

# DEFIB

**HOW TO TAKE HISTORY IN SURGERY?**

**+++ QUICK REVISION**



*2<sup>nd</sup> Edition*

2009/2017

GCMHS



## **PREFACE**

### ***What is new in the second edition?***

*In this edition;*

- 1. Volume-II ,*
- 2. Pictures of basic surgical instruments &*
- 3. Youtube links to basic physical examination videos are included.(online)*

*In addition there are some modifications made on the contents of Volume-1. Which include;*

- 1. additional notes on long & short cases with special emphasis on the management part &*
- 2. modified and enhanced sample histories .*

*Since this book contains long & short cases, we hope you will find it very important when you are preparing for bedsides & oral examinations in short period of time.(+++QUICK REVISION)*

*Finally we want to emphasize that the quality of this book will be kept up to-date by the continual comments made by users.*

*If you have any comment or suggestion on this edition, please inbox us @ [dannyfentaneh@gmail.com](mailto:dannyfentaneh@gmail.com) or [birukbirhanu75@gmail.com](mailto:birukbirhanu75@gmail.com).*

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## <<>> ACKNOWLEDGEMENT <<>>

First we would like to thank our friends: *Cheru Lilay, Ekram Abdu, Daniel Belhu, Fkadu Alemye, Daniel Kassie & Natnael Alemu*, for their contribution in the first edition by sharing their bedside histories to be used as a sample history, during their C#1 attachment.

Our sincere thanks & gratitude goes to the following friends for their unrelenting dedication and contribution to this edition by preparing notes on incomplete parts of the first edition (which were left to be included in VOL-II): *Eyasu Feleke(sms), Elshaday Amare (sms), Cheru Lilay(sms), Bruh Alem(sms), Daniel Belhu(sms), Endalkachew Belayneh(sms), Eshetie Endalew(sms) & Dawit Berhanu(sms)*.

Last but not least we would like to thank Janhoy batch students & Mekdi batch students (our juniors) for their encouraging comments.

**Chief coordinator**  
**DAN ALEMAYEHU**

## Message for users

*Whenever you go through the long cases of this book...*

### *HPI*

We have tried to write the possible *clinical presentations* of a patient in each case before we proceed to the sample hx. So, you are expected to characterize each Clinical Presentation based on your patient to write your *HPI*.

### *Positive-negative statements (HPI)*

Throughout the long cases of this text book we have tried to focus on this part because we find it challenging for a beginner. Whenever you go through the cases, please give attention for the first part of each case that contains the *causes, risk factors, differential diagnosis & complications* which are essential for construction of your positive & negative statements.

### *Investigations*

In bed-sides & oral examination, If you are asked to list investigations you want to do for your patient...try to mention from diagnostic investigation modalities that are available in your setting & those that are cost-effective then you can list the others. *ωργρλω!!!*

Also be ready for the next question of the investigation you mentioned...→"What information do you want to get from this investigation?"

### *DDx*

Notice →since almost all epidemiological data are from abroad...for some cases, the orders of the DDx listed in books (*common* →*least common*) often may mismatch with our country...

## *Acronyms used*

- ✓ *Ass't = Assessment*
- ✓ *ATLS = Advanced trauma life support*
- ✓ *Abd. = Abdominal*
- ✓ *ANDI = Aberration of normal development & involution*
- ✓ *Ca = Cancer*
- ✓ *CPs = Clinical presentations*
- ✓ *Cmn = Common*
- ✓ *Cpds = Compounds*
- ✓ *Dx = Diagnosis*
- ✓ *Dxtic= Dignostic*
- ✓ *DRE = Digital rectal examination*
- ✓ *DOC = Drug of choice*
- ✓ *G/A = General appearance*
- ✓ *Hx = History*
- ✓ *INVx = Investigations*
- ✓ *Lt = Left*
- ✓ *LNs = Lymphnodes*
- ✓ *LAP = Lymphadenopathy*
- ✓ *LOC = Loss of consciousness*
- ✓ *MOI = Mechanism of injury*
- ✓ *MOA = Mechanism of action*
- ✓ *MVA = Motor vehicle accident*
- ✓ *Mov't = Movement*
- ✓ *Mgt = management*
- ✓ *N&V = Nausea & vomiting*
- ✓ *NR = Non-reactive*
- ✓ *No# = Number*
- ✓ *P/E = Physical examination*
- ✓ *Pts = Patients*
- ✓ *+ve = positive*
- ✓ *RFs = Risk factors*
- ✓ *R/o = rule out*
- ✓ *Rx = treatment*
- ✓ *Rt = Right*
- ✓ *U/S = ultrasound*
- ✓ *Ur = your*
- ✓ *# = fracture*

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***This book is dedicated to...***



# **JANHOY BATCH /05**

*...it rained while we arrived & named after this event ... ቻንዮይ !!!*



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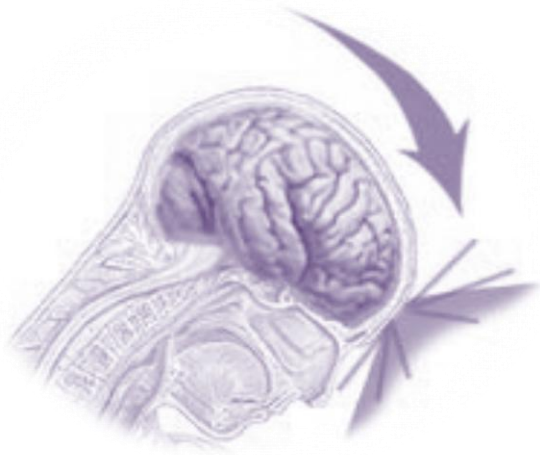
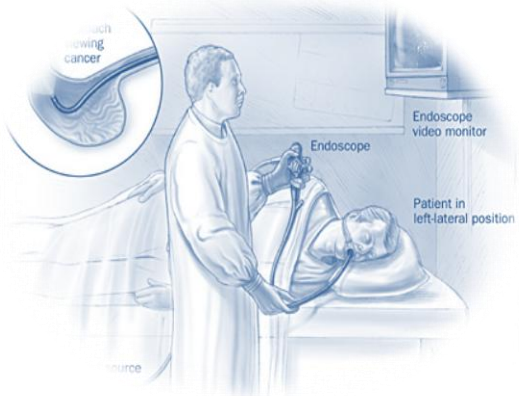
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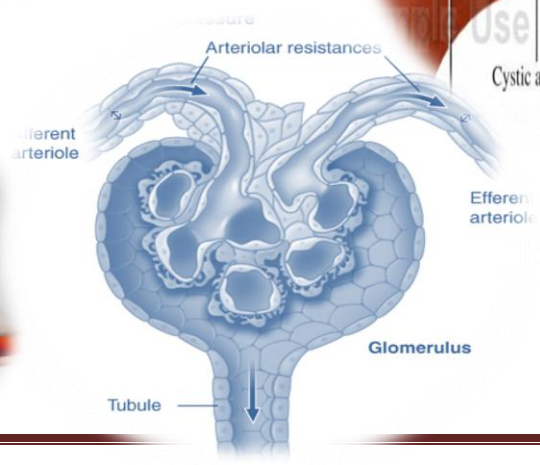
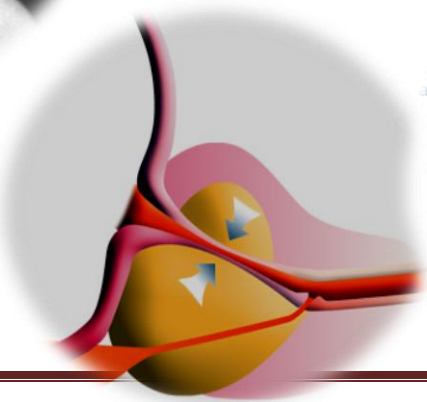
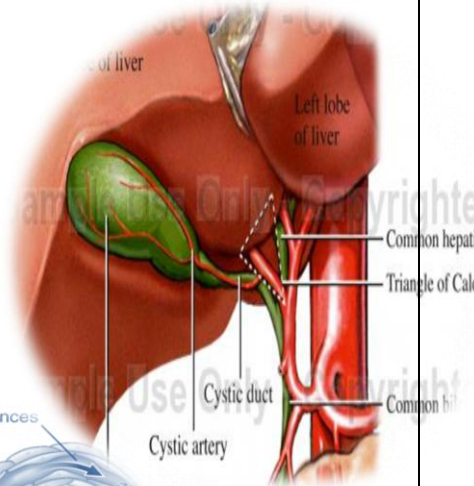
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# LONG CASES



# SAMPLE HISTORY ON THYROID ENLARGEMENT

## DDx for anterior neck swelling

- Goiter
  - *May be*
    - ✓ Diffuse, uni-nodular or multi-nodular
    - ✓ Non toxic(simple) or toxic goiter
- Lipoma
- Thyroglossal cyst
- Brachial cleft anomalies
- Lymphadenopathy
- Cystic hygroma
- Subhyoid bursitis...

## DDx for goiter (enlargement of thyroid gland)

### 1) Causes of non-toxic goiter

- Endemic goiter
  - ✓ Iodine deficiency
- Dietary goitrogens
  - ✓ Cabbage, Cassava...
- Drug induced goiter
  - ✓ Iodide, amiodarone, lithium
- Thyroiditis (inflammatory goiter)
  - ✓ Sub-acute, chronic thyroiditis
- Familial goiter
  - ✓ Dysmorphogenesis--inborn errors of metabolism
- Neoplastic goiter

### 2) Causes of toxic goiter

A. By increasing hormone synthesis → they have increased Radio-Active Iodine Uptake (RAIU)

- Graves' disease
- TMNG
- Toxic adenoma
- Drug induced goiter
- Thyroid ca.
- Struma ovarii
- GTD (gestational trophoblastic disease) → The  $\alpha$ -subunit of HCG mimic TSH

- TSH-secreting pituitary adenoma

**B. By releasing pre-formed hormone → they have decreased RAIU**

- Thyroiditis
  - ✓ Acute phase of hashimoto's thyroiditis
  - ✓ Subacute thyroiditis

## Clinical Presentations (CPs)

### 1) History (Hx)

\*In order to write a good hx on thyroid enlargement follow the orders listed below

#### A. About the swelling

- ✓ When it began?
- ✓ How the pt noticed the swelling?
- ✓ Painful /painless
- ✓ Site & progression

#### B. Pressure symptoms

- ✓ Dyspnea /Stridor
- ✓ Dysphagia

#### C. Abnormal function manifestations

- ✓ Hyperthyroidism: symptoms like...
  - Heat intolerance
  - Palpitation
  - Irritability, emotional lability
  - Sleep disturbance
  - Weight loss despite increased appetite
  - Diarrhea
  - Tremor (the pt may complain as symptom)
  - N & V (nausea & vomiting)
  - Oligomenorrhea or amenorrhea...
- ✓ Hypothyroidism: symptoms like...
  - Cold intolerance
  - Weight gain
  - Anorexia
  - Constipation
  - Menorrhagia
  - Fatigue
  - Slowed intellectual & motor activity ...

#### D. Mention any medication hx (attempted Rx)

## E. Compose ur +ve & -ve statements

- ✓ If you are trying to r/o or rule in simple goiter...
  - Is the pt from Iodine deficient area/not--endemic goiter
    - =Ask if there are peoples in the vicinity with similar illness
    - =Identifying the geographical location from where the pt come from→ID
      - ✓ Is it mountainous /not?
        - Because in highland areas→low iodine content of the water
  - Goitrogen intake
    - =Drug hx
      - ✓ Iodide, amiodarone, lithium
    - =Dietary hx
      - ✓ Because diets containing heavy metals compete with iodine to be taken by thyroid tissue
      - ✓ Cabbage, Cassava
  - Family hx of thyroid disease (similar illness)
    - Dyshormogenesis
- ✓ If you are trying to r/o or rule in Grave's disease Vs TMNG...
  - Ask the pt about the timing between the goiter & thyrotoxic symptoms
    - a. The anterior neck swelling first then thyrotoxic symptoms or
    - b. Did both appear simultaneously?
- ✓ If you are trying to r/o or rule in malignancy...
  - Rapidly/ slowly growing mass?(duration)
  - Constitutional symptoms of malignancy?
    - ✓ Anorexia
    - ✓ Easily fatigability
    - ✓ Wt. loss
  - Family hx of thyroid ca.
  - Previous head & neck radiation therapy
- ✓ If you suspect metastasis...Ask
  - Hx of hoarseness of voice (RLN involvement)
  - Hx of swelling in the neck (LAP--LN metastasis)
  - Hx of hemoptysis, bone pain...(Distal metastasis)
- ✓ If you want to r/o or rule in inflammatory causes ...Ask
  - Pain in the neck
  - Fever, chills

## 2) Physical Examination (P/E)

- **General Appearance (G/A)**
  - ✓ Thyrotoxic pts → hot intolerance → See carefully their dressing...
- **Vital Signs (VS)**
  - ❖ **BP**
    - ✓ Thyrotoxic pts → wide pulse pressure due to systolic hypertension
  - ❖ **PR**
    - ✓ Tachycardia (in thyrotoxic pt (>85bpm))
    - ✓ Bradycardia (in hypothyroidism)
  - ❖ **BMI**
- **LGS examination**

### ❖ Thyroid examination

- ✓ **On inspection, notice...**

- **Size (estimate)**
- **Shape**
- **Site**
- **Overlying skin color change**
- **Visible Pulsation**
- **Movement with deglutition & protrusion of tongue**
  - Because thyroid gland is enclosed by pretracheal fascia → it moves with deglutition
  - In case of solitary thyroid swelling looks for upward movement of the swelling on protrusion of the tongue to differentiate a thyroid nodule from thyroglossal cyst.
- **Pemberton's sign**
  - Ask the patient to raise both upper limbs above the head and keep it for @least 1 minute. If retrosternal prolongation is there, patient will have congestion and puffiness in the face with respiratory distress.
  - Done...when? In pts with...
    - Compliant of aero-digestive tract obstruction
    - Vascular congestion
    - If the lower border of the gland is not visible during deglutition/ lower tracheal ring isn't palpable

- ✓ **On palpation of the swelling, appreciate...**

- **Temperature**
- **Tenderness**
- **Size (measure)**

- **Surface** (smooth Vs nodular)
- **Border** (regular Vs irregular)
- **Consistency** (soft Vs Firm Vs hard)
- **Retrosternal extension**  
=try to palpate the lowest tracheal ring above the sternal notch
- **Fixity to overlying structure**
- **Thrill** (on upper pole)
- **Position of trachea** (central Vs deviated)
- **Kocher's test**→test for tracheal compression  
=The swelling is pressed slightly on either side of trachea. If trachea is already compressed patient will have stridor
- **Berry's sign**→carotid pulse palpation
  - Berry's sign positive mean→Carotid pulse is not palpable on the side of the swelling

#### Methods of palpation

- ✓ Standing in front of the pt &
- ✓ Standing behind the pt

✚ Percuss→if you suspect retrosternal extension

=Resonant Vs dull

✚ Auscultation

- ✓ **Bruit over the swelling**→upper poles
- ✓ **Venous hum**→in supraclavicular space

### *Reporting format*

#### Inspection

✚ There is about 15X10cms butterfly shaped anterior neck swelling which moves with deglutition. The lower border is visible on swallowing. It's slightly deviated to the right side. There is no visible pulsation or overlying skin color change. Pemberton's sign is -ve.

#### Palpation

✚ There is 20X14cms non-tender, nodular, firm anterior neck mass with regular border & no fixity to the overlying skin. Its temperature is comparable to other parts of the body. The lower tracheal ring is palpable above sternal notch. There is no thrill. Kocher's test is -ve. Carotid arteries are palpable bilaterally (Berry sign is negative). The trachea is central.

#### Percussion

✚ -----

## Auscultation

---

✚ No bruit over the swelling

### **NB\*\*\*\*\***

Pertinent positive or negative physical examination findings on other systems...

#### ✓ **Signs of thyrotoxicosis**

- ❖ Tachycardia (on VS)
- ❖ Eye signs (on HEENT)
  - Exophthalmos= abnormal protrusion of the eye ball
    - Top view (see from top)
      - Exophthalmos is said to be present when the eyeball is seen beyond the superior orbital margin
    - Visibility of both the upper & lower sclera → exophthalmos
  - Lid lag (von Graefe's sign)
    - Steady the patient's head with one hand
    - Ask the patient to look at your finger
    - Ask the patient to look up and down following your finger
    - In case of thyrotoxicosis, the lid may lag while the eyeball moves downward and the upper sclera becomes visible.
  - Lid retraction (Dalrymple's sign)
    - ❖ Visibility of upper sclera due to spasm of upper eyelid. (@rest)
  - Absence of wrinkling (Joffroy's sign)
    - Steady the patient's head with one hand
    - Ask the patient to look up at the ceiling.
    - In case of thyrotoxicosis, there may be loss of wrinkling of forehead.
  - Failure of convergence
    - Ask the pt to look at your finger at distance then bring it suddenly in front of the pt eye
    - In thyrotoxicosis, there is failure of convergence
- ❖ Warm moist skin (on IGS)
- ❖ Pretibial myxedema (on IGS)
- ❖ Tremor (on CNS)
  - Finger
    - Ask the patient to stretch out both the upper limbs and spread out the fingers
  - Tongue
    - Ask the pt to protrude the tongue resting on the lower lip



- ✓ **Signs of hypothyroidism**
  - ❖ Bradycardia (on VS)
  - ❖ Edema of face & legs (HEENT + MSS)
  - ❖ Delayed relaxation of deep reflexes (on CNS)
  - ❖ Pendred's sign (on CNS)
    - Goiter + severe sensory neural hearing impairment
- ✓ **Signs of retrosternal extension**
  - ❖ Increased JVP (on CVS)
  - ❖ Horner syndrome
    - ptosis
    - Anhidrosis
    - Miosis...
- ✓ **Signs of metastasis**
  - ❖ Hard cervical LNs (on LGS)
    - Never forget to check LNs
  - ❖ Nodules on skull (on HEENT)
    - Rapidly growing, pulsatile & warm swelling
    - erosion of the skull may be present
  - ❖ Long bone metastasis (on MSS)
  - ❖ Chest effusion & consolidation (on RS)
  - ❖ Nodular liver & ascites (abd. Examination)

**Watch video on how to examine thyroid enlargement @**

**<https://www.youtube.com/watch?v=ta-s-ZWRk6g>**

## Discussion of the DDX (goiter)

### 1) Simple goiter

#### Causes

→ See causes listed for nontoxic goiter above...

#### CPs

→ Most → asymptomatic

→ If symptomatic → often complain of

+ Pressure sensation in the neck

+ Compressive *symptoms*

> Dyspnea

> Dysphagia

> Catarrh -- A need for frequent throat clearing

+ Acute pain

> In case of hemorrhage

+ In substernal goiters → on P/E → Positive Pemberton's *sign*

○ If Diffuse type → on P/E → Soft, diffusely enlarged thyroid gland

+ diffuse → due to persistent stimulation by TSH

○ If Multinodular type → on P/E → Nodules of various size & consistency

+ nodules → due to fluctuation in stimulation by TSH

Types

#### Complications

➤ Tracheal obstruction

➤ 2<sup>o</sup> thyrotoxicosis

○ In 30% of pts

➤ calcification

➤ Premalignancy

○ Cmn for follicular thyroid ca

NB\*

Cmn in females → because of estrogen receptors in the thyroid tissue

#### INVx

euthyroid

▪ normal TSH

▪ normal free T4 level

## Mgt

- Large goiters
  - ✓ Give exogenous thyroid hormone
    - to reduce TSH stimulation of the gland growth (-ve feedback mechanism)
- Endemic goiters
  - ✓ administer iodine
- Surgical resection
  - ✓ indications
    - toxic feature
    - goiters causing obstructive symptoms
    - goiters suspected for being malignant or proven by FNA
    - goiters cosmetically unacceptable
  - ✓ Preferred methods of resection → Near-total or total thyroidectomy with lifelong T4 therapy.

## 2) Toxic goiter (thyrotoxicosis)

### A. Diffuse toxic goiter (graves' disease)

- ✓ An autoimmune disease with a strong familial predisposition
- ✓ Cmn in females (5:1)
- ✓ Thyroidal manifestations
  - Thyrotoxicosis
  - Diffuse goiter
- ✓ Extra-thyroidal manifestations
  - Eye signs + CNS symptoms → cmn

### Triggering agents

- ✓ Postpartum state
- ✓ Iodine excess
- ✓ Lithium therapy
- ✓ Bacterial & viral infections

### CPs

- ✓ Related to hyperthyroidism...
  - See lists of hyperthyroidism symptoms above...

