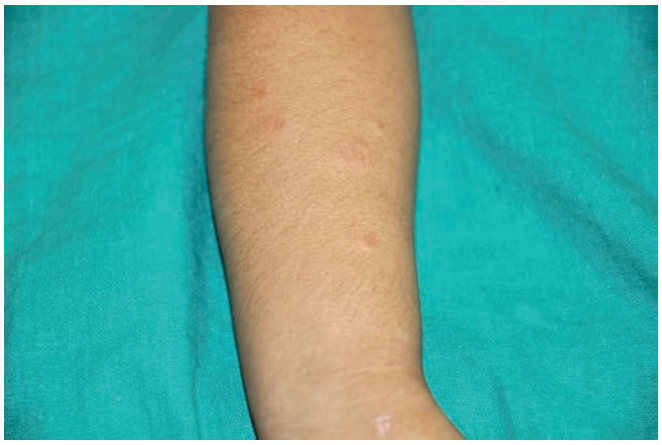

Fig. 20.54A Same child with lesions over forearm

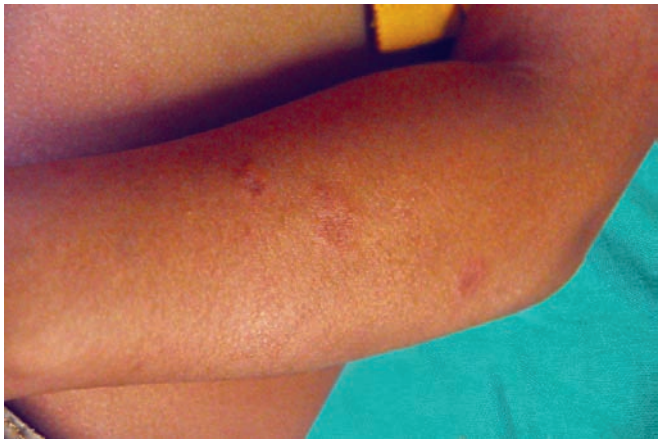

Fig. 20.54B Multiple lesions of GA over forearm

Histopathologic findings include focal degeneration of collagen in the dermis with reactive inflammation and fibrosis along with fragmented collagen bundles. Treatment is supportive as the lesions may undergo spontaneous resolution. Topical and intralesional steroids may be tried in some cases. In resistant and persistent lesions, cryotherapy or laser can be effective.

TRICHOEPITHELIOMA (Fig. 20.56)

Trichoepitheliomas are benign adnexal tumors of follicular differentiation. It is an autosomal dominant disorder characterized by multiple skin-colored papules predominantly on the face. Familial cases have been reported. There are three types of trichoepitheliomas: solitary, multiple and desmoplastic type. Solitary and desmoplastic trichoepitheliomas are rarely seen in childhood. Multiple trichoepitheliomas presents as small, firm, skin colored papules and nodules measuring 2 to 5 mm on the nasolabial folds, nose, forehead, cheeks, upper lips and eyelids. Occasionally scalp, neck and trunk can be involved. Diagnosis is based on clinical and histological features. Since they are benign lesions they can be left untreated. Treatment modalities include electrodessication, curettage, laser therapy and surgical excision.

BILATERAL SYMMETRICAL LIVIDITY (Figs 20.57 and 20.58)

This entity is characterized by well-defined hyperkeratotic, white or erythematous plaque with bluish red (livid) border. Common sites of involvement are ball of feet, heel and palm. Commonly bilateral but unilateral cases and involvement