- ✓ **Specific to graves' disease**
  - **Ophthalmopathy**
    - Lid lag (von graefe's sign)
    - Spasm of upper eye lid (Dalrymple's sign)
    - Prominent staring
    - Exophthalmos, conjunctival swelling & congestion, proptosis→...in true infiltrating eye disease
  - **Dermopathy**
    - Pretibial myxedema
      - Due to deposition of glycosaminoglycans
- ✓ **Thyroid gland on P/E**
  - the thyroid is usually diffusely & symmetrically enlarged
  - there may be overlying bruit or thrill on thyroid gland
  - there may be loud venous hum in supraclavicular space

### INVx

- **TSH level**
  - Finding→Suppressed
- **Free T3 or T4 level**
  - Finding→May or may not be elevated
- **Radioactive iodine uptake (RAIU) & scan**
  - Findings→increased uptake + diffusely enlarged gland

### Mgt

#### 1) Medical Rx

- ✓ **Anti-thyroid drugs**
    - Usually administered for preparing the pt for thyroid ablation with radioactive iodine or thyroidectomy.
      - To render the pt euthyroid
        - If not→thyroid storm will happen during the procedure
    - Dose=titrated as needed in accordance to TSH & T4 level
    - Duration= Until the pt is euthyroid (Clinical & Lab. Evidences)
    - **Anti-thyroid drugs...**
      - **PTU (propylthiouracil)**
        - 100-300 mg three times daily
        - DOC
      - **Methimazole**
- MOA:**
- both reduce thyroid hormone production by inhibiting the organic binding of iodine & the coupling of iodotyrosines
  - In addition PTU inhibits peripheral conversion of T4 to T3
    - Making it DOC for Rx of thyroid storm
  - PTU→less risk of transplacental transfer compared to methimazole→Preferred in pregnant & breast feeding women

- ✓ **β-blocking agents**
  - To alleviate catecholamine response of thyrotoxicosis; =...Palpitation, nervousness, emotional lability, hyperkinesis & tremors
  - Should be considered in all symptomatic (thyrotoxic) pts & elderly with cardiac disease
  - β-blockers...
    - Propranolol
      - 20-40 mg four times daily
    - Atenolol
      - Long acting

## 2) Thyroid ablation with Radio-Active Iodine (RAI)

- ✓ **indications**
  - elderly pts with small or moderate sized goiters
  - those who relapsed after medical or surgical therapy
  - when anti-thyroid drugs or surgery is contraindicated in the pt
- ✓ **Absolute contraindications for this Rx**
  - Pregnant or planning to conceive soon (< 6 month ) after the Rx
  - Breast feeding mother
- ✓ **Relative contraindications**
  - Young pts
  - Those with thyroid nodules
  - Those with ophthalmopathy

## 3) Surgical Rx

- ✓ **Indications**
  - Confirmed ca. or suspicious thyroid nodules
  - Enlarged goiters (>80gm) causing compressive symptoms
  - Desire to conceive soon (<6 month) after the Rx
  - Pts with moderate to severe Grave's ophthalmopathy
- ✓ **Pre-op preparation**
  - Pt should be rendered euthyroid with anti-thyroid drugs
  - 7-10 days prior to surgery give #3drops bid of...
    - lugol's iodine solution or
    - Saturated potassium iodide
    - MOA: they reduce vascularity of the gland & decrease the risk of precipitating thyroid storm

✓ Procedure → thyroidectomy

➤ Types

Recommended for Graves' disease

- Total thyroidectomy
- Near total thyroidectomy
- Subtotal thyroidectomy
- Lobectomy
- Hartley–Dunhill procedure
- Subtotal thyroidectomy + Total lobectomy

**NB\*\*\*\*\***

In Graves' disease

- ✓ enlargement of thyroid gland &
- ✓ thyrotoxic signs & symptoms

Appear @ the same time unlike TMNG

## B. Toxic Multinodular Goiter (TMNG)

Cps

- This pts will have prior hx of *non-toxic multi-nodular goiter*
  - this pts will tell you that “I had anterior neck swelling first” (non-toxic)
  - “Then...after some period of time I started to experience.....” (the thyrotoxic symptoms)
- CVS symptoms → cmn
- Eye signs → infrequent unlike graves' disease

INVx

- TSH level → Suppressed TSH
- Free T3 & T4 → both elevated
- If RAI scan is done → it will show you multiple nodules with increased uptake

Mgt

- 1) Control hyperthyroidism
  - a. Anti-thyroid drugs
  - b. B-blockers
- 2) RAI—thyroid ablation
  - ❖ Reserved for elderly pts
- 3) Surgical Rx
  - ❖ Near total or total thyroidectomy is recommended
    - To avoid recurrence & risk of repeating the surgery

### C) Toxic adenoma (Plummer disease)

=Autonomous, solitary overactive nodule with inactive surrounding tissue

=Typically occur in young pts

>>...recent growth of long standing nodule along with symptoms of hyperthyroidism

=Thyroid gland on P/E

>>usually reveals a solitary nodule without palpable thyroid tissue on the contra lateral side

=RAI scan (INVx)

>>Hot nodule with suppression of the rest of the gland

=Mgt

=Smaller nodules

>>Anti-thyroid drugs

>>RAI-- thyroid ablation

=Larger nodules

=Higher dose

>>Anti-thyroid drugs

>>RAI

=Surgery

>>Lobectomy & isthmusectomy

### 3) Inflammatory goiter

→Inflammatory goiter may be toxic or non-toxic

#### A) Acute (suppurative) thyroiditis

➤ More cmn in children

➤ Often preceded by URTI or otitis media

CPs

➤ Severe neck pain radiating to the jaws/ear

➤ Fever, chills

➤ Odynophagia

➤ Dysphonia

#### Complications

➤ Systemic sepsis

➤ Tracheal /esophageal rupture

➤ Jugular vein thrombosis

➤ Laryngeal chondritis & perichondritis

➤ Sympathetic trunk paralysis

## INVx

- CBC=leukocytosis
- FNA for gram stain, culture & cytology

## Mgt

- Parenteral antibiotics
- Drainage of abscesses
- Thyroidectomy
  - For persistent abscess
  - Failure of open drainage

## B) Sub acute thyroiditis (granulomatous thyroiditis)

### CPs

May be painful or painless

#### • Painful

- ✓ Thought to be viral in origin or post-viral inflammatory response
- ✓ Four stages
  - Hyperthyroidism→euthyroid→hypothyroidism→ resolution & return to euthyroid state
- ✓ On Hx
  - sudden or gradual onset neck pain
    - which may radiate to the mandible or ear
  - Hx of preceding URTI (often)
- ✓ On P/E
  - Enlarged, tender, firm gland
- ✓ INVx.
  - Early stage
    - TSH decreased, T4 & T3 elevated
    - ESR >100mm/h
    - RAI uptake=decreased
- ✓ Mgt→Self limiting disease
  - So Rx is primarily symptomatic relief
    - pain relief
      - Asprin & NSAIDS
      - Steroids→in severe cases
    - Short-term thyroid replacement may be necessary
      - To shorten duration of symptoms



- **Painless**

- **Considered to be autoimmune**
- **On P/E**
  - normal sized or minimally enlarged, firm, non-tender gland
- **INVx.**
  - **Similar to the painful one except**
    - Normal ESR
- **Mgt**
  - **Pts→with symptoms**
    - B-blockers
    - Thyroid hormone replacement

### **C) Chronic lymphocytic thyroiditis /Hashimoto's/**

- **A transformation of thyroid tissue to lymphoid tissue**
- **Leading cause of hypothyroidism**
- **Cmn in females (10-20:1)**

#### **CPs**

- ✓ **Minimally or moderately enlarged firm & nodular gland**
- ✓ **20% present with hypothyroidism while 5% present with hyperthyroidism**

#### **INVx.**

- ✓ **Elevated TSH**
- ✓ **Thyroid auto-antibodies**
  - Present

#### **Mgt**

- ✓ **Overtly hypothyroid pts**
  - **Thyroid hormone replacement therapy**
    - **Levothyroxine**

### **D)Reide's thyroiditis**

- **Replacement of all or part of the thyroid parenchyma by fibrous tissue**

#### **CPs**

- ✓ **The pt may present with symptoms of hypothyroidism & hypoparathyroidism→since the gland is replaced by fibrous tissue**
- ✓ **Typically presents as painless, hard ("woody") anterior neck mass, with fixation to the surrounding tissue**

#### **Dx**

- ✓ **Open thyroid biopsy**

## Mgt

- ✓ Surgery
- ✓ Hypothyroid pts → thyroid hormone replacement therapy

**NB\*\*\***

Thyroid gland is inherently resistant to infection due to

- Its extensive blood & lymphatic supply
- High iodide content &
- Fibrous capsule

## 4) Neoplastic goiter

### ❖ Benign

- Follicular adenoma

### ❖ Malignant

- ✓ May be primary or secondary (metastasis to thyroid gland)

#### i) Primary

- From follicular epithelium → well differentiated → slow growth

### a. Papillary thyroid ca.(PTC)

- 80% of all thyroid malignancies
- Predominant in children & individuals exposed to radiation
- LN metastasis → cmn
- Distant metastasis
  - ✓ Lungs, bone, liver & brain
- Dx → FNAC
- Mgt
  - Surgical Rx
    - ✓ Total /near total thyroidectomy
  - Post-op
    - ✓ Radioiodine therapy
    - ✓ Radiotherapy & chemotherapy
    - ✓ Thyroid hormone

## b. Follicular thyroid ca.(FTC)

- 10% of thyroid ca.
- Occur more commonly in iodine deficient areas
- Often present as solitary thyroid nodule
- Hematogenous metastasis → cmn
- Unlike PTC cervical LAP isn't cmn
- Dx
  - FNAC is unable to distinguish benign from malignant disease
  - Difficult to DX pre-op unless distal metastasis
- Mgt
  - Surgical Rx
    - ✓ Lobectomy
    - ✓ Total thyroidectomy
  - Post-op
    - ✓ Radioiodine therapy
    - ✓ Radiotherapy & chemotherapy
    - ✓ Thyroid hormone

## c. Hurthle cell ca. (subtype of follicular ca)

- 3% of thyroid ca
- Can't be DXed with FNAB
  - ✓ Since it's characterized by vascular & capsular invasion

→ Follicular epithelium → de-differentiated

## a. Anaplastic ca.

- early local infiltration → aggressive
- Typically pts present with long standing neck mass, which rapidly enlarges & may be painful+...
  1. Dysphagia
  2. Dyspnea
  3. dysphonia
- pts may experience...
  1. bone pain
  2. weakness
  3. cough
- poor prognosis

## →Others

### ==Medullary ca.

- arise from Para-follicular or C cells
  - ✓ Lump @ supero-lateral neck
- may occur in combination with adrenal pheochromocytoma and hyperparathyroidism
- Mgt
  - ✓ total thyroidectomy
  - ✓ External beam radiation

### ==Thyroid Lymphoma

- Non Hodgkin's B-cell type

## ii) Secondary (Metastasis)

- Thyroid is rare site of metastasis
- Sites→kidney, breast, lung & melanoma

**NB\***

**Prognosis**→parameters;

- Age
- Metastasis
- Size
- Extrathyroidal extension
- Histologic type
- Resectability

## **SAMPLE Hx**

**C/C**

**Anterior neck swelling of 2yrs duration**

**HPI**

This pt was LRH **2yrs** back @ which time her families suddenly noticed a swelling on her left lower neck. The **swelling** was *painless* & it was initially pea sized but it started to grow slowly upwards & to the right to attain its current size & location. Associated with this she started to experience **stridor** which worsen during sleeping but no difficulty of swallowing or change in *voice quality*.

**07 months** prior to admission she started to experience **palpitation, heat intolerance, profuse sweating & un-quantified weight loss** to the extent her skirts become loose despite good appetite. In addition she started to experience **irregular menstrual cycle** for the past 07months which come every 2 or 3months.

**03 months** prior to admission she visited our hospital where blood sample & sample from the swelling was taken. Then she was given whitish scored oval tablet to be taken three times daily & reddish scored circular tablet to be taken twice daily. She is taking her medications adherently & currently she has no palpitation, heat intolerance or excessive sweating.

- Many peoples in her vicinity have similar illness. (endemic goiter)
- Her regular dietary habit is 'injera' made of 'teff' & 'shirrowot' made of 'atter.' She occasionally eats cabbage.(Dietary goitrogens)
- No hx of drug intake except the medication explained above.(Drug induced goiter)
- No hx of fever, chills or rigor.(inflammatory goiter)
- No family hx of similar illness.(familial goiter or thyroid ca.)
- No hx of head & neck radiation therapy. (RF--if ca)
- No hx of swelling in the neck or axilla. (LN metastasis-if malignant)
- No hx of bone pain, hemoptysis or yellowish discoloration of the eyes. (distant metastasis-if ca)
- No hx of dyspnea, orthopnea, PND or lower leg swelling. (thyrocardiac disease)
- No hx of chronic cough, contact with a chronic cougher or previous TB Rx
- No self/family hx of DM, HTN or asthma
- She was screened for RVI 7months back & found to be NR (non-reactive)

*Finally she was admitted to our hospital walking by herself.*

## Investigations (INVx.)

### Lab. studies

#### ➤ *TFT (thyroid function test)*

- ✓ TSH
  - ❖ Normal=0.5-5 $\mu$ u/mL
- ✓ T3 & T4
  - ❖ Total (reference range)
    - T3=1.5-3.5nmol/L
    - T4=55-150nmol/L
  - ❖ Free(reference range)
    - T3=3-9pmol/L
    - T4=12-28pmol/L

### Pathology

#### ✓ *FNAC*

- ❖ Reliable in...
  - Papillary, medullary, anaplastic thyroid ca.
- ❖ Not reliable in...
  - follicular adenoma vs follicular carcinoma
  - hurthle cell ca.
  - hashimoto's thyroiditis Vs thyroid lymphoma

### Imaging

- Chest & thoracic inlet radiograph
  - ✓ What to look?
    - ❖ Retrosternal goiter
    - ❖ Tracheal deviation & compression
    - ❖ Pulmonary metastasis
- U/S
  - ✓ In evaluation of thyroid nodules
    - ❖ solid Vs cystic
    - ❖ size
    - ❖ multicentricity
    - ❖ risk of malignancy...by looking @ its echotexture, shape, border, calcifications, vascularity...
  - ✓ Targeted aspiration-(USG-FNAC)
  - ✓ For assessing cervical lymphadenopathy
- CT, MRI & PET

## Thyroid (isotope) scanning

- Size & shape of the gland
- Activity of the gland
  - ✓ hot
  - ✓ Warm
  - ✓ Cold

## Anti-thyroid antibody assessment

- ❖ Do not indicate thyroid function rather indicate the underlying disorder
  - Usually an autoimmune thyroiditis

## Management

- See the mgt in each section on the discussion of DDX

## Complications of thyroid surgery

- ✓ Hemorrhage
- ✓ Airway obstruction
  - causes
    - ✚ Laryngeal edema
      - Mgt
        - Intubate then
        - Give Steroids → to reduce the edema
    - ✚ RLN injury
      - Bilateral
        - CPs—respiratory distress
        - Mgt
          - tracheostomy
          - chordoctomy
      - unilateral
        - CPs--hoarseness of voice
        - Mgt
          - re-innervation
          - medialization → injection therapy (edema)
    - ✚ Haematoma
      - CPs—respiratory symptoms due to the compression
      - Mgt
        - remove all the stitches
        - Urgent decompression → release the blood collection
    - ✚ Hypocalcemic tetany
      - Laryngeal spasm → cause airway obstruction
      - Mgt
        - Intubate first & then Calcium supplementation
    - ✚ Tracheomalacia

- ✓ **Wound infection**
- ✓ **Thyroid storm**
  - Is a condition of hyperthyroidism accompanied by
    - ✚ fever, CNS agitation or depression,
    - ✚ Cardio-vascular dysfunction (hypotension + tachycardia) &
    - ✚ GI dysfunction, including hepatic failure
  - Due to Poor pre-op preparation
  - Mgt of thyroid storm
    - B-blockers
      - propranolol
    - Oxygen supplementation
    - Hemodynamic support
    - Pyrexia → give non-aspirin cpds
    - Lugol's iodine or sodium ipodate (IV route)
    - PTU
    - Corticosteroids
      - To prevent adrenal exhaustion & block hepatic thyroid hormone conversion
- ✓ **Hypothyroidism**
  - Mgt
    - ✚ levothyroxine
- ✓ **Hypoparathyroidism**
  - May be
    - ✚ Transient
      - Due to ischemia/manipulation
    - ✚ Permanent
      - Due to removal of the gland
  - May be
    - ✚ Subclinical--asymptomatic
      - Elicit signs of hypocalcemia
        - Chovestik sign
        - Trousseau sign
    - ✚ symptomatic--overt
      - CPs
        - perioral parasthesia, carpopedal spasm, laryngospasm, seizure, tetany...
      - Mgt
        - symptomatic--calcium supplementation
- ✓ **Superior laryngeal nerve injury**
  - Cps
    - ✚ can't produce high pitch sound
  - Mgt → speech therapy



✓ **Other complications**

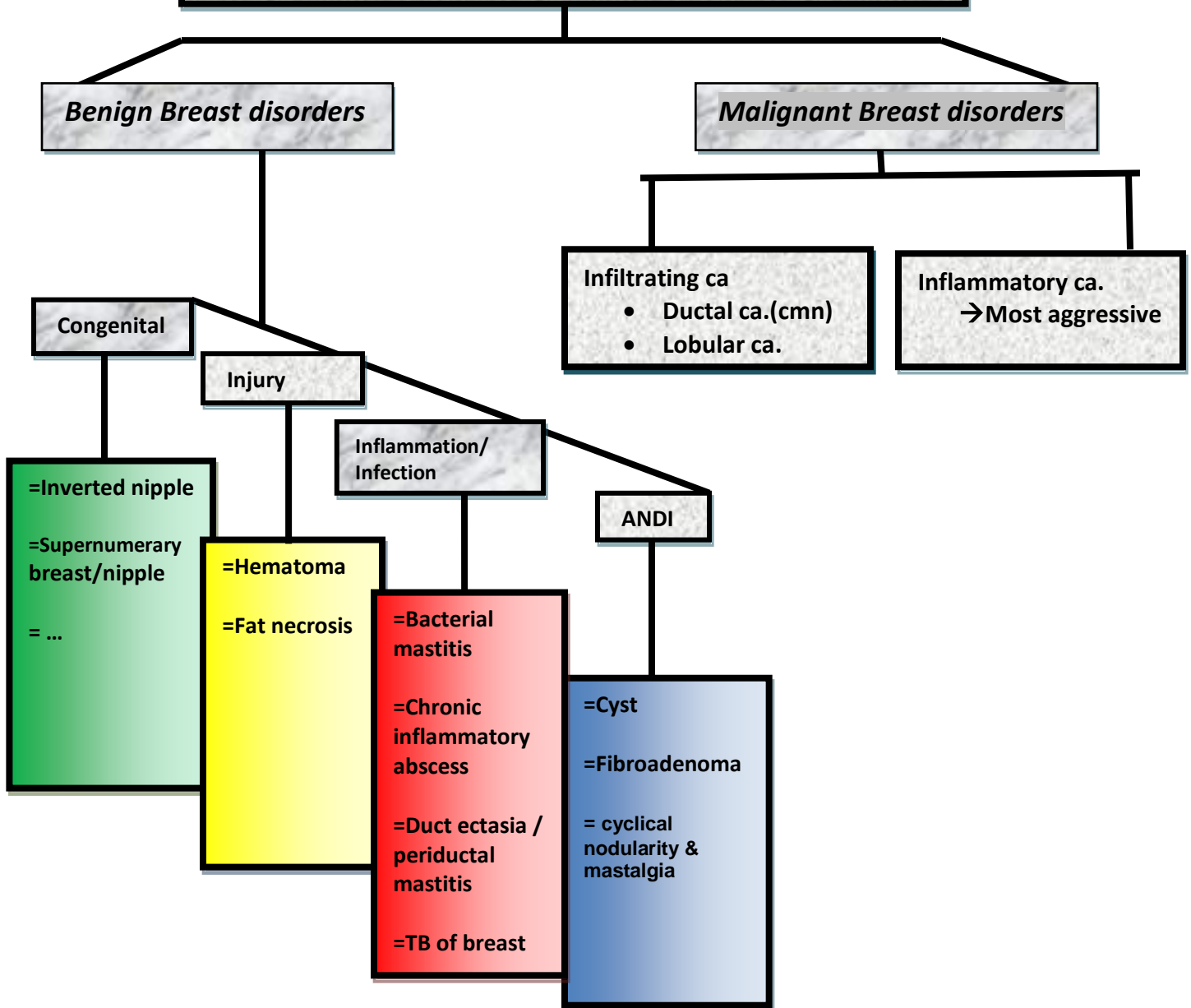
- **Keloids**
- **Stitch granuloma**

**NB\*\***

**β-blocker Rx should be continued 1wk after surgery. Because, the half life of T4 reaches up to 7days.**

# SAMPLE HISTORY ON BREAST CANCER

## How to approach Breast disorders



# BREAST CA

## Risk Factors

+ Female sex

+ Increasing age (65+)

### + Hormonal

- ✓ Increased (unopposed) estrogen exposure due to
  - Early menarche
    - age <12
  - Late menopause
    - age >55
  - Nulliparity
  - Never breastfed
    - Breast feeding → protective
  - First full term pregnancy >30yrs of age
    - First child @ early age → protective
  - Exogenous hormones
    - Hormone Replacement therapy (HRT) within the last 5yrs
      - Increased risk among those taking combined HRT than single estrogen formulation
    - ? OCP use within the last 10yrs
      - Up to 25% of pts → increased risk
      - >10 yrs of cessation → risk returns to that of average population
  - Obesity
    - In postmenopausal women → the adipose tissue acts as major source of estrogen

### + Non hormonal

- ✓ Hx of radiation therapy/high dose/
  - E.g. mantle radiotherapy for Hodgkin's lymphoma
- ✓ Alcohol abuse (females → not cmn in our country)
  - known to increase serum level of estradiol

### + Genetics

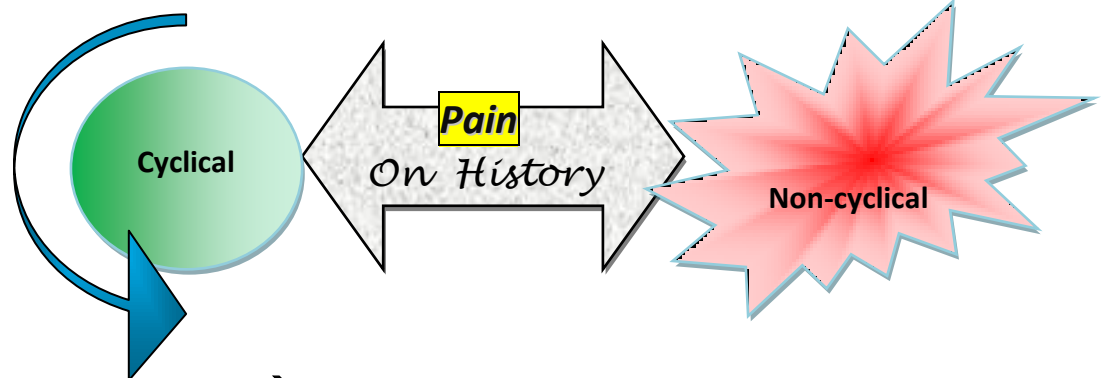
- ✓ Familial breast ca
  - Ask Hx of first degree relatives with breast ca.
- ✓ Hx of endometrial, ovarian or colonic ca

# Clinical presentations

## 1) History

### ○ Common presentations

- Lump (swelling)
  - When the pt noticed the swelling?
  - How?
  - Site & progression?
- Nipple discharge or retraction
  - Color of discharge?
- Ulceration or erythema of the skin
- Axillary mass
  
- Pain → usually associated with benign diseases



- In advanced cases → when you suspect metastatic spread, u can ask...
  - Bone pain, fracture hx (pathological one) → bone metastasis
  - Breathing difficulties (breathlessness) → malignant pleural effusion
  - Yellowish discoloration of the eyes & the skin → liver metastasis
  - Headache, nausea, vomiting (features of raised ICP) → cerebral metastasis

### *Spread of breast ca*

1. Local spread
  - Skin, muscles, chest wall
2. Lymphatic metastasis
  - Axillary LNs, internal mammary LNs, supraclavicular LNs
3. Hematogenous metastasis
  - Skeletal metastasis (lumbar vertebrae, femur, thoracic vertebrae, rib & skull)
  - Liver, lungs & brain

## 2) Physical Examination

### → LGS Examination

#### ➤ Breast examination

#### Inspection

- First position the pt
  1. Arms by side
  2. Arms straight up in the air
  3. Hands on hips
- Comment on....
  - Symmetry with other breast
    - Use nipple line for comparison
  - breast size & shape → compare both sides
  - Edema or peau d'orange appearance
    - due to cutaneous lymphatic obstruction
    - peau d'orange appearance become more prominent on elevation of the hands
  - Skin or nipple retraction
    - skin retraction accentuated by positioning the pt with arms extended forward, sitting position & leaning forward
  - Nipple discharge
  - Ulceration

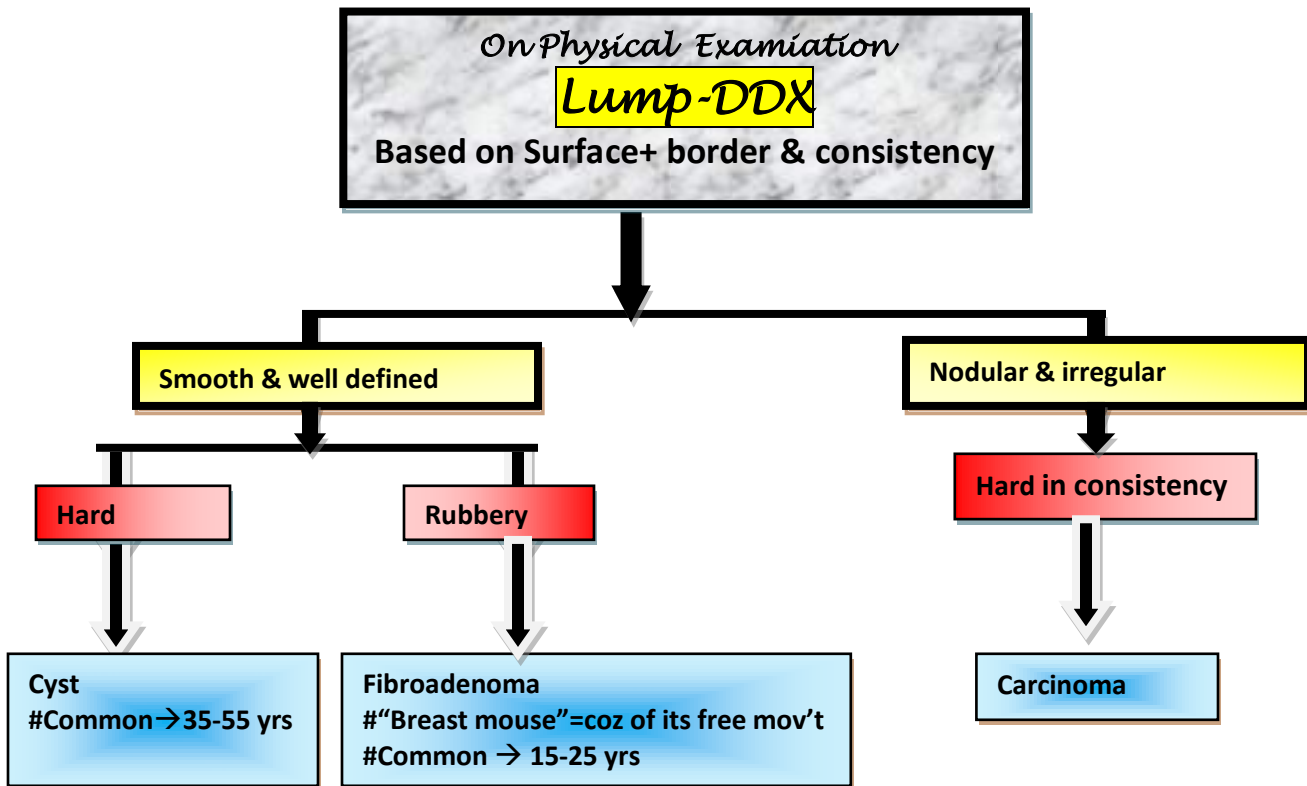
#### Palpation

##### Technique

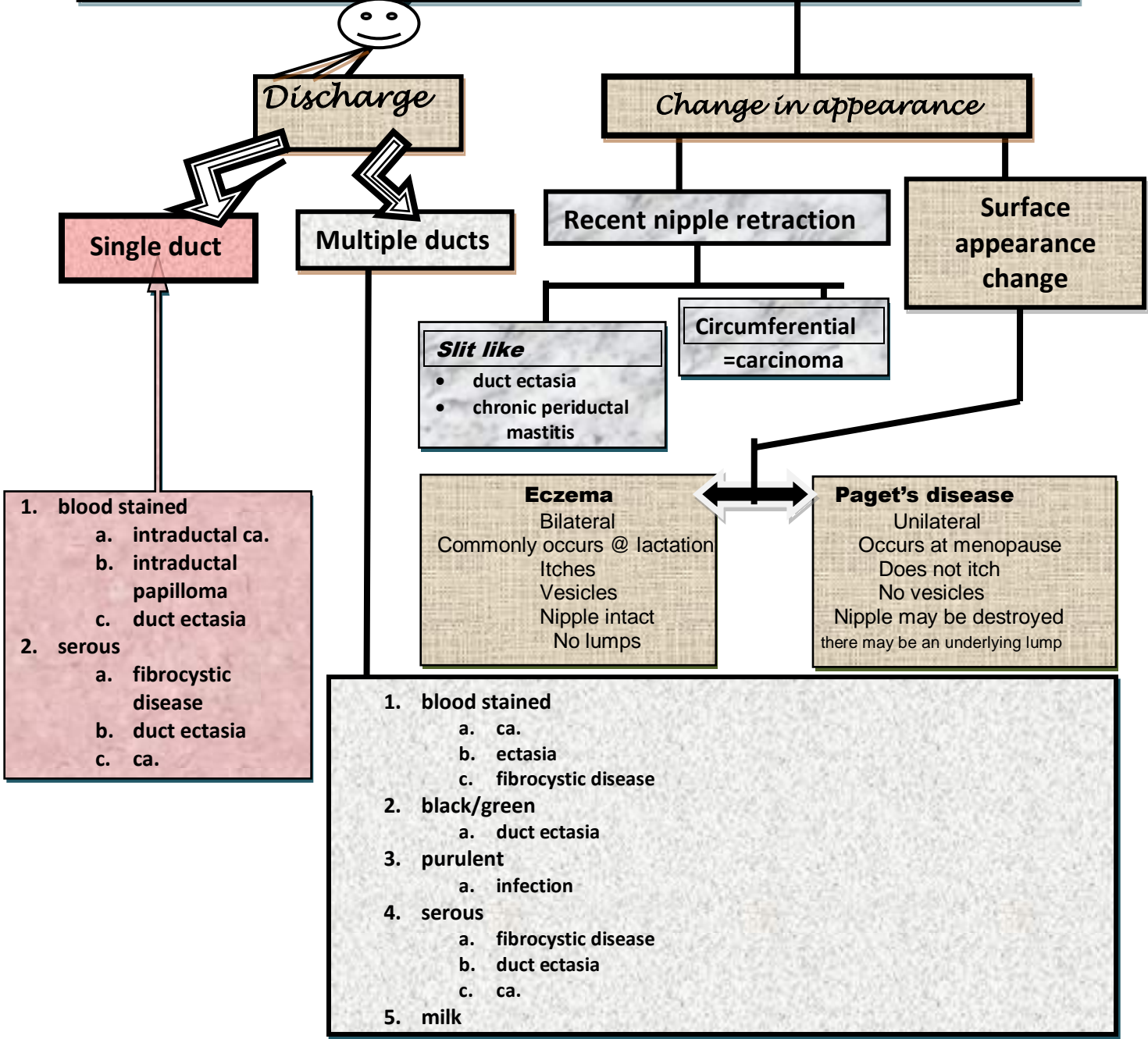
- Examine all the 04 quadrants with palmar aspect of your fingers
- Avoid a grasping or pinching motion
- Comment on the swelling...
  - Site
    - Upper outer quadrant(UOQ) → cmn
  - Tender / non-tender
  - Consistency
    - Hard Vs firm Vs soft

- Border
  - irregular Vs regular
- Surface
  - Nodular Vs smooth
- Fixation
  - fixed to overlying or underlying structures Vs not fixed

**Watch video on how to examine breast swelling @**  
<https://www.youtube.com/watch?v= p8PobUp2Yo>



*On physical examination*  
**Nipple - areola complex findings - DDX**



\*\*\*important things to check after breast examination in breast ca.

- Axillary + supraclavicular lymphadenopathy (LAP)
- Upper extremity neurologic motor & sensory examination
  - In case of infiltration of brachial plexus

# Approach TO THE LIKELY DX

**Lump**

**Nipple**

**Yes**

**No lump  
But painful & tender**

**Discharge**

**Change in appearance  
(including areola)**

**Painless**

**Painful**

**Change in breast size/ shape**

- Cyclical breast pain
- Non-cyclical breast pain
- Very rarely, carcinoma

- Duct ectasia
- Intraductal papilloma
- DCIS
- Associated with a cyst

- Duct ectasia
- Carcinoma
- Paget's disease
- eczema

- Carcinoma
- Cyst
- Fibroadenoma

- An area of fibroadenosis
- Cyst
- Periductal mastitis
- Abscess  
usually postpartum or lactational
- Sometimes carcinoma

- Pregnancy
- Carcinoma
- Benign hypertrophy
- Rare large tumors




## **NB\* Bacterial mastitis**

Can be

1. Lactational
  - Ask hx of cracked nipple or skin abrasion
2. Non-lactational
  - periareolar
    - periductal mastitis
  - peripheral-rare
    - ask Hx of DM , RA, steroid Rx, trauma

### **CPs**

- cardinal signs of inflammation
  - severe pain
  - swollen breast
  - Erythema
  - warm to touch

cellulitic stage
- When breast abscess develop there will be...
  - high grade fever &
  - Fluctuant swelling → can be felt unless deep seated

### **Mgt**

- Cellulitic stage
  - Proper antibiotics
    - Penicillins or Cephalosporins
  - Appropriately fitting supportive bra
  - Warm compress
  - Analgesia
  - Emptying the breast with breast suction pump
  - If not resolved within 48hrs or tense indurations after being emptied/underlying abscess → repeated aspirations
- Stage of abscess
  - Repeated aspiration with antibiotic coverage with or without u/s guidance
  - Incision & drainage ( I&D)
    - For large abscesses with purulent discharge
  - Antibioma=large, sterile, brawny edematous swelling that form if antibiotic is used in the presence of undrained pus
    - antibiotic induced swelling=antibioma

**NB\*** Duct ectasia=dilatation of the breast ducts

## SAMPLE Hx

*e/e*

**Breast swelling of 6 months duration**

**HPJ**

*This is a 38 years old nulligravida lady who was LRH 6months back @ which time she noticed a small **swelling** on her left upper lateral breast while she was taking shower. Initially the swelling was pea sized, and then it started to grow downwards & medially to attain its current size & shape. 01 month prior to admission she started to experience **bright red colored discharge** from her left nipple but no hx of breast **pain**. Associated with this she started to notice change in **nipple position & orange cover like skin appearance change** over the left breast.*

*For the above complaints she visited a private clinic in Gondar where aspiration was taken from her left breast & told to have breast cancer. Then they referred her to our hospital for better management.*

- *Her menses started @ the age of 12, It was regular, comes every 28 days, stays for 3-4 days, moderate in amount & associated with mild abdominal discomfort*
- *The pt doesn't notice any cyclical changes of the swelling with her menses.(ANDI)*
- *No family hx of similar illnesses. (RF)*
- *No hx of HRT or OCP use. (RF)*
- *No hx of radiation therapy. (RF)*
- *No hx chronic alcohol consumption. (RF)*
- *No hx of breast trauma*
- *No hx of breast or abdominal surgery. (Recurrence + surgery for ovarian/ endometrial ca resp.)*
- *No hx of swelling in the neck or axilla. (lymph node metastasis)*
- *No hx of bone pain, breathing difficulty or yellowish discoloration of the eyes.(metastasis)*
- *No hx of cough, contact with chronic cougher or previous TB Rx. (breast TB)*
- *No self or family hx of DM, HTN or asthma*
- *Has been screened for RVI 01 month back & found to be NR.*

*Finally she was admitted to our hospital walking by her self.*

# Investigations

## Imaging studies

### 1. Mammography

- Mammography=imaging breast either in medio-lateral or cranio-caudal view by a selenium coated x-ray plate which become in direct contact with the breast.
- sensitivity of this investigation increases with age as the breast becomes less dense

- What to look for ca. in mammography?
  - a solid mass with or without stellate features
  - asymmetric thickening of breast tissue &
  - clustered micro-calcifications

### 2. U/S

- can be used in young women with dense breasts in whom mammograms are difficult to interpret
- can distinguish cysts from solid lesions
- Can localize impalpable areas of breast pathology
- It can guide
  - FNAC, core biopsy...
- Drawback=not ideal for lesions < or =1cm in diameter

- What to look for a cyst on u/s?
  - Well circumscribed wall
  - Smooth margins
  - Echo-free center
- What to look for breast ca. on u/s?
  - Irregular walls
  - But may have smooth margins
  - Acoustic enhancement
- What to look generally for benign breast masses?
  - Well defined margins
  - Round or oval shape
  - Smooth contour
  - Weak internal echoes

### 3. Ductography

- Ductography = Radio-opaque contrast media (injected) + mammography
- Primarily indicated for → blood stained nipple discharge

- What to look in ductography?
  - If intraductal papilloma
    - =Small filling defects surrounded by contrast media
  - If ca.
    - =May appear as irregular masses or as multiple intra-luminal filling defects

#### 4. MRI

#### Pathology

#### 5. FNAC

- The least invasive technique for obtaining a cytological Dx.
- Drawback → can't distinguish invasive cancer from in-situ disease

#### 6. Core biopsy

- Differentiates invasive ca from in-situ ca
- Pre-op ass't of hormone receptors can be done

#### Routine workups

- **CBC**
  - May show Anemia

#### Metastatic workups

- **Lab. studies**
  - ALP Level
    - If increased → Bone or liver metastasis
- **Radiological**
  - CXR
  - Abdominal U/S
    - If there is hepatomegally
  - Bone scan
    - If the pt is symptomatic or increased ALP level

NB\*\*\*

*Triple ass't* → for pts suspicious of carcinoma

- Positive predictive value (PPV)=99.9%

1) Clinical ass't

*Triple Ass't*

2) Radiological imaging

- If >40 u/s , <40 mammography

3) FNAC

## Management

### \*Early breast ca (Stage I & IIA)

#### ➤ *Surgical mgt*

##### ❖ Mastectomy

- Indicated for
  - ✓ Large tumors
  - ✓ Central tumors beneath or involving the nipple
  - ✓ Multifocal
  - ✓ Local recurrence
  - ✓ Pt's preference
- May be
  - ✓ Simple mastectomy
    - Removal of the entire breast tissue
  - ✓ Modified radical mastectomy (patey)
    - Simple mastectomy + removal of pectoralis minor + axillary block dissection
  - ✓ Radical mastectomy
    - Obsolete nowadays

##### ❖ Breast conservative surgery

- Lumpectomy+ axillary block dissection

##### ❖ Lumpectomy

- Removal of the tumor with a rim of at least 1cm of normal breast tissue
- Indicated for <4cms tumors with well-differentiated histology

##### ❖ Sentinel node biopsy

- Sentinel LN=The first LN to get enlarged in malignancies → has metastatic potential
- Considered as standard care for mgt of axilla in early breast ca with no clinically apparent LNs & non-multicentric disease
- Node localized preoperatively by injection of blue dye or using radio-isotope
- But, if node +ve disease detected → axillary block dissection

## ➤ *Adjuvant treatment*

- ❖ Radiotherapy
  - Indications
    - ✓ +ve tumor margin
    - ✓ Breast conservative surgery
    - ✓ Pectoralis major involved
    - ✓ Inner quadrant tumor
    - ✓ High grade tumors
    - ✓ Axillary clearance not satisfactory
- ❖ Chemotherapy
- ❖ Hormonal Therapy

### **NB\***

\*In case of advanced breast ca, mgt should be aimed at palliation of the symptoms & Rx of breast ca by hormonal therapy (usually) with or without radiation therapy.

# SAMPLE HISTORY ON GOO

GOO 2<sup>o</sup> TO???

DDx

## Approach

### Benign causes

- **PUD**
  - Decreasing in incidence due to triple therapy
- **Infantile Hypertrophic Pyloric stenosis/IHPS**
  - Pediatric groups
- **Gastric polyp**
- **Caustic ingestion**
- **Gastric TB**
- **Pancreatic pseudocyst**
- **Bezoars**
  - Child
  - Adults 2<sup>o</sup> to bariatric surgery
    - From vagotomy induced hypomotility
- **Post surgical complication**

### Malignant causes

- **Gastric ca.**
- **Pancreatic ca.**
- **Less frequent**
  - Gastric lymphoma
  - Duodenal ca.
  - Ampullary ca.
  - cholangiocarcinoma

Mechanism of obstruction & clinical presentation of GOO depend up on the underlying cause.  
The following cases are selected for discussion here...