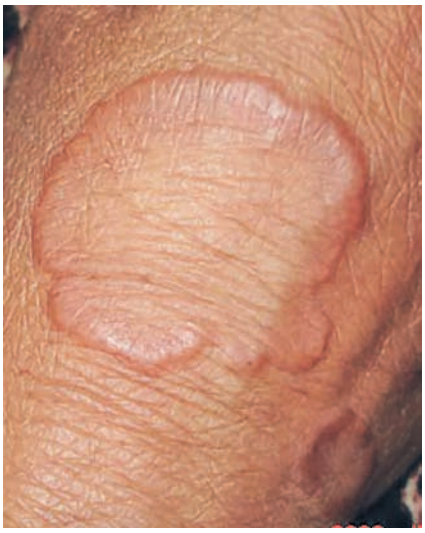

Fig. 20.55 Close-up of GA lesions

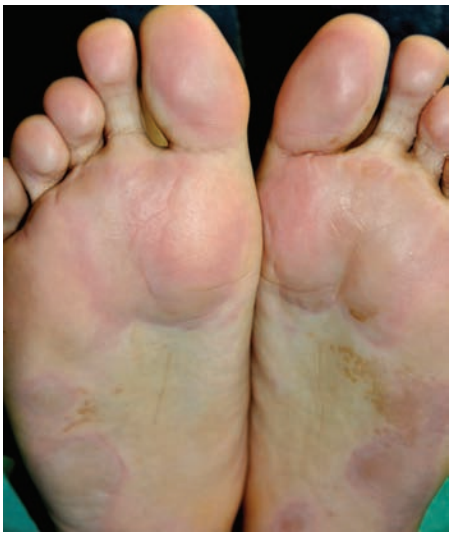

Fig. 20.57 Bilateral symmetrical lividity in a 18-year-old boy

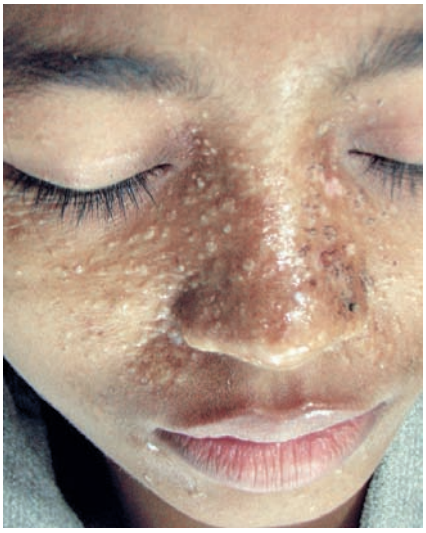

Fig. 20.56 Trichoepithelioma in a 15-year-old girl

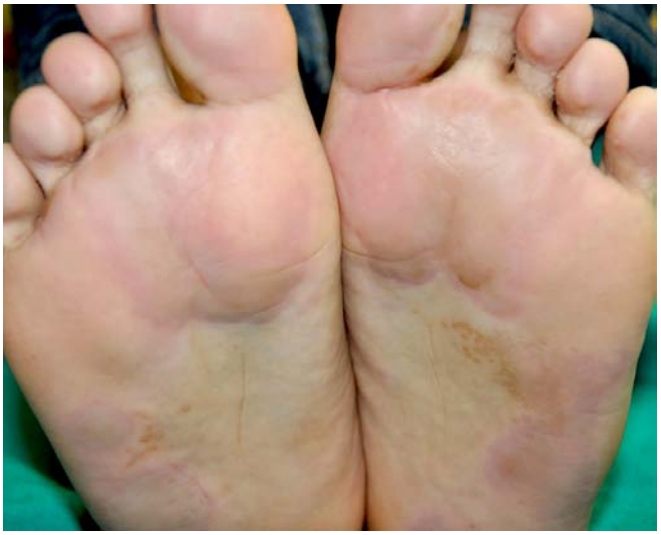

Fig. 20.58 Same boy, close-up of soles

of both hands and feet are also reported. Adolescents and young adults are common victims. Predisposing factors are hyperhidrosis, occlusive shoes, poor ventilation from nylon stockings, thin sole, psychoneurosis and friction from ill fitting shoes. BSL are of two type; transient symmetrical lividity and persistent symmetrical lividity. Transient one is induced by various forms of stress including occlusive foot wear and can be successfully treated with drying agent. The persistent counterpart does not respond to drying agent but partial response to tretinoin is documented. Prognosis is variable. Some cases are self limited, where as some are marked by chronicity.