1. PUD
2. Gastric ca
3. IHPS

# *I) PUD*

## **Risk Factors**

- **H. pylori infection**
  - ✓ Predispose to ulcer by increasing acid secretion & compromising the mucosal defense mechanism.
- **Drugs**
  - ✓ **Chronic use of NSAIDS... E.g. Aspirin**
    - ✓ Cause ulcer predominantly by compromising the mucosal defense mechanism.
- **Age**
  - ✓ **Gastric ulcer—cmn in >40yrs of age**
- **Lifestyle**
  - ✓ **Cigarette Smoking**
    - ✓ 2X increased risk than non-smokers
    - ✓ Smoking cause ulcer by increasing gastric acid secretion & duodeno-gastric reflex
      - It also interferes with the blood flow → impairing healing process
  - ✓ **Chronic alcohol consumption**
- **Severe stress like...**
  - ✓ **Burn (curling's ulcer)**
  - ✓ **Head trauma (Cushing's ulcer)**
- **ZES (gastrinoma)**
- **Neurological causes**
- **Genetic factors**

## **Clinical Presentations**

### *1. History*

- ✓ **Abdominal pain**
  - ✓ **Site = Epigastrium**
  - ✓ **Character = gnawing, burning**
  - ✓ **Pattern= may be episodic, seasonal or may become constant (deeper penetration)**
  - ✓ **Radiation= no radiation in typical pts**
    - referral of pain to the back is usually a sign of penetration into the pancreas



- ✓ **Timing of the pain**
  - **Immediately after a meal**
    - **Gastric Ulcer (GU)**
  - **After 2-3hrs**
    - **Duodenal Ulcer (DU)**
      - Food is usually emptied in 2-3 hrs. And food stimulated acid secretion persist 3-5hrs.
  - **DU--often awakens the pt @night(nocturnal)**
    - **because**
      - Hunger aggravates it &
      - circadian stimulation of acid secretion is maximal from 5PM-2AM
- ✓ **Aggravating & relieving factors**
  - DU –aggravated by hunger & relieved by eating food
  - GU—aggravated during eating & relieved by vomiting
- ✓ **Associated symptoms**
  - Nausea, bloating
  - wt loss, anemia...

**NB\***

If the symptoms are severe, sudden onset & with sharp abdominal pain (generalized/epigastric) →suspect the complicated one→ i.e. perforated PUD

## 2. Physical Examination

- **G/A**
  - Acutely sick looking Vs chronically sick looking Vs acutely sick looking on chronic base
  - Nutritional status
- **V/S**
  - **Hypotension**
    - ✓ Think of complications (like Shock 2<sup>o</sup> to Upper GI bleeding...)
  - **Tachycardia**
    - ✓ Complications (like perforation...)
    - ✓ The pain by itself
  - **Febrile**
    - ✓ Think of complications (like perforation...)
  - **BMI**
- **Clinical findings are few & non-specific for uncomplicated PUD**
- **For complicated PUD**
  - See the findings below on complications of PUD...

## Investigations

### ➤ Diagnostic studies

#### ✓ *Upper GI endoscopy*

##### ✓ What to look?

- we look for ulcers, protruding mass or any active bleeding

##### ✓ Benign Vs Malignant Ulcers. How to differentiate on visualization?

- Benign ulcers ...
  - Have smoother, more regular, rounded edges with a flat, smooth ulcer base.
- Malignancy is more often associated with...
  - A mass that may protrude into the lumen or
  - have folds surrounding the ulcer crater (cavity) that are ...
    - nodular, clubbed, fused, or stop short of the ulcer margin.
  - Multiple biopsy specimens are necessary for any of these ulcers to r/o malignancy.(see the next section for gastric ca)

## Imaging

#### ○ *Double contrast barium swallow (meal)*

##### ✓ It demonstrates barium within the ulcer crater

- useful to determine the location and the depth of penetration of the ulcer as well as the extent of deformation from chronic fibrosis
- larger size, irregular filling defects...→suggestive of malignancy
  - site→little predictive value ,since malignancy can occur in any site.  
(see the next section for gastric ca)

## Laboratory

#### ○ *H. pylori testing*

##### ✓ Non-invasive tests

- Serology (*fecal Ag testing...*) and urea breathe test.

##### ✓ Invasive tests (need sample from gastric mucosa)

- *Rapid urease test*, histology and culture

### ➤ Imaging studies

#### ○ An upright chest radiograph

- ✓ When ruling out perforation→what to look for perforated PUD?...air under the diaphragm

#### ○ Abdominal/pelvic CT with IV & oral contrast

- ✓ for staging gastric ca.(see the next section for gastric ca)

### ➤ Lab studies

- CBC
- LFT
- serum gastrin level (for ZES)...in patients with ulcers that are refractory to medical therapy or require surgery
- Serum electrolytes
- Serum Cr level

# Mgt of PUD

## 1. Aim

- Symptoms need to be relieved
- The ulcer needs to be healed
- Recurrence must be prevented

## 2. Non pharmacologic

- Stop smoking
- Avoid alcohol & NSAIDS

## 3. Pharmacologic Rx

- Antacids
  - MOA: by reacting with hydrochloric acid, forming a salt and water to inhibit peptic activity by raising pH.
  - Magnesium antacids tend to be the best buffers
- H<sub>2</sub>-receptor antagonists
  - structurally similar to histamine
  - cimetidine ,Famotidine...
- Protein pump inhibitors (PPIs)
  - most potent antisecretory agents
  - omeprazole...
- sucralfate
  - it disassociates under the acidic conditions in the stomach & produce a kind of protective coating that can last for up to 6 hours

### ➤ In case of H.pylori infection

- Triple (eradication) therapy
  - ✓ PPIs + 2 antibiotics
    - Antibiotics such as metronidazole, clarithromycin or amoxicillin
  - ✓ For 2wks—bid
  - ✓ For failures or in patients with high metronidazole resistance→ quadruple therapy with bismuth added to the triple regimen is recommended.

## 4. Surgical Rx

- Indication for surgery;
  - perforation
  - Hemorrhage
  - Intractability (Non healing)
  - Obstruction

➤ **Surgical methods**

• **Vagotomy**

✓ **3 levels...**

- Truncal
- Highly Selective Vagotomy (Parietal Cell Vagotomy)
- Truncal Vagotomy +antrectomy

• **Subtotal gastrectomy**

- ✓ Usually reserved for patients with underlying malignancies or patients who have developed recurrent ulcerations after truncal vagotomy and antrectomy.

## Complications of PUD

### 1. Bleeding---(most frequent complication)

✓ **CPs**

- Melena & or hematemesis
- Shock
- Abd. pain is quite uncmn

✓ **Mgt**

- ABC of life & resuscitation
- Hx & P/E
- Localize bleeding
  - NGT aspirate
  - Endoscopy
    - Diagnostic & therapeutic importance
- Initiate therapy
  - If the bleeding is controlled...
    - Initiate long-term medical therapy. This includes;
      - Anti-secretory agents, usually in the form of a PPI or
      - H. pylori treatment (eradication therapy) for positive test results.
        - Eradication of H.pylori should be documented after therapy.
  - If the bleeding continues or recurs, surgery may be indicated.

### 2. Perforation---(fatal complication)

✓ **CPs**

- Present as acute abdomen
- The patient can typically recall the exact time of onset of abdominal pain
- frequently accompanied by fever, tachycardia, dehydration, and ileus
- Peritoneal signs +ve

✓ INVx

- Upright CXR
  - Free Air under the diaphragm—in 80%

✓ Mgt

- It's surgical emergency...
  - After the diagnosis is made, operation is performed in an expeditious fashion following appropriate fluid resuscitation.

### 3. Obstruction---GOO

## Clinical presentations of GOO

### 1) History

- cardinal symptoms
  - Nausea & Vomiting
    - Non-bilious
    - Undigested food
- Others symptoms
  - If the obstruction is incomplete → Gastric retention symptoms like...
    - Early satiety
    - Bloating/ epigastric fullness
    - Indigestion
    - Anorexia
    - Epigastric pain
      - It is not frequent in GOO. Usually related to the underlying cause...E.g. like this PUD case
  - Wt. loss depending on the duration

### 2) Physical Examination

- Dehydration signs
- Distended stomach and succussion splash may be audible with Stethoscope placed in epigastrium.

**Dehydration**

- \*Dry skin & tongue
- \*Sunken eye ball
- \*Poor venous filling
- \*oliguria

**NB\*\***

GOO 2<sup>o</sup> to PUD can occur both in

1. acute setting---due to inflammation & edema
2. chronic setting---due to scarring & fibrosis → part of the healing process

## Mgt of GOO

- NGT suction
  - *for relief of the obstructed stomach*
- Dealing with metabolic abnormalities
  - Rehydration with IV fluid
    - isotonic saline
  - Electrolyte repletion
    - with potassium & chloride supplementation

### NB\*\*\*

Because of the prolonged vomiting this pts are @ risk of Hypokalemic hypochloremia

- ✓ secondary to loss of gastric juice rich in hydrogen, chloride, and potassium ions

### NB\*\*

Metabolic abnormalities (acid-base disturbance) will be less pronounced if it's due to malignancy

- Acid suppression
- Dealing with mechanical obstruction based on the underlying etiology
  - Benign obstruction
    - ✓ As this case we are discussing if it's GOO 2<sup>o</sup> to PUD
      - Vagotomy & antrectomy → standard
      - Alternative vagotomy + gastrojejunostomy...
  - Malignant obstruction
    - ✓ *see the next section on Gastric ca. mgt*

## II) GASTRIC CA.

### Risk Factors

- ✓ Environmental & host factors
  - Age
    - ✓ elderly
  - Diet
    - ✓ Salted & smoked foods (used as preservative)
    - ✓ Nitrate rich foods
  - Chronic H.pylori infection
    - ✓ 3X increased risk than non-infected individuals
    - ✓ Causes atrophic gastritis, intestinal metaplasia, dysplasia → precursors for Gastric ca
    - ✓ H.pylori affects about 50% of the population but only 5% of the pop<sub>n</sub>. develop cancer, why?
      - Genetic susceptibility
      - Different strain of H.pylori
  - Previous gastric surgery (>10 yrs ago)
    - ✓ Why? Surgery may alter the normal PH production...
  - Pernicious anemia
    - ✓ IF deficiency
  - Radiation exposure
  - Smoking
    - ✓ Write it in #pack years
- ✓ Genetic factors
  - Family hx of gastric ca
  - Blood group A
  - Others that'll predispose to gastric ca
    - ✓ HNPCC
    - ✓ FAP...

**NB\***

**Adenocarcinoma 95% cmn**

## Clinical Presentations of Gastric ca

### 1. History

- ✓ Early → asymptomatic
- ✓ In advanced cases...
  - Constitutional symptoms of malignancy
    - Wt. loss, Anorexia & Easily fatigability
  - Early satiety → May be due to...
    - The tumor mass & or
    - Poor stomach distensibility.
  - N & V
  - Bloating
  - Tinnitus, blurring of vision & light headedness
    - ✓ Due to iron deficiency anemia 2<sup>o</sup> to Chronic occult blood loss—cmn
  - Dysphagia → Cmn if the tumor arises from GE junction
  - Overt bleeding (<20% of the cases)
    - Melena
    - Hematemesis
- Paraneoplastic syndromes—rarely present

### 2. Physical examination → late events

\*P/E is typically normal. If present...usually indicate incurability.

- G/A
- V/S
- Focused examination...
  - HEENT
    - Look for signs of anemia → Pale conjunctiva, Pale buccal mucosa
    - Look for liver involvement → Icteric sclera
  - LGS
    - Look for LAP in the neck, axilla...
      - ✓ Especially ...Virchow's node (left supraclavicular LN)
  - Chest examination
    - Metastatic pleural effusion
      - ✓ Inspection
        - Chest lag on the affected site
      - ✓ Palpation
        - Tracheal deviation away from the affected site
        - Asymmetrical chest expansion
        - Decreased tactile fremitus on the affected site



- ✓ Percussion
  - Stony dullness on the affected site
- ✓ Auscultation
  - Absent/decreased air entry on the affected site
  - BBS sound above the effusion
- **Abd. examination**
  - Palpable mass → If 1<sup>o</sup> tumor is large
  - Palpable mass 2<sup>o</sup> to metastasis
    - ✓ Hepatomegally → Liver metastasis
    - ✓ Sister Mary Joseph nodules → Periumbilical metastasis
      - pathognomonic of advanced disease
    - ✓ Carcinomatosis (metastasis to the peritoneum) including krukensberg's tumor of ovary
  - Evidence of malignant ascites
    - ✓ Dull abdomen with fluid shift & or +ve fluid thrill
  - In case of GOO 2<sup>o</sup> to gastric ca
    - ✓ Distended stomach with succussion splash &
    - ✓ Visible peristalsis may be present
  - **DRE**
    - ✓ Hard, nodularity mass may be palpable anteriorly & extraluminally
      - Drop metastasis on *blumer* shelf  
(in the pouch of Douglas)
    - ✓ Heme +ve stool on examining finger
- **IGS**
  - Look for signs of anemia
    - ✓ Palmar pallor

## INVx

- ✓ *See the investigations listed under PUD*

## Mgt

- Surgical resection (Gastrectomy)
  - Radical subtotal gastrectomy → standard
- Chemotherapy & radiation...

## Complications

- ✚ GOO
  - ✓ *See GOO above... under PUD complications*
- ✚ Obstruction of gastroesophageal (GE) junction

# III)IHPS

- ✓ Cmn→3-6wks of age

## RFs

- ✓ Male sex
  - 5Xmore common in males
- ✓ Family hx
- ✓ Drugs
  - erythromycin in early infancy
- ✓ B & O blood group

## CPS

## HX

- ✓ Non-bilious vomiting
  - Progressively become projectile
  - Occurs immediately after feeding
- ✓ After vomiting→Become hungry→wants to feed again
- ✓ Become increasingly dehydrated (*see symptoms of DHN in the table below*)
  - Wet dippers become less frequent
- ✓ Yellowish discoloration of the body
  - Jaundice→indirect hyperbilirubinemia

## P/E

- ✓ Palpation of “olive” shaped, firm, movable mass in the RUQ→pyloric mass
  - Best palpated after vomiting
- ✓ Presence of visible gastric peristalsis from left to right
  - Best seen after eating
- ✓ Look for signs of DHN(*see signs of DHN in the table below*)
- ✓ In Pediatrics→The 4 important DHN signs in well-nourished child are:

No Dehydration	Some Dehydration	Severe Dehydration
Alert <b>(mental status)</b>	Restless,irritable	Lethargic or unconscious
No sunken eyes <b>(eye ball)</b>	sunken eyes	sunken eyes
Drinking normally <b>(Drinking)</b>	Eager to drink	Unable to drink
Normal skin turgor <b>(Skin turgor)</b>	Skin pinch returns slowly	Skin pinch returns very slowly

## INVx

✓ *u/s*

### ➤ What to look for IHPS?

- Channel length
  - In IHPS >16mm
- Pyloric thickness
  - In IHPS >4mm
- Pyloric diameter
  - In IHPS <12mm

### ✓ Contrast studies → what to look?

- String sign
  - Due to elongated pyloric channel
- Shoulder sign
  - Due to bulging of pyloric muscle in to the antrum
- Double tract sign
  - Parallel streaks of barium in the narrowed channel

## Rx

- ✓ Medical emergency not surgical
  - First → fluid resuscitation with correction of electrolyte abnormalities
    - NB\*\*\*Hypochloric, hypokalemic metabolic alkalosis
- ✓ Surgical Rx → pyloromyotomy

## SAMPLE HX

## GOO 2<sup>0</sup> to? Chronic PUD

*e/e*

*Vomiting of 1month duration*

**HPJ**

This patient was LRH #1month back @which time he started to experience non-projectile, non-blood tingled, non-bilious, non-foul smelling vomiting of ingested matter 2-3X/day about 2hrs after taking a meal. Associated with this he started to experience **loss of appetite, feeling of early satiety & abdominal bloating**. In addition he has significant wt. loss of 4kg for the past 06months (from 70 to 66kg→>5% in 06 month). #04 days prior to admission he started to experience **projectile, blood tingled, non-bilious vomiting** of ingested matter 5-6X per day. Concomitantly he started to experience lip crackling & dryness of the mouth, His families also noticed recent sunkening of the eyeballs. In addition he has tinnitus, blurring of vision & light headedness. #From 02years prior to admission till now he was experiencing intermittent burning type epigastric pain with no radiation which was aggravated by taking spicy foods like “key wot” but without relieving factor noticed by the pt. The pain usually awakens the pt @ the night. For the above compliant he visited a nearby health center where he was given Omeprazole to be taken 2X/day for 10days. For the past #2yrs he was taking this medication repeatedly when his symptoms reappear.

- ✓ No hx drug use except the medication explained above.(NSAIDS--RF)
- ✓ No hx of cigarette smoking or chronic alcohol consumption. (RFs)
- ✓ His regular dietary habit is ‘injera’ made of ‘teff’ & ‘shiro’ made of ‘atter.’ (Dietary RFs—smoked food...)
- ✓ He has no hx of previous abdominal surgery. (RF)
- ✓ No hx of burn or trauma to the head. (stress ulcer)
- ✓ No hx of similar illness in the family. (RF-- PUD +Gastric ca)
- ✓ No hx of difficulty or pain during swallowing.(Gastric ca @ GE junction)
- ✓ No hx of radiation therapy.(RF-gastric ca)
- ✓ No hx of swelling in the neck or axilla. (LAP in gastric ca)
- ✓ No hx of yellowish discoloration of the eye or itching sensation (hepatobiliary disease with vomiting-DDx)
- ✓ No hx of chronic cough, contact with chronic cougher or previous TB Rx.(gastric TB)
- ✓ No self/family hx of DM, HTN or asthma
- ✓ Has been screened for RVI 08 months back & found to be NR

*Finally he was admitted to our hospital supported by his families*

# SAMPLE HISTORY ON SBO & LBO

## SBO (Small Bowel Obstruction)

SBO 2<sup>o</sup> to???

DDX

### ➤ Volvulus

✓ Volvulus is a twisting of a portion of bowel about its mesentery.

○ Common (cmn) in rural parts of Ethiopia.

\* Why?

1. Redundant small bowel (vegeterians)
2. Heavy meal (1-2X/day)
3. Strong abdominal muscle

### ➤ Previous abdominal or pelvic surgery

○ **Post-op adhesion**

\*Cmn in developed countries & major cities of Ethiopia

### ➤ Incarcerated hernia

○ Incarcerated=permanent trapping

○ Strangulation=arterial + venous occlusion

### ➤ Malignancy

○ E.g. lymphoma...

### ➤ Inflammatory Bowel Disease

○ Crohn Disease

### ➤ Infection

○ **Intestinal TB**

### ➤ Pediatric group

○ *Intussusception*

\*peak incidence between 5 & 10months of age

\*90% idiopathic, but URTI & AGE may precede the condition

\*ileo-colic cmn in most children (77%)

### ➤ Clinical presentations (intussusception)

*Hx*

- bloody diarrhea(currant jelly stool)
- intermittent crying with the laps towards the abdomen

P/E

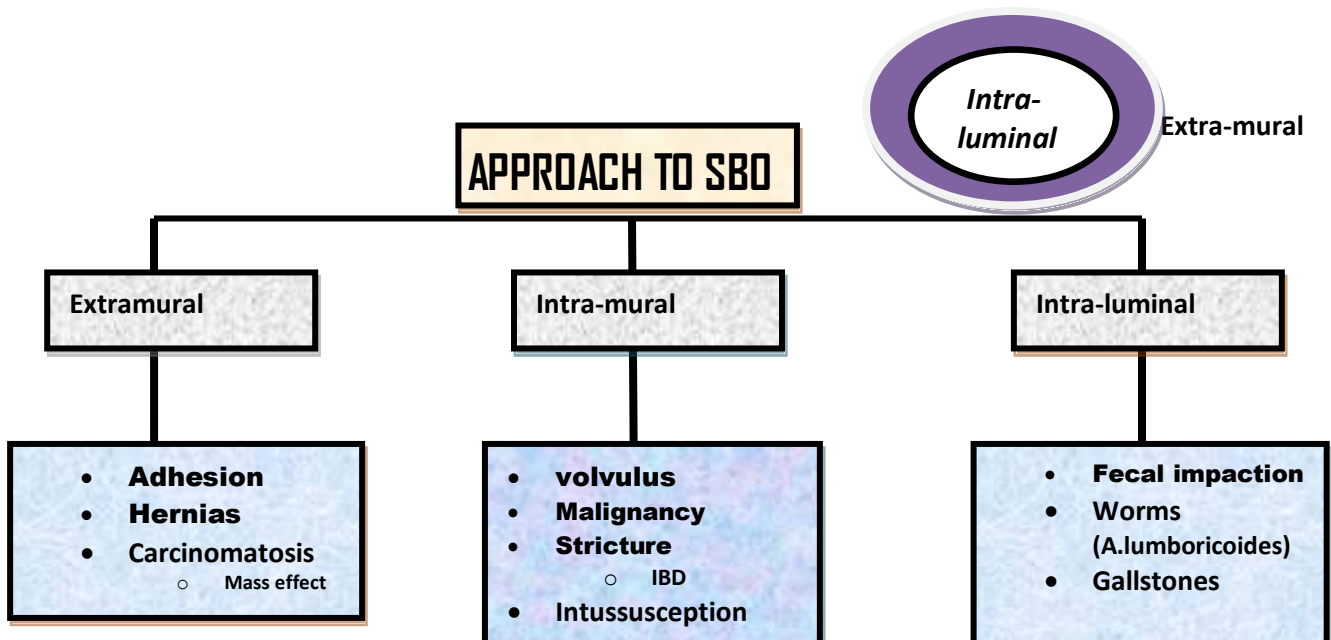
- Dance's sign-elongated mass in RUQ with absence of bowel in the RLQ
- DRE → blood stained mucus on examining finger (use little finger)

### ➤ Investigations for intussusception

- Barium enema-ileocolic
  - Claw sign
- Abdominal u/s = high diagnostic sensitivity
  - Doughnut sign
    - Appearance of concentric rings transverse section
  - Target sign

### ➤ Treatment of intussusception

- Resuscitation
- IV antibiotics
- Radiographic (pneumatic or hydrostatic) or surgical reduction



# Clinical Presentations (SBO)

## 1) History

### A. Nausea & Vomiting

- i. If frequent
  - It tells us the level of obstruction
    - ❖ More frequent in proximal obstruction
- ii. Timing (between the onset of the pain & the vomiting)
  - Early → suspect proximal obstruction
  - NB\* Be careful → rapid dehydration → electrolyte derangement

### B. Crampy Periumbilical pain

- i. Simple obstruction → intermittent pain
- ii. Strangulated → steady pain

\*In distal SBO pain is predominant

### C. Constipation

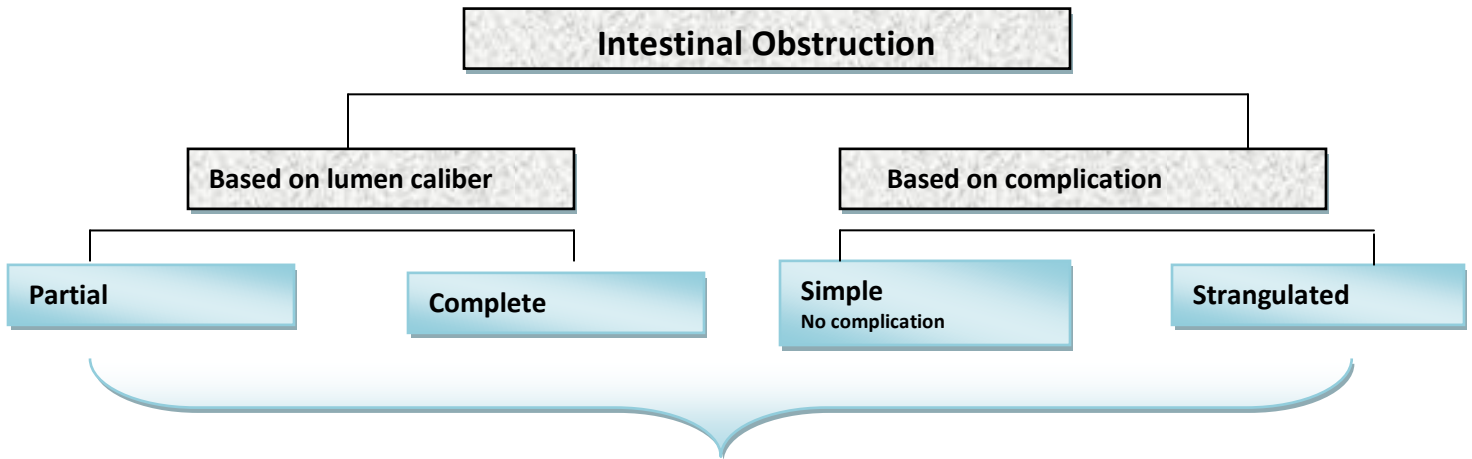
- i. Absolute constipation/ obstipation
  - absence of feces + flatus → complete
- ii. Relative
  - Can pass flatus → partial

### d. Distension

- In distal SBO = central distension
- In proximal SBO = minimal distension
- In LBO = pronounced distension

		SBO		LBO
		Proximal	Distal	
	Vomiting	Early & profuse	delayed	Mayn't have vomiting
	Abd. Pain		Predominant (periumbilical)	lower abdominal
	Constipation	It may take 1 or 2 days to empty the bowel distal to the obstruction. coz it was already there!!!		Early
	Distension	Minimal	Central distension	Pronounced distension
	Radiograph	Little evidence of dilated loops	Multiple dilated small bowel loops	The colon proximal to the obstruction is dilated *Small bowel will be dilated only if incompetent ileocaecal valve

Cardinal Clinical features of acute obstruction



## 2) Physical Examination

- ✓ General Appearance
  - Quietly lying down/not
- ✓ Vital signs
  - PR, T<sup>0</sup>
- ✓ Signs of dehydration
- ✓ On Abdominal examination # notice...
  - Inspection
    - Abdominal distension
      - Proximal vs distal
        - more pronounced in distal obstruction
    - visible peristalsis
    - Look for surgical scars
    - look hernial sites carefully
  - Palpation
    - tenderness
    - mass
  - Percussion
    - tympanicity
    - signs of fluid collection
  - Auscultation
    - Bowel sounds
      - Early
        - Hyperactive
      - Late
        - Hypoactive

### Dehydration

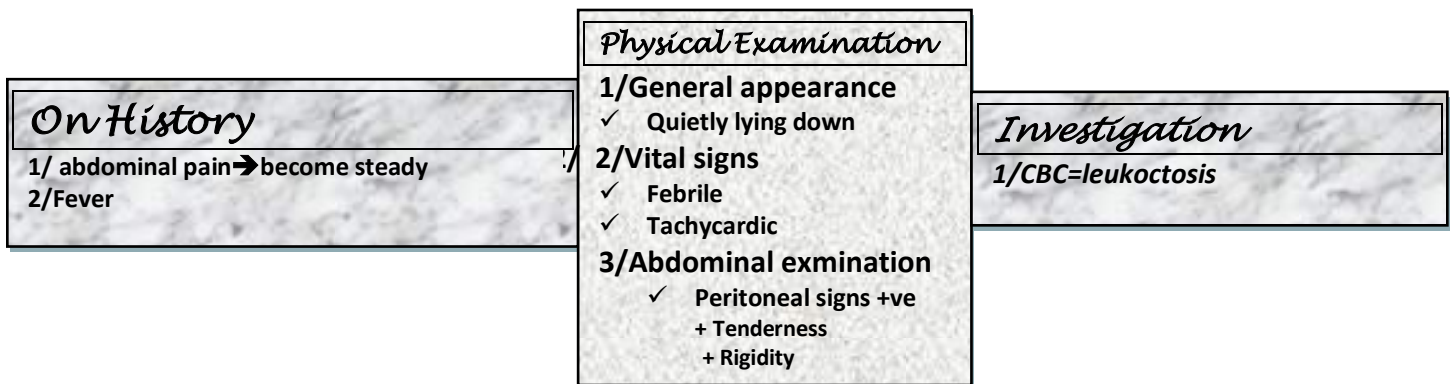
- › \*Dry skin & tongue
- › \*Sunken eye ball
- › \*Poor venous filling
- › \*oliguria



○ On DRE...

- If gross blood on examining finger → (malignancy or strangulation)
- Presence or absence of fecal matter
  - Complete vs partial

\*\*\*Check the following evidences for<<>> intestinal strangulation → surgical emergency



**NB**

\*\*when u try to Dx... approach →

1. Is it mechanical obstruction or ileus?

\*Colicky pain is not its feature paralytic ileus & it become significant if 72 hrs lapsed after laparotomy but still...

- No bowel sound
- No passage of flatus

2. What is the underlying cause?

3. Is it partial or complete obstruction?

4. Is it simple or strangulated?

**NB**

# ureteral colic= G/Appearance → restless patient...busy finding comfortable position

## **SAMPLE Hx**

*e/e*

**Periumblical abdominal pain of 3day duration**

**HPJ**

This pt was LRH 3day back @ which time he started to experience sudden onset severe intermittent **crampy periumblical pain** without known aggravating or relieving factor. About 3-4hrs after the onset of the pain he started to experience **bilious**, non-projectile, non-blood tingled, non-foul smelling **vomiting** about 5-7X/day. Associated with this he started to experience **failure to pass feces & flatus** (write the duration) with central distension of the abdomen.

For the above compliant.....

- No hx of previous abdominal surgery.(post-op adhesion)
- No hx of fever, wt loss or swelling in the neck, axilla or groin.(lymphoma)
- No hx of chronic cough, contact with known TB pt or previous TB Rx (intestinal TB)
- No hx of yellowish discoloration of the eyes or itching sensation.(hepatobiliary disease...)
- No hx of smoking, NSAIDS use or chronic alcohol consumption (RFs for GOO)
- His regular diet is “shiro” made of “atter” & “injera” made of “teff”, 2-3x/day.
- No self/ family hx of DM,HTN or asthma
- Not screened for RVI but he has no hx of MSP, chronic diarrhea or HZV attack

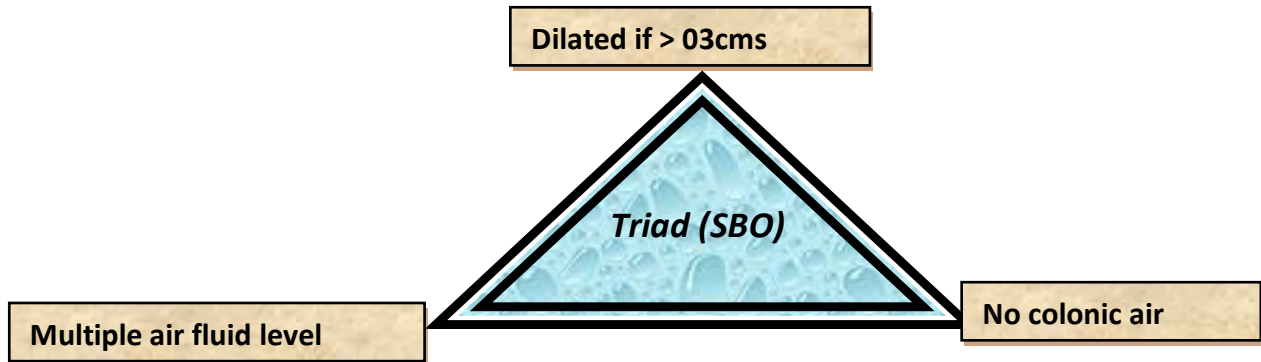
*Finally he was admitted to our hospital.....*

## Investigations

### Diagnostic

#### ✓ Abdominal radiograph (Erect or supine)

- What to look on x-ray for obstruction? *The triad*
  - 1) Air-fluid level
  - 2) Width of the bowel
  - 3) Paucity of Colonic air



### *SBO vs LBO on plain abd. x-ray*

#### \* In SBO

- 1) Site=The obstructed bowel is central & lie transversely
- 2) Anatomical landmarks

- *Valvulae conniventes* of small bowel completely pass across the width of the bowel & are regularly spaced unlike haustral folds in large bowel

\*in LBO →haustral folds are spaced irregularly & don't cross the whole diameter of the bowel (only 1/3)

- 3) No or minimal gas is seen in the colon incase SBO

\*incase of LBO air may be absent or minimally present only in the rectum

#### ✓ Enteroclysis

→gold standard...partial vs complete

- ✓ barium as a contrast is contraindicated if perforation exists→peritonitis
- ✓ CT-scan & MRI
- ✓ U/S

## Lab. Studies

- ✓ CBC----in case of strangulation<>> leukocytosis
- ✓ Degree of dehydration
  - RFT, Hct
    - BUN & Hct rise, giving a secondary polycythemia
- ✓ Sr. electrolyte
  - <>>dehydration<>electrolyte imbalance
  - \*NB\*\* *Dehydration & electrolyte loss are due to*

- 1) *Reduced oral intake*
- 2) *Defective intestinal absorption*
- 3) *Losses as a result of vomiting*
- 4) *Sequestration in the bowel lumen*
- 5) *Transudation of fluid in to the peritoneal cavity*

## Management

### 1. Conservative( supportive) Rx

- Secure NGT
  - ✓ For bowel decompression → see page 90 for NGT
- Secure IV line
  - ✓ Fluid & electrolyte replacement
  - \*Water & sodium loss → Give Hartmann's soln. or Normal Saline
- Analgesics & antiemetic
- Antibiotics (broad spectrum)
  - ✓ Mandatory for all pts undergoing surgery

### 2. Surgical Rx

- Indication for early intervention
    - ✓ Signs & symptoms of intestinal strangulation
    - ✓ Obstructed external hernia
    - ✓ Obstruction in a 'virgin' abdomen
- Operative decompression
- The type of surgical procedure required will depend upon the cause of obstruction
    - ✓ Division of adhesions (enterolysis/adhesiolysis)
    - ✓ Excision
    - ✓ Bypass or proximal decompression

# LBO (Large Bowel Obstruction)

## Risk Factors

- Age
  - Elderly
- Anatomical RFs
- Diet
  - High residue diet
- Chronic constipation

## LBO 2° to???

DDx

### ✓ Volvulus

- **Sigmoid volvulus**
  - Risk factors(RFs)
    - Anatomic RF
      - Long mesentery
      - Narrow base
      - Elongated colon (redundant)
- Cecal
- Colonic

### ✓ Malignancy

- **Colorectal ca.**

### ✓ Fecal Impaction

### ✓ Stricture

- IBD
- Diverticular disease

### ✓ Pediatric group

- Imperforate anus

## Clinical Presentation

### 1) History

- Abdominal distension
  - Ask hx of obstipation
- Nausea & Vomiting
  - LBO may not cause vomiting despite markedly distended abdomen
- Crampy abdominal pain

Ask about...

#The onset

1. Abrupt → acute obstructive events  
→ Cecal or sigmoid volvulus
2. Chronic constipation, straining @stool  
→ Diverticular disease  
→ Cancer  
#stool caliber change → Cancer

**NB**

\*\*Sigmoid colon & rectal tumors cause colonic obstruction earlier than right sided colon.

\*\*Attempt to distinguish

- ✓ Complete vs partial
- ✓ Simple Vs strangulated

## 2) Physical Examination

- 1) General appearance
- 2) Vital signs
- 3) Signs of dehydration
- 4) Abdominal examination
  - i) Hyper-tympanic on percussion
  - ii) Hypoactive bowel sound
  - iii) May be tender
- Inguinal & femoral hernial examination
- 5) DRE
  - i) Hard stool → impaction
  - ii) Soft stool → obstipation
  - iii) Empty vault → obstruction proximal to the level that our finger can reach

## **SAMPLE Hx**

**c/c**

**Failure to pass feces of 2days & flatus of 1day duration**

**HPJ**

This patient was last relatively healthy #03 days back @ which time he started to experience severe intermittent crampy lower left **abdominal pain** without known aggravating or relieving factor.#02 days prior to admission he started to experience **failure to pass feces** associated with **distension** of the lower abdomen which was relieved by passing flatus.

One day prior to admission he totally failed to pass both feces & **flatus**. In addition the abdominal pain & the distension progresses to become generalized. He has experienced nausea but no vomiting.

He had history of similar episode #03months back for which he was deflated with rectal tube in our hospital.

- ✓ No hx of rectal bleeding, tenesmus or wt loss
- ✓ No hx of tinnitus, vertigo or blurring of vision
- ✓ No hx of similar illness in the family
- ✓ No hx of previous abdominal surgery
- ✓ No hx of chronic cough, contact with chronic cougher or previous TB Rx
- ✓ No self/family hx of DM, HTN or asthma
- ✓ Screened for RVI 2yrs back & found to NR

*Finally he was admitted to our hospital supported by his families*

# Investigations

## Diagnostic

### ✓ Radiograph (erect /flat)

#### • Plain abdominal x-ray

#### \*What to look for?

- ✓ Dilated bowel loop
  - >05 cms for large bowel
  - If for small bowel >03 cms is dilated
- ✓ Paucity of air
  - Absent or reduced air in the rectum
    - ✓ Important to differentiate complete from partial obstruction
- ✓ Air fluid level

#### \*How to differentiate LBO from SBO?

##### <<+>>Anatomic markers

- ✓ Haustral markings →LBO
- ✓ Valvulae conniventes →SBO
  - Regular spacing & go the whole length

##### <<+>>Colonic air absent in case of SBO

### ✓ Lower GI Endoscope

#### ❖ E.g. sigmoidoscopy

- Has diagnostic & therapeutic importance

### ✓ Contrast studies with enema

#### ❖ Contraindicated in case of perforation or gangrenous change

### ✓ CT-scan

## Lab. studies

- ✓ CBC → in case of strangulation <<>> leukocytosis
- ✓ Serum electrolyte → Coz dehydration can lead to electrolyte imbalance



# Management

- Depends on the underlying cause

*LBO 2<sup>o</sup> to sigmoid volvulus*  
Is it...

## Simple obstruction (viable)

- ✓ **Deflation**
  - With sigmoidoscopy & a flatus tube
  - Repeat x-ray to ensure that decompression has occurred
    - The tube should be secured for 24hrs
  - There is 50% risk of recurrence → the definitive mgt is surgery
- ✓ **Surgery should be done 01-02 weeks after the deflation**  
\*Why?  
→ To buy time for the inflammation & edema to subside.
- ✓ **Pre-op preparation**
  - *Bowel preparation*  
(\*See page 113\*)
- ✓ **Surgical options**
  - Resection & anastomosis
  - Paul-mikulicz procedure
  - Sigmoid colectomy

## Strangulated

- Strangulated** → Contraindicated for deflation
- ✓ **Secure Iv line**
  - Resuscitate
- ✓ **Catheterize**
  - Follow urine output for adequacy of resuscitation
- ✓ **Antibiotics-broad spectrum**
- ✓ **Anti-pain**
- ✓ **Laparotomy &**
  - Gangrenous sigmoid resected
  - Hartman's procedure
    - Sigmoidectomy
    - Proximal colostomy
      - See colostomy @page 91
    - Closed distal end

NB\*\*\*

### Evidences for intestinal strangulation

#### On History

- 1/ abdominal pain → become steady
- 2/ Fever

#### Physical Examination

- 1/General appearance
  - ✓ Quietly lying down
- 2/Vital signs
  - ✓ Febrile
  - ✓ Tachycardic
- 3/Abdominal examination
  - ✓ Peritoneal signs +ve
    - + Tenderness
    - + Rigidity

#### Investigation

- 1/CBC=leukoctosis

# SAMPLE HISTORY ON COLORECTAL CANCER

## Risk Factors

### 1) Aging

- >50yrs → increased risk
- Median age @ Dx of colorectal ca is 62.

### 2) Genetic factors

- Progression from premalignant to invasive Ca.
  - FAP (Familial adenomatous polyposis)
    - Mutation in APC gene
    - More than 100 colonic adenomas are diagnostic
    - Rare but in known FAP pts life time risk of developing colorectal ca is 100% by age of 50
    - Prophylactic surgery is indicated to prevent colorectal ca.
  - HNPCC (hereditary non-polyposis colon ca.) or lynch syndrome
    - Error in mismatch repair
    - More cmn than FAP & in known HNPCC pts there is 70-80% life time risk of developing colorectal ca.
    - Pts with HNPCC → subjected to regular colonoscopic surveillance
- Familial colorectal ca.(Hereditary RF)
  - Accounts 10-15% of colorectal ca.
  - Risk rises with no# of first degree relatives affected
- Hx of breast ca.
  - BRCA 2
- Hx prostate or lung ca in men

### 3) Environmental factors

- **"SAD"** factors
  - Smoking
  - Alcohol abuse
  - Dietary factors
    - High intake of red meat
      - Red meat components (haem & N-nitroso cpds) have shown effect on the DNA in colorectal mucosa
    - High intake of animal fat
      - Direct toxic effect to the colonic mucosa → early malignant change

- Low fiber diet
  - Because of increased exposure to dietary carcinogens
    - increased roughage is associated with reduced bowel transit time → reduced exposure
- obesity & sedentary life style

### 3) Inflammatory

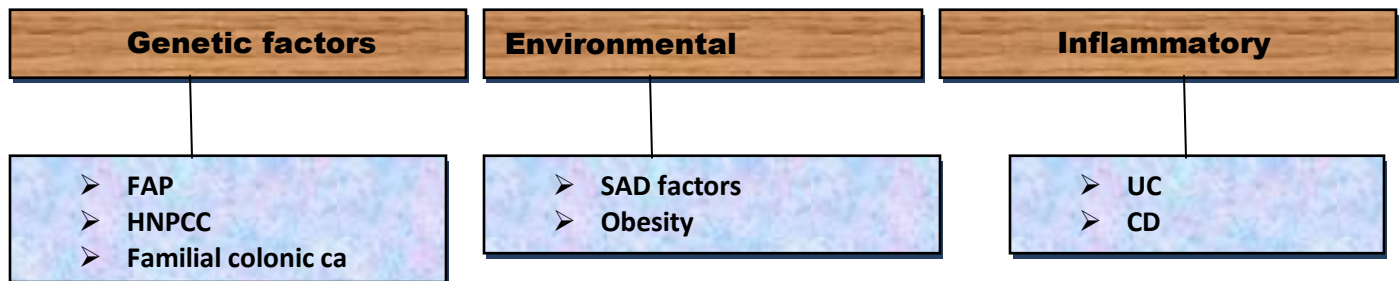
- IBD
  - Particularly chronic UC
    - Because chronic inflammation predisposes the mucosa to malignant changes

### 4) Others

- Previous hx of surgery for colorectal ca.
  - Recurrence risk 20-40%
- Pelvic irradiation
- ?Cholecystectomy
  - Possibly as a consequence of increased bile acid exposure
- ureterosigmoidostomy



Aging → dominant RF



## Clinical Presentations

- CPs of colorectal ca depend on tumor size, type & location

### 1) History

- ✓ Rectal bleeding
    - Gross
    - For suspected occult bleeding → FOBT (INvx)
  - ✓ Change in bowel habit
    - Chronic constipation or diarrhea
  - ✓ May complain of abdominal pain
  - ✓ Feeling of incomplete voiding
  - ✓ symptoms of Intestinal obstruction → left sided ca
  - ✓ Tenesmus → cmn in rectal ca
  - ✓ Anemia symptoms (tinnitus, blurring of vision & light headedness)
    - Unexplained iron deficiency anemia
    - Cmn as initial presentation in Rt. sided tumors
  - ✓ Unexplained wt loss
  - ✓ easy fatigability
  - ✓ anorexia
- constitutional symptoms of malignancy

### 2) Physical Examination

- ❖ G/A
  - Chronically sick looking/not
  - Nutritional status (looks malnourished or not)
- ❖ V/S
- ❖ HEENT
  - Signs of anemia (eye=pale conjunctiva + mouth & throat=pale buccal mucosa)
  - Signs of liver involvement-metastasis...= icteric sclera (eye)
- ❖ LGS → LAP
- ❖ Chest examination
  - If metastasis...signs of pleural effusion
- ❖ Abd. examination
  - In advanced cases there may be...
    - Palpable abdominal mass
    - Hepatomegally
    - Ascites

- DRE
  - In case of rectal ca. →
    - Characterize tumor size, location, surface, consistency, fixation to the underlying or overlying structure
    - Blood on examining finger

#### Modes of spread (colorectal ca)

- 1) Local
- 2) Lymphatic
- 3) Hematogenous
- 4) Transcoelomic

#### NB\*

#### Cmn sites of distal metastasis

- ✓ Liver → most cmn
- ✓ Lung
- ✓ Carcinomatosis

=Diffuse peritoneal metastasis

#### NB\*

- Tumors that arise from distal rectum may metastasis initially to the lung.
- 75-80% pts present with localized disease
- Adenocarcinoma >95%
- When u write ur ass't be specific → Don't say colorectal ca...
  - Say colonic or rectal ca.