"'Forgive' those who humiliated and tortured you but don't 'forget the act'."—Japanese Proverb

21

Sexually Transmitted Diseases, Patient Education and Counseling

SEXUAL ABUSE IN CHILDREN

Sexual abuse occurs when a child is engaged in sexual activities that he or she cannot comprehend, for which he or she is developmentally unprepared and cannot give consent or that violates the law or social taboos of society. Many studies have shown 12–25% of girls and 8–10% of boys are victims by the age of 18 years. Perpetrators may be both males and females. It is under reported and under recognized. In most cases the perpetrator is well known or related to the victim. Children with sexual abuse presents with behavioral changes like sexual acting out (most specific indicator), insomnia, regression, depression, eating and sleep disturbances or sexually transmitted diseases (STD).

Cutaneous findings seen are bruises, burns, bite marks, patterned injuries, hymenal changes, ecchymoses, hematomas or oral injuries. Examination of sites includes mouth, breasts, genitalia, perineum, medial thighs, buttocks and anus. Strong suspicion is necessary to diagnose sexual abuse. Forensic evidence must be collected within 72 hours if a recent abuse is suspected. Cultures and serology must be done only if indicated. Prophylaxis is given only in pubertal girls. A child may acquire any STD because of sexual abuse but the author has seen the following three conditions most commonly.

CHANCRE OF PRIMARY SYPHILIS (Fig. 21.1)

Primary syphilis is characterized by hard sore or Hunterian chancre which usually develop at the site of entry of organism 10–90 days (average 21 days) following infection and young sexually active males are usual victim. If the inoculums is large (10^7 organism) lesions can develop within 5–7 days. Initially lesion starts as painless, dull red macule which transforms into papule and ulcerates. Asymptomatic nature of the lesion manages to skip attention of the unfortunate patient. Classically the lesion can be described as painless, nontender, rounded, well defined, indurated like button with raised or rolled out border and dull red granulation tissue filled clear floor. Any indurated lesion on coronal sulcus does not imply syphilis because other lesions on the same site are indurated too. Manipulation of the lesion exudes

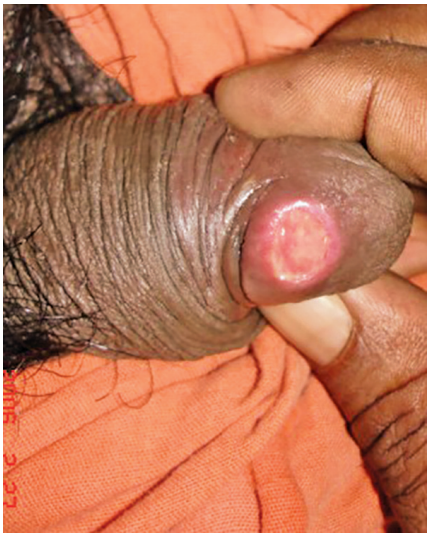

Fig. 21.1 Primary syphilitic chancre in an adolescent boy

"Twenty years from now you will be more disappointed by the things you didn't do than by the ones you did do. So throw off the bowlines. Sail away from the safe harbor. Catch the trade winds in your sails. Explore. Dream. Discover."—Mark Twain

serous fluid. Regional lymphadenopathy which becomes palpable within a week can be described as painless, nontender, small, discrete, firm, rubbery in consistency and nonsuppurative. In males lesions are commonly present on coronal sucus, glans penis, prepuce, frenulum and shaft of the penis. Anorectal lesions are frequently observed in homosexual males. In females common sites of involvement are labia, vulva, fourchette, clitoris, cervix, urethra, perineum and vaginal wall. Among extragenital sites lip, tounge, tonsils, fingers and breast are frequently involved. Chancre spontaneously heals within 3–8 week with atrophic scar.

Picture may be altered following drying of exudates, application of different topical medications, associated surrounding edema, secondary infection and mixed infection with *H. ducreyi* or *Chlamydia*. Other important atypical presentations are phimosis, balanoposthitis, nongonococcal urethritis due to intrameatal chancre, proctitis, whitlow like lesion and multiple chancres.

Diagnosis is confirmed by demonstration of *T. pallidum* in exudate from ulcer base or lymph node aspirate by dark field microscopy or by DFA-TP. Nontreponemal serological tests become positive 2–3 weeks after appearance of chancre. If nonreactive ideally should be repeated at one week, one month and three month. Patients should be treated with benzathine penicillin (2.4 million unit) in two divided intramuscular injection in two buttocks.

CONDYLOMA ACUMINATA (Figs 21.2 and 21.3)

Condyloma acuminata are anogenital warts caused by human papilloma virus. It is now increasingly seen in pediatric population. Girls are affected more than boys. Although the possibility of sexual abuse is considered in every case, other modes of acquiring the infection includes perinatal transmission, heteroinoculation and autoinoculation. They are incidentally noted by the guardian. Perianal region is most commonly affected. It presents as asymptomatic flesh-colored, soft verrucous papules coalesced to form plaques. Lesions may rapidly enlarge to form an exophytic cauliflower like masses. Sometimes, they present with itching, pain and bleeding. It is seen in other areas like glans penis, penile shaft, scrotum and vulva.

The diagnosis is made on clinical grounds. Any child presenting with perianal warts should undergo a complete history and examination to rule out sexual abuse. Treating condyloma acuminate is challenging as it is resistant to treatment. Spontaneous resolution without treatment occurs. Lesions persisting for 2 years may not undergo spontaneous resolution. Destructive methods include cryotherapy, application of trichloroacetic acid and podophyllin. Immunomodulators include topical application of imiquimod. Laser therapy is rarely used in children.

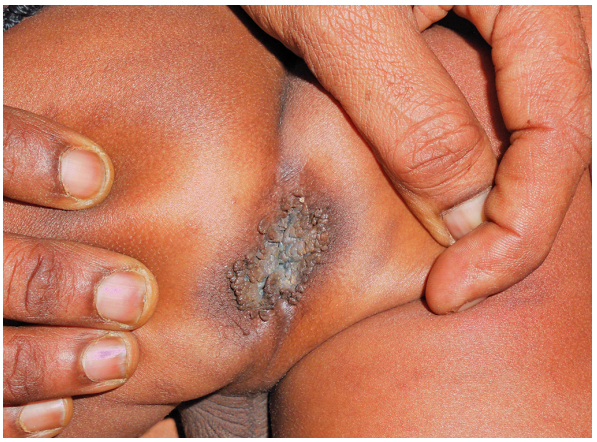

Fig. 21.2 Perianal condyloma acuminata in a 8-year-old boy

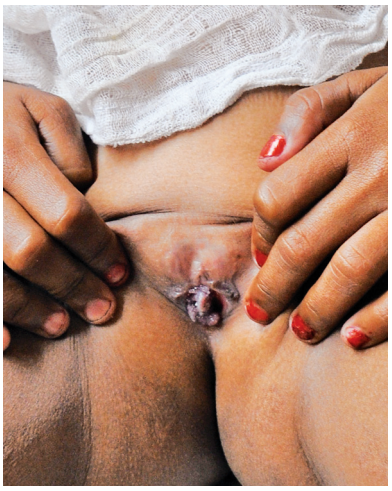

Fig. 21.3 Vulval condyloma acuminata in a 9-year-old girl

HERPES GENITALIS INFECTION (Figs 21.4 and 21.5)

Herpes simplex viruses (HSV) are common human DNA viruses that remain latent in the skin or mucosa after infection and undergo periodic reactivation. There are two types—(i) HSV-1 which mainly causes orofacial disease and occasional genital disease and (ii) HSV-2 which primarily causes genital disease. Infection with HSV-1 occurs commonly in childhood but acquisition of HSV-2 correlates with sexual activity. In general, genital herpes in not common in childhood and thus it poses diagnostic dilemma as well as need for assessment of possible sexual abuse. A more common cause could be transmission during handling of the child by the parents of caregiver infected with HSV-1 or HSV-2 or the child having orofacial lesions of herpes.