## DDx

- Inflammatory bowel disease (IBD)
  - CD
  - UC
- Diverticulosis
- Hemorrhoids (bright red bleeding +/- pain)
  - *See page 200 for hemorrhoids*
- Anal fissure (bright red bleeding + pain)
  - *See page 203 for anal fissure*

## SAMPLE Hx

*C/C*

Bleeding per rectum of 06 months duration

*HPJ*

This pt was LRH 06 months back @ which time she started to experience **bleeding** per rectum which was tingled with mucoid, foul smelling diarrhea 4-5x/day. Associated with this she started to experience dull aching left lower **abdominal pain** without known aggravating or relieving factor noticed by the pt. #02 month prior to admission she started to experience **tinnitus, light headedness & blurring of vision**. In addition she started to experience loss of appetite, easy fatigability & significant weight loss of 5kg for the past 06 months (from 59 to 54kg. >5% in 06 months). But she didn't experience abdominal distension, failure to pass feces or feeling of incomplete defecation. For the above complaints she visited a local health center @ Dabat 02 months prior to admission where stool examination was done & treated for amebiasis. But there was no improvement & finally they referred her to our hospital for better investigation & management.

- Her father died 20yrs back @ the age of 73 by similar illness.(Genetic Rfs)
- No hx of breast,endometrial or ovarian cancer.(Rfs)
- She has no hx previous abdominal surgery.( for colorectal ca—recurrence)
- Her regular dietary habit is “injera” made of “teff” & shirowot made of “atter.” (SAD...Rfs)
- She has no hx chronic alcohol consumption or cigarette smoking.(SAD...Rfs)
- She has no hx of radiation therapy.(Rfs—radiation to the pelvic)
- No hx of yellowish discoloration of the eyes, bone pain or hemoptysis.(metastasis)
- No hx of chronic cough, contact with chronic cougher or Previous TB Rx
- She has no self or family hx of DM, HTN or asthma
- She was screened for RVI 4 months back & found to be NR

*Finally she was admitted to our hospital walking by herself.*

# Investigations

## Diagnostic

### ✓ Colonoscopy

#### Advantages

- ✓ You can see the entire colon
- ✓ Has advantage on detecting synchronous ca.
  - ❖ *Synchronous colorectal carcinoma refers to more than one primary colorectal carcinoma detected in a single patient at initial presentation. Or pt presented with colorectal ca within #06 month after surgery was done for colorectal ca.*
  - ❖ *NB\*Metachronous→ defined as a secondary colorectal cancer occurring more than 6 months after the index cancer.*
- ✓ You can take biopsy

#### Disadvantages

- ✓ Most invasive
- ✓ Needs bowel preparation & IV sedation
- ✓ Risk of perforation or bleeding
- ✓ costly

### ✓ Sigmoidoscopy

#### Advantages

- ✓ Enemal bowel preparation only but sedation isn't necessary
- ✓ Slight risk of perforation or bleeding
- ✓ You can take biopsy

#### Disadvantages

- ✓ you can see only up to splenic flexure (60cms)
  - You may miss detecting synchronous polyps (I.e. you may miss proximal lesions)
- ✓ Colonoscopy is required if polyp is found

### ✓ Imaging

#### ✓ Double contrast barium enema (DCBE)

- A double-contrast barium enema is a form of contrast radiography in which x-rays of the colon and rectum are taken using two forms of contrast to make the structures easier to see.
  - (1) Liquid containing *barium* (that is, a radio-contrast agent) is put into the rectum.

- (2) Air is also put into the rectum and colon to further enhance the x-ray.

✓ **What to see?**

- Constant irregular filling defects ('Apple core' sign)

**Advantages of DCBE**

- Examines entire colon
- Good sensitivity for polyps >1cm

**Disadvantages**

- Require bowel preparation
- Less sensitivity for polyps <1cm
- May miss lesions in sigmoid colon
- Colonoscopy required if +ve result

✓ **Abdomino-pelvic CT-Scan**

- For diagnosis & staging

**\* Metastatic workup**

- ✓ U/S of liver
- ✓ CXR
- ✓ Abdominal/ pelvic/chest CT-Scan
- ✓ Abdominal/ pelvic MRI

**Lab studies**

- ✓ **FOBT(fecal occult blood test)**
- ✓ **Blood studies**
  - ✓ CBC
  - ✓ OFT
  - ✓ Serum chemistries
  - ✓ Tumor markers
    - ✓ Serum CEA level → More sensitive indicator of recurrence (important for post-op follow-up) but no role in screening or Dx.



## Management

### Pre-op preparation

- ✓ **Correct Anemia**
  - Hct should be >30 for operating
    - if emergent surgery is needed → consider blood transfusion
      - *See page 273 for blood transfusion*
- ✓ **Bowel preparation**
  - For elective pts
  - *See page 194 for bowel prep.*

### Principle of colorectal ca. mgt

- Surgical Rx
- Medical care
  - Chemotherapy
  - Radiation therapy

### 1) Surgical Rx

Depend on presentation

Emergency

- ❖ Acute on chronic base presentation → obstructive symptoms
- ❖ Because the bowel isn't prepared
  - We will not consider anastomosis of the bowel or definitive Rx
- ❖ Defunctioning colostomy
  - Loop colostomy proximal to the tumor
  - *See page 191 for colostomy*
- ❖ Then definitive Rx

Elective

- ❖ Definitive Rx after preparation

### ❖ Principle of resection in colorectal ca/ Definitive Rx/

→ Complete removal of

1. The tumor
2. The major vascular pedicles
3. The lymphatic drainage &
4. Involved adjacent structures (difficult in case of rectal ca.)

❖ **Types of resection (colectomy) in colonic ca.**

- ✓ Right hemicolectomy
- ✓ Extended rt. hemicolectomy
- ✓ Left hemicolectomy
- ✓ Extended left hemicolectomy
- ✓ Sigmoid colectomy
- ✓ Total colectomy with ileorectal anastomosis

❖ **Types of resection in rectal ca.**

= it is based on the distance from the sphincter → Rigid proctosigmoidoscopy should be done to accurately measure the exact distance of the tumor from the anal sphincter.

- ❖ **Anterior resection**
- ❖ **Lower anterior resection**
- ❖ **Abdominal perineal resection/APR** → If below 7cms
  - complete excision of the rectum and anus &
  - End permanent colostomy

**2) Medical care**

- ✓ **Chemotherapy**
  - Systemic chemotherapy
  - Adjuvant

- ✓ **Radiation therapy**

**Post-op complications**

- ❖ **Bleeding**
- ❖ **Anastomosis leak**
- ❖ **Colostomy related complications**
  - See page 192 for the complications
- ❖ **Intra- op injury to the adjacent structures**
- ❖ **DVT & embolism**
- ❖ **Wound related complications**
- ❖ **Anesthesia related complications**
- ❖ **Recurrence**

**Post-op follow-up**

- ❖ **Nutritional rehabilitation**
- ❖ **Serum CEA level**
- ❖ **Metastatic work up**
- ❖ **Psychological support**

**NB\***  
**Adverse prognosis if**

- Younger age < 40 yr
- Longer duration of symptoms
- Obstruction/ perforation
- Ulcerative lesion

# SAMPLE HISTORY ON BOO

## BOO 2<sup>o</sup> TO???

## DDX

1. **BPH**
2. **Prostatic ca**
3. **Bladder ca**
4. **Urethral stricture**
5. **Bladder neck contracture**
  - E.g. following aggressive resection of a small prostate
6. **Bladder stone**
7. **Bladder trauma**
8. **Neurogenic bladder—functional obstruction**

## Discussion of the DDX

### I) BPH

- \*Common cause of BOO in elderly > 70yrs
- \*LUTS (Lower Urinary Tract Symptoms)
  - =The voiding dysfunction that results from prostatic enlargement & Bladder Outflow Obstruction (BOO)
- \*Not all men with BPH have LUTS & the vice versa
- \*hyperplasia of the gland → on periurethral & transition zone

## Clinical presentations

### 1) History

#### ➤ How to approach symptoms of BPH--LUTS

#### Voiding (obstructive) symptoms

- Hesitancy
- Poor flow
  - Ask if Improved/ not → by straining
- Intermittent stream
  - Stops and starts
- dribbling
  - Including Post-micturition
- Sensation of poor bladder emptying

#### Storage (irritative) symptoms

- Frequency
  - Put it in Day:Night ratio
- Urgency
- Nocturia
- Urge incontinence

### ***Special attention to....***

- Onset & duration of symptoms
- Precipitating factors
- General health issues including sexual history
  - ...Erectile & ejaculatory dysfunction
- Severity of symptoms & how they are affecting the patients quality of life
- Medication intake
  - E.g.--- anti-histamines, anti-hypertensives, anti-cholinergics, tricyclic antidepressants → these drugs can induce retention
- Previously attempted Rx

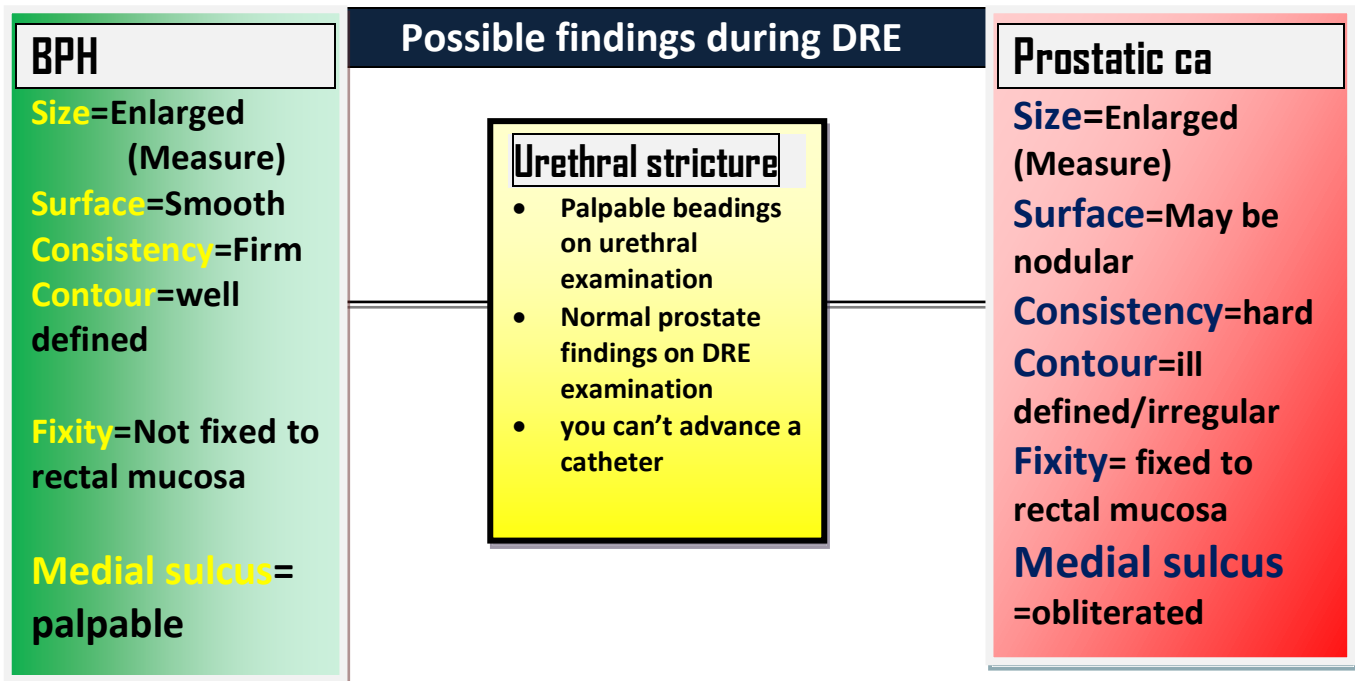
## ***2) Physical Examination***

### **➤ Focus on**

- ❖ Signs of anemia
  - Kidney → erythropoietin production...
- ❖ Suprapubic area
  - For bladder distension
- ❖ DRE
  - ***Prostate***
    1. Size
      - \*Measure (by finger) & approximate if reachable
    2. surface
    3. Consistency
    4. Contour
    5. Fixity
    6. Medial sulcus

### ***DRE reporting format***

- Inspection
  - No ulceration or no visible protruding mass
- Palpation
  - Normotonic anal sphincter
  - There is palpable mass which is non-tender with smooth surface, regular border, firm in consistency, not fixed to the rectal mucosa & palpable medial sulcus but the upper border isn't reachable.
  - No blood on the examining finger



❖ Also assess...

1. Absence or presence of fluctuation
    - Prostatic abscess
  2. Tenderness
    - Prostatitis
- Anal sphincter tone & bulbocavernous muscle reflex
    - ...neurological disorder

## INVx

- Urine analysis
- Urine culture
- Sr electrolytes
- Sr creatinine
- Hct

### International prostate symptom score (IPSS)

\*scored out of 35 & has 7 components

\*it tells us how severe the patients' symptoms are

- ➔ 0-7=Mild
- ➔ 8-19=Moderate
- ➔ 20-35=Severe

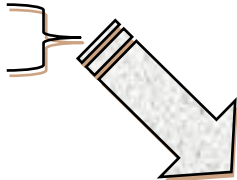
# Management of BPH

## 1) Watchful waiting

- For mild symptoms, follow-up → 1 to 2 times yearly
- Offer suggestions that help to reduce symptoms
  - Avoid caffeine and alcohol
  - Avoid decongestants and antihistamines

## 2) Medical mgt

## 3) Surgical mgt



*Medical*

*Surgical*

### 1) $\alpha$ -adnergic blockers

MOA: act on  $\alpha$ -receptors in the smooth muscles of prostate & decrease its tone  
E.g. tamsolusin

### 2) $5\alpha$ reductase inhibitors

MOA: inhibit conversion of testosterone to its potent form (DHT) & shrink the prostate over several months

NB\*this drugs can be given in combination or as a single agent

### Indications

- 1) AUR
- 2) Chronic urinary retention & renal impairment
  - Hydroureter or hydronephrosis
  - Residual urine > or =200ml
  - Raised BUN
  - Uraemic manifestations
- 3) Complications of BOO
  - \*infection, stone, diverticulum formation...
- 4) Symptoms are severe enough to bother the patient and affect his quality of life
- 5) Failed medical Rx

### Surgical methods

#### Minimally invasive procedure

#### 1) Trans-urethral resection/TURP

\*Gold standard

#### Open surgery

#### 2)Retropubic

\*commonly done in our setup  
(Gondar university hospital)

#### 3)Transvesical

#### 4)Perineal

\*Obsolete nowadays

### Specific complications of the Surgery

- 1) Bleeding
- 2) retro-grade ejaculation
- 3) Incontinence
- 4) Impotence
- 5) Urethral stricture
- 6) Bladder neck contracture

**DEBOL**

How to take Hx in surgery+++QUIC  
2<sup>ND</sup> EDITION

NB\*

If the pt present with AUR → the mgt initially is...

- Urethral catheterization then arrange urological mgt...
  - See page 206 for urethral catheterization

When compared to prostatic ca  
BPH causes LUTS earlier. WHY?

## II) Prostatic ca.

### Risk Factors

- Genetics
  - Ask similar illness in the family...
- Diet
  - Dietary hx?
    - Fat intake
- Obesity
- Hormonal
  - High levels of LH , testosterone : DHT ratio

Prostatic ca.

- 70% arise from peripheral zone
- 95% are adenocarcinoma

### Clinical Presentations

- Urinary complaints or retention
- Back pain
- Hematuria

---

- Advanced disease
  - Wt loss & anorexia
  - Anemia
  - Bone pain with /without pathologic fracture
  - Neurologic deficit from spinal cord compression
  - Lower extremity pain & edema due to obstruction of venous & lymphatic tributaries by nodal metastasis

#### Prostatic ca on DRE

**Size**=Enlarged (Measure)

**Consistency**=hard

**Fixity**= fixed to rectal mucosa

**Surface**=May be nodular

**Contour**=ill defined/irregular

**Medial sulcus** =obliterated

## Investigations

- **PSA level**
  - PSA velocity
  - PSA density [percentage of free PSA]
    - The lower the percentage of free PSA , the higher the likelihood of ca .
- **Prostate biopsy**
  - Done when PSA level is elevated or abnormal DRE
- **Ultrasonography**
  - What to look on u/s for prostatic ca.?
    - Enlarged prostate
    - Nodular surface
    - calcification
    - Capsular invasion
- **CT , MRI → for staging**
- **Bone scan**

## Mgt of prostatic ca.

### Localized disease

- ❖ Radical prostatectomy
- ❖ Radiation therapy
- ❖ Active surveillance
- ❖ Androgen deprivation therapy [ADT]

### Metastatic disease

- ❖ Palliation of pain
- ❖ Attempt to slow further progression of disease
  - ✓ LHRH agonists
  - ✓ Antiandrogens
  - ✓ Orchiectomy



## III) Bladder ca.

### Risk Factors

- Environmental factors (80%)
  - Cigarette smoking
  - Occupational exposures
- Medical RFs
  - Radiation therapy to the pelvis
  - Chemotherapy with cyclophosphamide
  - Prolonged indwelling catheter due to spinal cord injury →RF for Squamous Cell Ca.(SCC)
- S.hematobium →SCC

NB\*\*transitional/urothelial/ cell carcinoma is the most cmn-90%

\*\*common in males & elderly

### Clinical Presentations

- ❖ Irritative bladder symptoms(20-30%)→appear before the hematuria
    - Dysuria
    - Urgency
    - Frequency...
  - ❖ Painless gross hematuria (80-90% of cases) →terminal reddish discoloration of urine (the discoloration come at the end of urination)
- 
- ❖ In advanced cases
    - Pelvic/ bone pain
    - Lower extremity edema
      1. Due to compression of iliac vessels
    - Flank pain
      1. Due to ureteral obstruction

NB\*\*

Source of hematuria←→based on the timing during micturation

- ✓ @ the beginning→urethra
- ✓ @ the end→bladder neck + prostate
- ✓ Throughout→high up in the kidneys & ureter

## Investigations

- Urinalysis
- urine culture
  - before any endoscopic procedure
- Urine cytology
- Cystoscopy
- u/s
- LFT (liver metastasis) , ALP (bone metastasis)

## Mgt of Bladder ca.

### • Non muscle invasive

- Immunotherapy & chemotherapy
  - Intravesical BCG
- TURBT
  - Electrocautery
- Radical cystectomy
  - High risk

### • Muscle invasive

- Radical cystectomy
- Pelvic lymphadenectomy
- Urinary diversion
- Neoadjuvant chemotherapy

### • Metastatic

- Chemotherapy
- Radiation therapy

## IV) Urethral Stricture

### Causes

- Inflammatory/infectious/ stricture
  - Gonococcal infection
    - CPs → *Penile discharge, dysuria...*
    - NB\* *Bulbar urethra—cmn site*
  - TB
    - NB\* *prostate—cmn site*
    - \**multiple strictures @ the site*
- Traumatic stricture
  - Instrumentation (for therapeutic or diagnostic)
    - E.g. *prolonged catheterization...*
  - pelvic injury