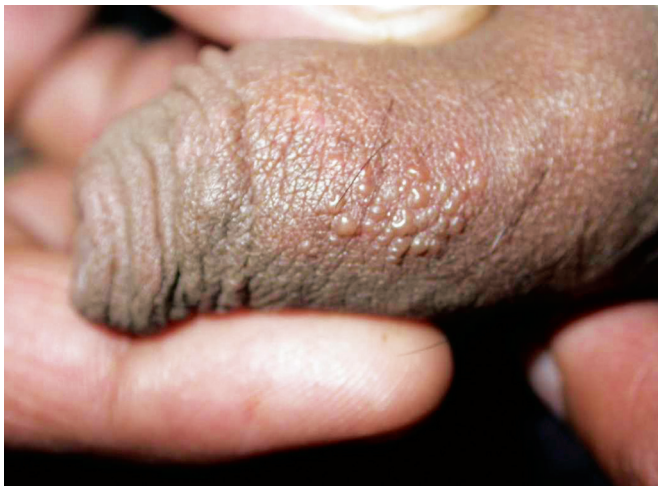

Fig. 21.4 Grouped vesicles over shaft of penis

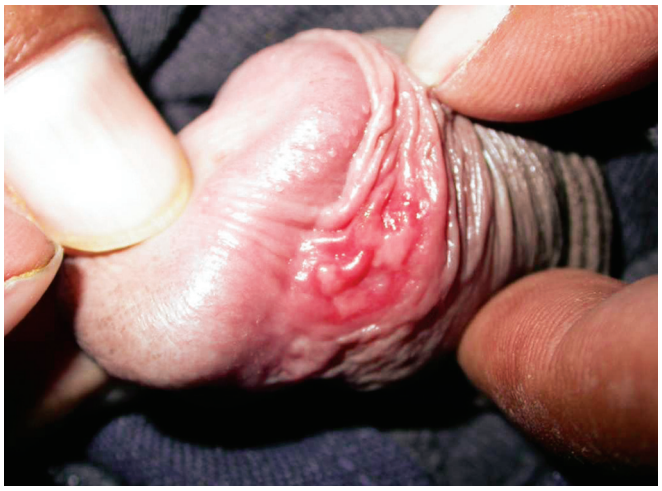

Fig. 21.5 Serpiginous ulcer of herpes genitalis

Clinically, there is a prodrome which is most severe prior to the first episode with fever, malaise, headache and myalgia. Subsequently, characteristic genital lesions appear in different stages of evolution, including vesicle, pustules and erythematous ulcers that gradually heal. Lesions may be located over the glans penis or the shaft. In females, lesions may occur over the mons, perineum, vagina or buttocks. There may be associated urinary retention and constipation.

The gold standard for diagnosis is viral cell culture. For the treatment of genital herpes acyclovir may be given in a dose of 40–80 mg/kg/day for 7–10 days or until clinical resolution occurs. If the caregivers suffer from orofacial herpes then they should be treated and asked to avoid handling the child. If sexual abuse is suspected then appropriate measure must be taken and counseling suggested.

ROLE OF PATIENT EDUCATION AND COUNSELING IN PEDIATRIC DERMATOLOGY PRACTICE

Patient education and counseling are the cornerstones of effective management and patient care in different branches of modern medicine. It becomes even more relevant in the context of dermatologic practice because along with the various treatment modalities, the patient often needs to understand and follow particular do's and don'ts which help in quick recovery, prolonged remission as well as prevent exacerbations. With respect to pediatric dermatologic practice it is more of a challenge as the patient is sometimes too young to verbalize his or her symptoms and complaints and may not be able to take care of himself or herself. In such situation, the onus is on the parents and caregivers who must intuitively understand the needs of the child and respond accordingly. The situation is often further complicated in cases where the child has certain special needs or is either abandoned or orphaned and thus may not have an attentive caregiver at all times. Thus counseling and patient (or rather parent) education becomes an important as well as challenging aspect of dermatologic practice and management.

Difficulties with Pediatric Patient Education and Counseling

The most arduous obstacle in successful patient education and counseling is the use of technical medical jargon. Words and concepts which are often simple for dermatologists are incomprehensible to most parents and care givers. Along with that instructions which are too elaborate or time consuming are often either forgotten or skipped altogether by some. There also seems to exist wide variations in the perception of amount of topical medications required by many patients and caregivers alike. Hence, all attempts should be made to provide information in the simplest possible manner, with least number of steps and in a language that the caregiver understands best.

The second most important aspect is that children are a special subset of the patient population who are unique in certain aspects. They cannot verbalize their complaints or symptoms and in such cases the dermatologist must have a keen eye and thorough clinical knowledge in pediatric dermatology so as to correctly identify the skin lesions and disease leading to the child's discomfort and treat accordingly. The only relevant clinical history that is available is from the parents, which can range from being highly accurate to completely erroneous depending on the educational status, economic condition, and family size among a few factors. On top of that the parents are often over concerned and over cautious and all efforts must be taken to allay their fears and educate them about their child's illness.

Also there are numerous social, religious and cultural customs and rituals which are deep rooted in society and a cause for various dermatologic illnesses. For example, application of kohl to the eyes or face of the child can cause conjunctivitis, trachoma and contact dermatitis, use of threads and talismans around the neck to protect from the evil eye can lead to candida intertrigo, use of cow dung or ash over the stump of the umbilical cord can lead to infection, omphalitis and even death from neonatal tetanus. In all these cases, extreme care must be taken explain and counsel in the most non-judgmental manner as far as possible since these customs are often rooted in fear and not easy to overcome.

Lastly since the child is often dependent on the parents or caregiver for physical, social, psychological and economical support, they have little choice in decision making regarding treatment. In such cases, it becomes doubly important to ensure that the child is well taken care of by the caregivers. In cases where the child is without a parent and is not being properly taken care of or being subjected to physical or mental abuse, it sometimes becomes the duty of the dermatologist to inform the social service authorities if the need so arises. Also disease like molluscum contagiosum or herpes occurring over the genitalia may point towards sexual abuse and parents should be thoroughly counseled as children may often be unable to provide accurate history.

Children are not miniature adults and whenever possible, all attempts should be taken to customize treatment and counseling sessions according to their age. Play acting is a great way to bond with children and educate them at the same time. Presence of a parent may help gain the confidence of a young child too. Children are often sensitive to usage of certain words and whenever possible gentler and simpler sounding words must be used. A child may not be able to distinguish between itch and pain. Or clarify whether the oozing from lesion is hemorrhagic, serous or serosanguinous. In all such situations, a thorough clinical examination becomes imperative. A soft and gentle tone of voice is quintessential to soothe a scared and apprehensive child. It has been seen that children above the age of two years can be taught to follow certain simple instructions and by age of seven can be trained to have a better understanding of their skin condition by explaining to them in simple and easy to understand words.

Advantages of Patient Education and Counseling

The advantages of successful patient education and counseling are numerous. On one hand it makes the parent or caregiver equally responsible for the success of failure of any treatment modality, and on the other it builds their confidence and helps to improves adherence to therapeutic regimes.

Dermatologic diseases often have a tendency for chronicity. Most diseases are marked with periods of remissions interspersed with episodes of exacerbations. With successful patient counseling and educations these periods can be prolonged and the episodes minimized. In totality it improves patient compliance and also decreases drop out and a tendency towards 'doctor shopping'.

It is true that in everyday dermatologic practice, there is immense constraints on proper time management and few precious minutes are available to diagnose and prescribe treatment to patients. But in spite of that, even a few moments spent in educating and counseling the patient and their care givers can have a tremendous positive impact on the final treatment outcome. It also makes future follow ups less time consuming since any queries regarding the disease or treatment would have been answered in the first visit itself. It thus becomes a win-win situation for both the patient (parent) and the doctor.

A number of dermatologic diseases can be managed efficiently with proper education and counseling. For example, in atopic dermatitis, proper patient education and counseling is imperative to keep the disease process under control. Like use of adequate 'barrier-repair' moisturizers, wet wraps and wet dressings, use of hypoallergenic soaps and creams, avoidance of hot humid weather, woolen clothing, nuts, dairy products, etc. In infections and infestations, avoidance of sharing of items of personal use like combs, towels, etc. In disease like acne vulgaris avoidance of comedogenic creams, cosmetics and facial products by teenagers and young adults.

In cases of genodermatoses, education and counseling of parents assumes significant importance. Many of these children are referred to dermatologist for evaluation of the skin lesions since many genodermatoses have manifestations involving the skin, hair, nails and mucosae most of the times. Parents are often also concerned about the probability of future offspring having the same disease. In all these cases, the different options must be discussed with the parents and their queries answered empathetically. They should be referred to other specialists for genetic and prenatal diagnosis whenever the need arises.