### Clinical presentations

- The voiding symptoms of urethral stricture are very similar to BPH
- Suspect the Dx in a young man with poor urinary stream

#### Urethral stricture on P/E

- Palpable beadings/scarring on urethral examination
- Normal prostate findings on PR examination
- you can't advance a catheter

### INVx

- Urethroscopy
  - The stricture will be viewed as circumferential scar
- Urethrography
  - Show the extent & severity of the stricture

### Mgt

- Urethral dilation
- Endoscopic (internal) urethrotomy
- Urethroplasty

NB\*

In case of AUR (even though rare) → suprapubic catheterization

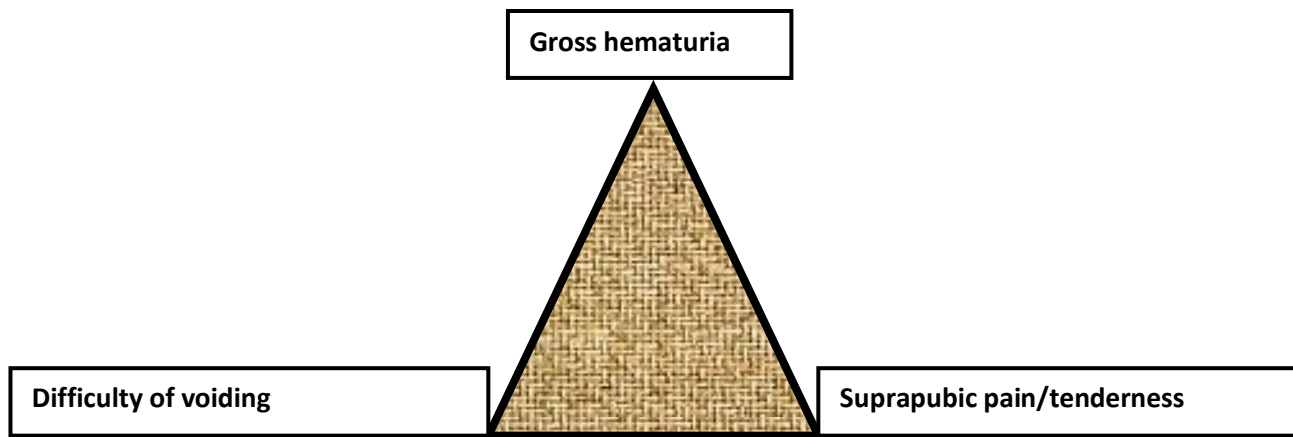
- *See page 208 for suprapubic catheterization*

## ++ Bladder+prostatic+urethral stone

- Common in male children
- Is the difficulty of urination *position dependent* or not? → bladder stone
- Pain on the tip of the penis + hx of stone passage → urethral

## ++ Bladder trauma

✓ Triad of symptoms



## Complications of BOO

- Urinary retention
  - Acute Urinary Retention (AUR)
    - Precipitated by*
      - postponement of micturation
        - Cmn after heavy drinking of alcohol in social gathering
      - Medications
      - Perianal pain
      - UTI
    - Chronic urinary retention
      - Due to Vesiculoureteral junction incompetence
        - *Bilateral hydronephrosis...*
- Renal insufficiency
- Recurrent UTI
- Gross hematuria
- Bladder calculi
- Dierticulum formation
- Renal Failure-rare

## SAMPLE Hx

**JD**

Age= 68yrs old

**e/e**

Difficulty of urination of 06 months duration

**HPJ**

This pt was LRH 06 months back @ which time he started to experience **difficulty** of urination associated with straining to **initiate & maintain** his urination. In addition he started to experience urgency & **frequency** of urination with D:N ratio of 10 to 6 which made his bed time difficult. He has also a feeling of **incomplete voiding & post micturation dribbling** but no reddish discoloration of urine. 1 month back he was totally **unable to pass** urine after drinking about 1 & ½ Liters of local tella on a social gathering. On the next day he visited our hospital & he was catheterized which enable him to urinate. 10days prior to admission he returned on the appointed date for catheter replacement & his catheter was changed. Currently he presented with total failure to pass urine of 01 day duration after he removed the second catheter because he felt discomfort.

- **No hx of anorexia, easily fatigability or significant wt loss.** (malignancy constitutional symptoms)
- **No hx of similar illness in the family.** (genetic RF--prostatic ca)
- **No hx penile discharge, genital ulcer or MSP** (urethral stricture—RF→symptoms)
- **No hx chronic cough, contact with a chronic cougher or previous TB Rx.** (urethral stricture—TB)
- **No hx trauma to the pelvis.** (traumatic stricture)
- **No hx of cigarette smoking or radiation therapy to the pelvis.** (RF-bladder ca)
- **Has hx of river water contact but can't recall post RWC itching.** (RF bladder ca)
- **No hx medication intake.** (retention →Anti-histamines, anti-cholinergics...)
- **No hx of position dependent sudden cessation of urine** (bladder stone)
- **No hx of fever, chills or rigor.** (complication--UTI)
- **No hx of tinnitus, blurring of vision or light headedness.** (complication—renal insufficiency →anemia)
- **No hx of bone pain, hemoptysis or yellowish discoloration of the eyes.** (metastasis)
- **No self /family hx of DM, HTN or Asthma**
- **Screened for RVI & found to be NR 06 months back.**

*Finally he was admitted to our hospital supported by his families.*

## General list of investigations in BOO

- **CBC**
  - Information we may get → Anemia, leukocytosis
- **Urine analysis**
  - Midstream urine
  - Information we may get → Blood, leukocytes, bacteria, protein or glucose
- **Urine culture** → To r/o infectious causes of irritative voiding
  - Done if the Urinalysis shows abnormality
- **Sr. electrolytes & RFT** → chronic renal insufficiency...
- **Ultrasound (abdominal ,renal ,trans-rectal)**
  - Prostate, what to look?
    - Size
    - Surface
      - Smooth/nodular
    - Capsular invasion
    - calcification
  - Bladder , what to look?
    - Size
    - stone
  - Degree of hydronephrosis
- **IVP**
- **cystoscopy**
- **Urine cytology** → Bladder ca.
- **PSA**
  - Screening for prostate ca.
    - PSA velocity
    - PSA density
  - 4ng/ml
- **Prostate biopsy**
  - In pts with elevated PSA
  - Abnormal DRE
- **CT/MRI**
  - For staging
- **Urodynamic flow studies**
  - Done in best setups

## Mgt

*See the mgt in each part of the DDx discussion.*

# SAMPLE HISTORY ON UROLITHIASIS

## Risk Factors

- Infection...
  - E.g. Due to chronic catheterization
    - So, ask hx of catheterization
- Dietary + environmental factors...
  - Low fluid intake(dehydration)→low urine output
    - increased concentration of urinary solutes→@ risk of stone formation
    - So, ask about fluid intake habit & the type of the fluid...
  - Vitamin A deficiency
    - Cause desquamation of renal epithelium→which act as a nidus for stone deposition
  - Diet rich in red meat, fish, eggs (rich in proteins (purines))
    - Leads to hyperuricemia
    - So, ask dietary hx...
  - Living in hot climate area
- Medical conditions...
  - Hyperparathyroidism
    - Result in a great increase in the elimination of calcium in the urine
      - these pts “pass their skeleton in their urine”
  - Gout
    - Increases uric acid level & causes multiple uric acid stones
    - Ask hx of joint pain, swelling, disability
      - Especially at the base of big toe
  - Crohn’s disease→hyperoxaluria & malabsorption of magnesium
  - Obesity
  - HTN
  - Medication hx
    - e.g.
      - acyclovir,sulfadiazine
      - loop diuretics→increase calcium renal excretion
      - glucocorticosteroids →increase bone resorption
  - Prolonged immobilization
    - E.g. paraplegic pt
- Surgical hx
  - Gastric bypass procedures, bariatric surgery, short bowel syndrome
    - Enhanced enteric oxalate absorption→increased risk of stone formation

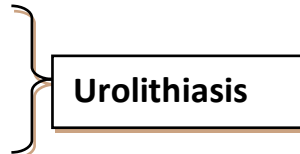
- Anatomical...
  - Inadequate urinary drainage
    - E.g. Horse shoe kidney, un-ascended kidney
- Others...
  - Prior hx of nephrolithiasis → recurrence
  - Family hx of nephrolithiasis

**NB\***

Renal stone=Nephrolithiasis

Ureteral stone=ureterolithiasis

Bladder calculi



### Clinical Presentations

- May be clinically silent (asymptomatic)
- Symptomatic stones are commonly associated with pain in the flank area
- Site of obstruction determine the location of the pain
  - ✓ Upper ureteral or renal pelvic obstructions lead to flank pain
    - which is dull aching to pricking type
  - ✓ Lower ureteral obstructions lead to colicky type of flank pain with radiation from the loin to the groin area
    - The radiation is due to irritation of genitofemoral nerve
    - Patients are usually quite agitated and have difficulty in getting a comfortable position unlike peritonitis pts.(writhe)
    - The severity of the pain isn't associated with the size of the stone
- In majority of symptomatic pts there is microscopic or gross hematuria
- Nausea and vomiting commonly accompany ureteral colic...
  - ✓ as a result of pressure on the renal capsule
    - Due to common innervation pathway of the renal pelvis, stomach & intestine
      - Through the celiac axis and vagal nerve afferents
- Due to recurrent UTI the pt may present with
  - ✓ Fever with chills & rigor
  - ✓ Burning micturation, increased frequency of micturation & or
  - ✓ pyuria
- Urinary urgency or frequency may also be present if the obstruction is in the distal ureter
- On P/E
  - ✓ there may be guarding & rigidity on the back & abdominal muscles during severe attacks of the pain



## Complications

- Calculus hydronephrosis
  - due to back pressure→renal enlargement→pain
- Calculus pyonephrosis
  - Calculus hydronephrosis→infected
- Renal failure
  - staghorn calculi can lead to renal failure over years if it's bilateral
    - because they don't typically produce symptoms unless the stone results in urinary tract obstruction or infection
- Squamous cell ca----long standing stones→increased risk

## DDX

### 1. Pyelonephritis

#### CPs

---

- fever, chills
- N & V
- CVAT

### 2. Renal Cell Carcinoma (RCC)

#### RFs

---

- Cigarette smoking
- Obesity
- HTN
- Long term dialysis

#### CPs

---

- Flank pain
- Hematuria
- Palpable abdominal/flank mass
  - Firm, homogenous, non-tender & moves with respiration

#### Mgt principles

---

- surgery , radiation therapy , chemotherapy , hormonal therapy , immunotherapy...combinations

### 3. Peri-renal abscess

### 4. Bladder ca

### 5. Renal trauma

### 6. Polycystic kidney disease

- Hematuria
- Hypertension
- Bilateral renal mass
  - Nodular, firm to hard sometimes cystic

### 7. Renal TB

- Frequency→earliest
- Sterile pyuria
- Hematuria...

## SAMPLE Hx

*c/c*

Right flank pain of 2 days duration

*HPJ*

This pt was LRH 2 days back @ which time he started to experience sudden onset severe intermittent **colicky right flank pain** with radiation to *the right groin area & the right medial thigh* which was aggravated by going *up stairs* but no relieving factor noticed by the pt. The pain started while he was trying to urinate after drinking about 2 liters of beer from local beer house. Associated with this he started to experience *nausea & non-bilious, non-blood tingled, non-foul smelling vomiting* of ingested matter about 3-4X/day. One day prior to admission he started to experience *urgency, dysuria with D:N frequency of 5:3* but no fever, chills or rigor. In addition he noticed *decreased amount of his urine* when compared to the previous times but no reddish discoloration of the urine. This pt had hx of *deep dull aching* right flank pain 01 year prior to admission for which he visited a private clinic in Gondar town where *abdominal x-ray* was done. He was told to have small *renal stones* and he was given antipain & advised to drinking plenty of water.

- ✓ He usually drinks up to #02 glass of water/day. (dietary RF)
- ✓ His regular dietary habit is "shiro" made of "atter" & "enjera" made of "teff." (dietary RF)
- ✓ No hx of catheterization.(UTI--RF)
- ✓ No self/family hx of similar illness.( recurrence + RF)
- ✓ No hx of prolonged immobilization. (RF)
- ✓ No hx of abdominal surgery. (RF--bariatric surgery...)
- ✓ No hx of medication intake except the antipain.(medication hx-RF)
- ✓ No self/family hx of DM, HTN or gout.(medical conditions-RF)
- ✓ No hx of penile discharge, genital ulcer or MSP. (RF-ascending infection)
- ✓ No hx of tinnitus, blurring of vision or light headedness. (anemia→may have microscopic hematuria in this pt)
- ✓ No hx trauma to the abdomen or pelvic area. (renal trauma)
- ✓ No hx of chronic cough, contact with chronic cougher or previous TB Rx. (renal TB)
- ✓ No hx of anorexia, easily fatigability or significant wt loss
- ✓ No hx of bone pain or hemoptysis
- ✓ He has been screened for RVI 1yr back & found to be NR

*Finally he was admitted to our hospital supported by his families.*

## Investigations

### Lab. studies

#### 1. U/A

- Information we get...
  - Hematuria
  - Bacteria, Leukocytes
  - PH
    - ✓ PH > 7...urea-splitting micro-organisms
      - a. proteus , pseudomonas , klebsiella , struvite stone
    - ✓ PH < 5 = uric acid stones
  - crystals
    - ✓ ca oxalate , uric acid , cystine

#### 2. CBC

- Anemia, leukocytosis

#### 3. Serum electrolytes

#### 4. RFT (BUN & creatinine)

- To r/o renal failure

### Radiological studies

#### 5. Plain x-ray (KUB)

- KUB=Kidney+ureter+bladder
- Will identify sufficiently large radio-opaque stones

#### 6. IVU (intra-venous urography)

- It tells us the presence & anatomical position of a calculus
- Also gives us information on the function of the kidneys
- Hydronephrosis, Hydrouretronephrosis can also be seen
  - >6mm of ureter – hydroureter

#### 7. Non-contrast enhanced helical CT scan

- Gold standard

#### 8. u/s scanning

- valuable in locating stones for Rx by ESWL

#### 9. Retrograde pyelography

## Mgt

### 1. Conservative Rx

#### a. Pain mgt

- ❖ NSAIDS
  - ✓ Diclofenac, indomethacin

#### b. Hydration

- ❖ Small stones <5mm can pass with intake of plenty amount of fluid
  - ✓ Advice them to drink > 2L of water/day=around #08 glass

#### c. alpha-adrenergic blockers

- ❖ tamsulosin...
  - ✓ ureteral smooth muscle relaxing effect

### 2. Medical Rx

#### a. alkalization of urine→to dissolve the calculi

Using NaHCO<sub>3</sub> or K<sup>+</sup> citrate (urinary PH should be between 6.5-7)

- ❖ Which stones dissolve?
  - ✓ uric acid stones
  - ✓ cystine stones

#### b. Chemoprophylaxis→to prevent recurrence

- ❖ Limitation of dietary components
- ❖ Addition of stone formation inhibitors (Magnesium & citrate) or intestinal Calcium binders
- ❖ Avoid excess salt / protein intake
- ❖ Augmentation of fluid intake(>2L/day)
- ❖ Allopurinol

### 3. Surgical Rx

#### a. Non-invasive procedures

- ❖ PLS (percutaneous nephrolithotomy)
- ❖ ECSWL (extracorporeal shock wave lithotripsy)

#### b. Open surgery

- ❖ Pyelolithotomy
  - ✓ Indicated for stones in the renal pelvis
- ❖ Nephrolithotomy

#### *Emergency management of renal colic*

##### a. Secure IV line & give

- ❖ analgesics
  - ✓ NSAIDs, PO
  - ✓ Parenteral narcotics
- ❖ Fluid

- ✓ IV hydration

- ❖ antiemetic

##### b. obstruction / infection

- ❖ needs emergent decompression

## Indications for surgical removal of a ureteric calculus

- Repeated attacks of pain and the stone is not moving
- Stone is enlarging
- Complete obstruction of the kidney
- Urine is infected
- Stone is too large to pass
- Stone is obstructing solitary kidney or there is bilateral obstruction

## Surgical Rx of ureteric calculus

### Endoscopic stone removal

---

- ✓ Dormia basket
- ✓ Ureteric meatotomy

### Ureteroscopic stone removal

---

- ✓ Push bang
- ✓ Lithotripsy in-situ

### Open surgery

---

- ✓ ureterolithotomy

### NB\*

If UTI is present, appropriate antibiotic is given & continued during & after surgery

# SAMPLE HISTORY ON CHOLELITHIASIS

*Cholelithiasis* → Stone in the gallbladder

## Risk factors

- **Gender** → Female sex
  - #03 times increased risk
- **Increasing age**
- **Obesity**
- **Factors that predispose to gallbladder stasis. E.g. ...**
  - **Pregnancy**
    - Mechanism=Because of increased progesterone exposure → reduce gallbladder contractility → bile stasis
  - **prolonged NPO with parenteral nutrition (PTN)**
    - **Previous abdominal surgery. e.g.**
      - vagotomy → Mechanism=denervation of gallbladder → affects its motility
- **Surgery. E.g. ...**
  - **Truncal vagotomy in case of GOO (Rx)**
  - **Post surgical biliary tract stricture**
  - **Terminal ileum resection**
    - Mechanism=It affects enterohepatic circulation
- **Drugs**
  - **Estrogen formulations** → E.g. OCP, medications for Prostatic ca.
    - Mechanism=by increasing biliary cholesterol secretion
  - **Colfibrate (hypolipidemic drug)** → Mechanism=by increasing hepatic elimination of cholesterol via biliary secretion
  - **Somatostatin analogues** → Mechanism=CCK inhibition...decrease gallbladder emptying
- ➡ **Hereditary 25%**
- ➡ **Disorders of hemolysis**
  - **Sickle cell anemia, Hereditary spherocytosis, Beta-thalassemia...**

## Clinical Presentations

1. *Lithogenic stage*
2. *Asymptomatic stage*
3. *Symptomatic stage*
4. *Complicated stage*

### 1) History

\*About 2/3 of pts with gallstone present with chronic cholecystitis characterized by recurrent attacks of pain.

#### ➤ *Pain*

- ✓ characterization of the pain
  - **Site**→localized to the RUQ/epigastrium
  - **Quality**→colicky
  - **Pattern**→episodic in chronic one & Persistent in acute cholecystitis
  - **Radiation**→May radiate to the right upper back or between the scapulae
  - **Aggravating & relieving factors**
    - Usually begins postprandially after fatty meal
- ➔ **Associated symptoms**
  - ✓ Nausea & vomiting
  - ✓ fever

\*Acute cholecystitis is secondary to gallstones in 90-95% of the cases

- about 80% of pts have compatible hx with chronic cholecystitis
  - ✓ but the pain is unremitting type & may persist for several days
  - ✓ & the pt is often febrile ,complains of anorexia, N & V + reluctant to move

### Pain characterization

#### ➔(OPQR<sup>2</sup>S<sup>2</sup>)

- *Onset(1)*
- *Pattern(3)*
- *Quality(4)*
- *Radiation(6)*
- *Relieving & Aggravate factors(7)*
- *Severity(2)*
- *Site(5)*

*E.g... sudden onset severe intermittent colicky RUQ pain with radiation to the right upper back which was aggravated by taking fatty meals & relieved by....*

## 2) Physical examination

- ➔ G/A
- ➔ vital signs
- ➔ HEENT
- ➔ Abdominal examination...
  - In chronic cholecystitis P/E may reveal
    - Mild RUQ tenderness during episodes of pain
  - In acute cholecystitis
    - Focal tenderness & guarding are usually present in RUQ
      - Guarding=contraction of abdominal muscles on palpation
    - *Murphy's sign +ve*
      - Inspiratory arrest with deep palpation in the right subcostal area

## Complications of gallstone

### 1. Cholecystitis

- Well localized **steady** pain with rebound tenderness & guarding
- *Murphy sign +ve*
- No peritoneal signs present unless perforated
- Differentiate calculus vs acalculus cholecystitis
  - Calculus
    - Hx of biliary pain
  - Acalculus
    - Persistent steady pain for > 6-8hrs
    - No previous hx of biliary pain
    - In severely ill pts...e.g.elderly with DM

*Have high suspicion index for complication when there is*

*\*Fever*

*\*Tachycardia*

*\*Hypotension*

*\*Jaundice*

### 2. Cholidocolithiasis + or - Ascending cholangitis

- Charcot triad ➔ Reynolds' pentad (see page 69)

### 3. Acute pancreatitis

- Pain=severe steady sharp epigastric/mid-abdominal
- Radiation to the back
- Relieving factor=leaning 4wrd
- Associated smx ➔ anorexia, N & V ,diarrhea may be present



4. Gallbladder empyema

5. Gallstone ileus

6. Mirizzi syndrome

- Distended gallbladder causing common bile duct obstruction
- Cause elevated LFT

## DDX

➔ PUD(Perforated/without perforation)

➔ Acute pancreatitis

➔ Appendicitis

- Before it shifts to RLQ

➔ GERD

➔ Hepatitis

➔ Liver abscess

➔ Acute pyelonephritis

➔ Renal calculi

➔ Diverticulitis

➔ Gallbladder ca

- Pain is late manifestation in malignancies

➔ pneumonia

➔ Pleuritis

➔ Myocardial ischemia

➔ HZA involving IC nerves

## SAMPLE Hx

*c/c*

Right upper abdominal pain of 03 days duration

**HPJ**

This patient was LRH 03 days back at which time she started to experience abrupt onset severe intermittent colicky **RU abdominal pain** with radiation to the right upper back which was aggravated by taking fatty meal but no relieving factor noticed by the pt. Associated with this she started to experience nausea & bilious, non-projectile, non-blood tinged, non-foul smelling **vomiting** for about 4-5X/day immediately after taking a meal. In addition she started to experience low grade intermittent **fever** but no chills or rigor. For the above compliant she visited a LHC @ Dabat town where she was given #01 bag of IV fluid & they referred her to our hospital for better investigation & management.