Types and Method of Patient Education and Counseling

A wide variety of modalities are available for successful patient education and counseling. Each has its own advantage and disadvantage. In general, best results are achieved when there is bidirectional and interactive flow of information. Participation of the patients and their caregivers has shown to have greater adherence to instructions and improved treatment outcomes.

The most common type of education and counseling provided to patients and their caregivers is verbal. It is often casually offered within the time frame of the consultation. It is the simplest form of sharing information and time saving. But it has the disadvantage of poor patient recall. Most patients and their caregivers have difficulty recollecting the verbal advice given to them. And since the dermatologist may not always be available for clarifications, it often leads to poor compliance to treatment and unsatisfactory outcomes.

The next most commonly used medium is printed material. It is often made available to the patients in different local languages and describes the disease and treatment in a simple and easy to follow format. It has the advantage that it saves time spent in giving verbal advice and also helps to overcome problems of recall, since the advice is available for easy reference. To be truly successful, printed advice must be easy to read, with minimum text and maximum illustrations and preferably be colorful, have least possible number of steps and must be self-explanatory. The disadvantage of printed material lies in the fact the patient/parent/caregiver must be literate and have sufficient intelligence to comprehend the advice. Young children may not be able to read and if the caregiver is unable to understand and follow, then the whole purpose of the initiative fails.

Another important modality for counseling is group education. This is one of the most beneficial and productive methods. Here, the patient and the caregiver 'learn by doing'. This has the most successful and satisfying outcomes for both the patient and the dermatologist because there are no ambiguities or confusions. It boosts the morale and confidence of the patient and the caregivers. And since it is a group activity, there is interaction between different people and they can form self-help and support groups. This has an immense positive effect on the psyche of the patients and their caregivers. This approach has been very successful with various genodermatoses and other chronic conditions. A number of international and national societies and groups have come up and the barriers of race, religion, language and nationalities have been broken down and support is available throughout the world. The disadvantage of this modality lies in the fact that it might not be feasible to persons living in socially and economically backward areas. Also sufficient commitment and interest is quintessential on the part of the caregivers to take part in group activities.

Lastly the least informative and highly misleading source of information in the Internet. Hordes of websites crop up each day that provide partial information and falsify facts. In the so called 'Internet generation' parents often come up with half-baked and misinterpreted facts and information acquired from different 'medical websites' and attempt to guide the dermatologists regarding diagnoses and treatment options. Such situation should be dealt with humour as any confrontation is futile. An emphatic attitude must be maintained and topmost priority given to dispelling myths and providing authentic and accurate information.

CONCLUSION

Successful treatment of any dermatological disorder requires equal participation from the dermatologist, affected children (barring neonates, infants and young toddlers) and their parents or caregivers. Improvement or worsening of any dermatosis is often visual and the caregivers can be educated and trained to identify the various relieving and exacerbating factors. Also positive behavioral outcomes can be reinforced as they get an understanding of the activities that help keep the disease within control and what action lead to worsening.

Different forms of educational and counseling modalities are available nowadays and should be customized depending on the needs of individual patients and their caregivers. Information should be shared and counseling done in a non-judgmental and non-confrontational manner. Whenever possible medical jargon should be avoided and instructions given in simple and lucid fashion. Local customs and traditions must also be kept in mind. It is often said that 'people learn best by doing'. Thus group demonstrations should be encouraged so that caregivers and parents may learn the techniques themselves as well as get to interact with others in similar situations.

Lastly the greatest benefits of successful patient education and counseling is to the pediatric dermatologists themselves. Time is often a constraint in day to day clinical practice but a few minutes spent in sharing educational information with the parents or caregiver can have a multitude of positive outcomes. By involving the parents in the treatment of the child, it helps to gain their confidence and also makes them aware of equal responsibility in therapeutic response. It also becomes easier to manage the child in subsequent follow ups as the parent can often provide additional information to the clinical history. The possibility of attrition is also reduced since the caregivers feel that they too can contribute to making the child get better faster and thus look forwards to gaining more information from the dermatologist.

The relevance and essence of patient education and counseling in pediatric dermatologic practice can be beautifully summed up in the words of Confucius – "Tell me, and I will forget. Show me and I may remember. Involve me, and I will understand."

"Experience is a hard teacher because she gives the test first, the lesson afterwards."—Unknown

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