- ✓ **She was on oral contraceptive pill for the last 3 years but no hx of other medication intake**
- ✓ **She is a grand multipara mother**
- ✓ **She has no history of abdominal surgery**
- ✓ **She has no hx of similar illness in the family**
- ✓ **She has history of burning epigastric pain for the past 02 years but no hx NSAID use or chronic alcohol consumption.(PUD)**
- ✓ **She has no history of yellowish discoloration of eye, itching sensation or color change in the urine & stool (choledocolithiasis)**
- ✓ **No hx of MSP, contact with jaundiced person or blood transfusion (hepatitis)**
- ✓ **She has no history flank pain or pain on passing urine(renal colic)**
- ✓ **She has loss of appetite but no significant wt loss or easily fatigability**
- ✓ **She has no history of chronic cough but has history of contact with known TB patient who was on Anti-TB medication after diagnosed by sputum & CXR examination.**
- ✓ **She has no self or family history of DM, HTN or asthma.**
- ✓ **She was screened for RVI 9 month back and found to be NR.**

*Finally she was admitted to our hospital by...*

## Investigations

### Imaging modalities

#### ➤ *Abd. Ultrasonography*

☞ Standard Dxtic test

What to look on U/S for Acute cholecystitis?

1. Acoustic shadow ((stone)
2. Gall bladder wall thickening
  - Acute cholecystitis if >3mms
3. Pericholecystic fluid
4. Sonographic murphy's sign

- HIDA Scan → +ve if there is lack of filling of the gallbladder in 4 hours
- Computed tomography (CT) scan → less sensitive than U/S

### Lab. studies

- CBC with differential
  - Degree of leukocytosis +++ neutrophil predominance
- LFT
  - Sr bilirubin, Albumin, PT & PTT
  - In case of Mirrizi syndrome → elevated
  - Read on components of LFT
- RBS
  - DM
- Amylase /Lipase
- Urinalysis

# Management

## Acute cholecystitis

### ➤ Conservative Rx

- NPO
- IV fluid
- Antibiotic
  - Criteria
    - Broad spectrum
    - Single
    - Effective
    - Fast acting
  - Drug Of Choice (DOC)
    - ✓ 3<sup>rd</sup> generation cephalosporin or
    - ✓ 2<sup>nd</sup> generation with metronidazole
    - \*If allergic to cephalosporins → Aminoglycosides with metronidazole
  - *In our setting (GUH), Ceftriaxone (3<sup>rd</sup> generation cephalosporin) with metronidazole is being used*
- Analgesics

### ➤ Definitive Rx → surgery

- Cholecystectomy
  - Timing → with in 2-3 days of the illness (preferred) → (Source--Schwartz 10<sup>th</sup> edition)
  - Preparation for operation for Cholecystectomy
    - ✓ CBC
    - ✓ OFT
    - ✓ Prothrombin time
    - ✓ Chest X-ray and electrocardiogram (if over 45 years or medically indicated)
    - ✓ Antibiotic prophylaxis
    - ✓ Deep vein thrombosis prophylaxis
    - ✓ Informed consent
  - Methods
    - ✓ Laparoscopic cholecystectomy
    - ✓ Open cholecystectomy

## Chronic cholecystitis

### ➤ While waiting for surgery

- Avoid dietary fats and large meals
- Control comorbidities

### ➤ Cholecystectomy

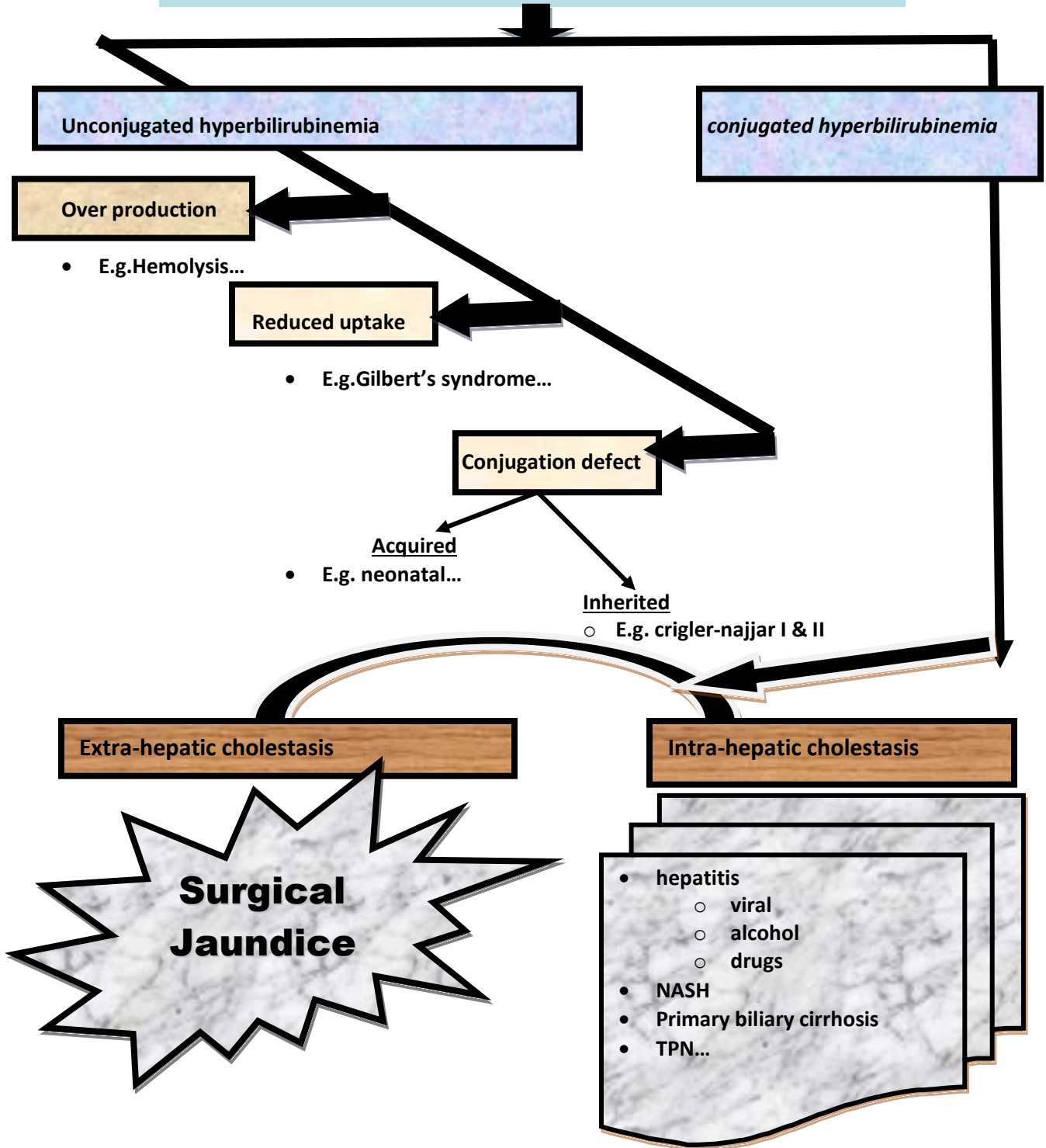
#### Indications for surgery

- Symptomatic/complicated cholecystitis
- Rare indications in asymptomatic cholecystitis → for prophylaxis
  - Elderly with DM
  - In individuals to be isolated from medical care for long period of time
  - In population with increased risk of gallbladder ca
  - Porcelain gallbladder

> Because this pts may develop complications without biliary symptoms

Before we proceed to next case... Let's Recall

# Jaundice



# SAMPLE HX ON OBSTRUCTIVE (SURGICAL) JAUNDICE

OBSTRUCTIVE JAUNDICE 20 TO ???

DDX

## APPROACH

### Intra-ductal causes

- **Stone disease**
- Neoplasms
  - **Cholangiocarcinoma**
  - Gall bladder ca.
- Biliary stricture
  - Surgical trauma
  - Erosion by gallstone
- Parasitic infection
  - *A.lumbricoides*
- Primary sclerosing cholangitis/PSC/
  - Underlying → UC
- AIDS cholangitis
- Choledocal cyst
- Biliary TB--rare

### Extra-ductal causes

- Pancreatitis
- 2<sup>o</sup> to neoplasms
  - **Periampullary ca.**
- Portal adenopathy
  - Metastasis
    - GIT
    - breast
  - TB
- Cystic duct stones
  - Mirizzi syndrome

NB

Periampullary ca. includes →

1. Pancreatic head ca.
2. Cholangiocarcinoma
3. Duodenal ca.

DEBOL

How to take Hx in surgery +++ QUICK REVISION  
2<sup>ND</sup> EDITION

GCMHS

Page 111

## 1) History

- Pale stool
- Dark urine
- Pruritus
  - May be related to the circulating bile acids or our body response...
- Jaundice

**NB\***

Urine darkening, stool changes & pruritus are often noticed by the pt before clinical jaundice. Usually clinical jaundice is noticed by the pt & the family when it reaches 6-8mg/dl. Physicians can usually detect it @ 2.5-3mg/dl...

**On Hx→Also consider**

- Pt's age & associated conditions
- Presence/absence of pain
  - Location & character
    - Stone in CBD→severe colicky pain
    - Periampullary ca. →mild discomfort
- Acuteness of symptoms
  - Stone in CBD→long duration
  - Periampullary ca→short duration (1-3months)
- Presence of systemic symptoms
  - Fever
  - Wt loss--Significant in periampullary ca.
- Symptoms of gastric stasis→/GOO/
  - Early satiety
  - Vomiting
  - Belching
- Anemia symptoms--Usually present in periampullary ca.
- Previous malignancy
- GI bleeding
- Hepatitis
- Known gallstone disease
- Previous biliary surgery
- Diabetes or diarrhea of recent onset
- alcohol, drugs & medications



## 2) Physical Examination

- G/A
- V/S
- Signs of jaundice
  - sclera
  - skin
- Gall bladder may be palpable
  - Courvoisier sign
  - Suspect underlying pancreatic malignancy...
- Neoplastic→suggestive
  - Look sign's of wt loss, adenopathies & occult blood in the stool
  - Malignancy is more cmnly associated with the absence of pain & tenderness
- Signs of cirrhosis
  - Ascites
  - Collateral circulation→GI bleeding
- Xanthomas
  - PBC=primary biliary cirrhosis
- Excoriations
  - Prolonged cholestasis /high grade biliary obstruction

## DDx

## +Discussion

1<sup>st</sup> try to differentiate between obstructive jaundice & medical jaundice

Obstructive jaundice 2<sup>o</sup> to???

### 1) Choledocholithiasis(stone disease)

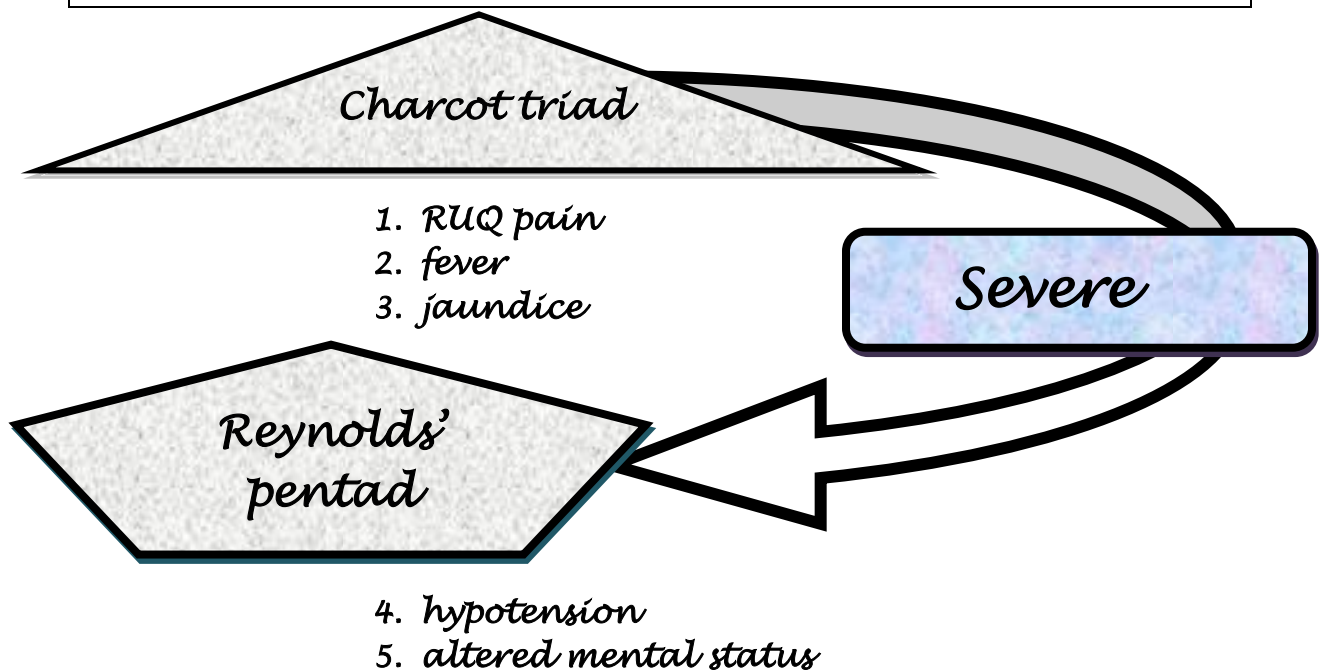
- ✓ Gall stone in CBD /cmn bile duct
- ✓ cmn→2<sup>o</sup> to passage of stone from gall bladder to CBD
- ✓ 1<sup>o</sup>→less cmn

#### Clinical Presentation

- ✓ Asymptomatic/ 85%
- ✓ Symptomatic →
  - ✚ Pain is similar to biliary colic
    - Usually with nausea and vomiting
    - Usually intermittent

#### Complications of choledocholithiasis

##### Acute cholangitis



##### Acute pancreatitis

- ✚ pain→severe steady sharp epigastric/mid-abdominal pain
- ✚ Radiation to the back
- ✚ Relieving factor→leaning 4ward
- ✚ N & V
- ✚ Anorexia, diarrhea may be present

## 2) Periampullary carcinoma

### I) Pancreatic ca.

- 95% -exocrine portion
- 75%-@ the pancreatic head & neck

#### Etiology+Risk Factors

- ✓ Sporadic→40%
- ✓ Smoking→30%
- ✓ Dietary factors→5-10%
  - Esp. red meat –processed kind
- ✓ Hereditary→5-10%
- ✓ DM→2X increased risk
- ✓ Underlying chronic pancreatitis→<5%
- ✓ Alcohol→not independent RFs
- ✓ Industrial carcinogen exposure

#### Clinical Presentation

##### i) History

- ✓ Significant wt loss
  - Carcinoma associated, or
  - Malabsorption from exocrine pancreas insufficiency
- ✓ Mid epigastric pain
  - Radiation to mid/lower back may be present
  - Unrelenting in nature—night time
- ✓ Onset of DM within the previous yrs
- ✓ **Painless obstructive jaundice+ Pruritus**
- ✓ Migratory thrombophlebitis (Trousseau sign) + venous thrombosis

##### ii) Physical Examination

- ✓ Palpable, non tender gall bladder
- ✓ Skin excoriations
- ✓ Developing, advanced intra-abdominal disease
  - Ascites
  - Palpable abd.mass
    - Hepatomegally
      - metastasis
    - splenomegally
      - portal venous obstruction
- ✓ ...advanced
  - sister mary joseph nodule
  - virchow's node
  - blumer's shelf also possible→palpable rectal mass in rectal pouch

## II) Cholangiocarcinoma

### Clinical Presentation

#### i) History

- jaundice
- clay-colored stools
- dark urine → bilirubinemia
- pruritus
- wt loss...(variable)
- abdominal pain...dull ache in RUQ

#### ii) Physical Examination

- ✓ palpable gall bladder may be present
  - Courvoisier sign

**SAMPLE Hx 1**

**OJ 2<sup>o</sup> to ?periampullary ca.**

**e/e**

Loss of consciousness of 1hr duration

**HPJ**

This is a known **DM** pt for the past 10yrs on insulin injection, who claimed to be adherent to his medication.

This pt was LRH 04 wks back @ which time he started to experience **dark colored urine & pale stool**. 3 wks prior to admission he started to experience **itching sensation** which began from his hands & progresses to include all the body parts which especially worsens @ night. 2wks prior to admission his families began to notice persistent light lemon to deep **yellow discoloration** of his eyes. Associated with this he started to experience steady **epigastric pain** without radiation or known aggravating/relieving factor. In addition he started to experience low grade intermittent **fever** but no chills or rigor. 03 days prior to admission he started to experience nausea & non blood tingled, non bilious vomiting of ingested matter about 6X/day. For the above complaints he visited a traditional healer where he was cauterized on his back. One hour prior to admission he experienced LOC.

- ✓ **Has hx of anorexia, easily fatigability & unquantified wt loss for the past 1 month**
- ✓ **Has hx of tinnitus, blurring of vision & light headedness**
- ✓ **No hx of cigarette smoking or chronic alcohol consumption**
- ✓ **His regular dietary habit is "shiro" made of "atter" & "siga wot" by "injera" made of "teff"**
- ✓ **No hx of similar illness in the family**
- ✓ **No hx of previous abdominal surgery**
- ✓ **No hx of MSP, contact with jaundiced pt or blood transfusion**
- ✓ **No hx of river water contact itching**
- ✓ **No hx of malarial attack for the past 1yr**
- ✓ **No hx of medication except the insulin injection explained above**
- ✓ **No hx of chronic cough, contact with chronic cougher or previous TB Rx**
- ✓ **No self/family hx of HTN or asthma. No family hx of DM**
- ✓ **He has been screened for RVI 1yrs back & found to be sero-negative**

*Finally, he was admitted to our hospital by ambulance.*

**e/e****Abdominal pain of 01yr duration****HPJ**

This pt was LRH 01yr back @ which time he began to experience severe **intermittent colicky right upper abdominal pain** with radiation to the right shoulder. The pain was aggravated while taking fatty meal but no relieving factor noticed by the pt. 03 months prior to admission he started to experience low grade **intermittent fever** but no chills & rigor. 01 month prior to admission his families started to notice **intermittent deep yellowish discoloration** of the eye. In addition he started to experience mild itching sensation all over the body but no change in urine or stool color. For the above complaints he visited a traditional healer repeatedly, where he was given herbal medication & got cauterized. But he didn't get any relief from his symptoms for which he came to our hospital.

- ✓ He has hx of nausea but no vomiting
- ✓ No hx of LOC
- ✓ No hx of anorexia, easily fatigability or significant wt loss
- ✓ No hx of smoking or alcohol abuse
- ✓ No hx of MSP, contact with jaundice person or blood transfusion
- ✓ No hx of abdominal surgery
- ✓ No family hx of similar illness
- ✓ No hx of chronic cough or previous TB Rx but he has hx of contact with known TB patient which was on medication.
- ✓ No self/family history of DM, HTN or asthma.
- ✓ He was screened for RVI 9 month back and found to be sero-negative

*Finally he was admitted to our hospital.....*

## Investigations

### Lab.studies

- Serum bilirubin,ALP,transaminaes(AST,ALT), GGT
- PT
  - Vit. K administration
    - Hepatic failure/cholestasis?
- Hepatitis serology
- Anti-microbial Ab
- Urine bilirubin
- CBC—acute cholangitis

### Imaging

- U/S
  - Important for documenting stones in the gallbladder (if still present) & determines size of CBD.
    - Dilated CBD when >8mm in diameter
- Contrast CT-scan
- MRI

### Cholangiography

- ERCP/endoscopic retrograde cholagiopancreatography
  - Endoscopic cholangiography→gold standard for Dxing CBD stones + advantage of therapeutic options @ the time of Dx.
- PTC/ percutaneous transhepatic cholangiography
  - Examination of liver and bile ducts by x-rays. This is accomplished by the insertion of a thin needle into the liver carrying a contrast medium to help to see blockage in liver and bile ducts.

**\*In both cases fluorescent fluids are used to create contrasts that make the diagnosis possible**

# Mgt

## 1) cholidocolithiasis

- sphincterectomy & ductal clearance, followed by laparoscopic clearance or
- open CBD exploration → choledochotomy → T-tube left in place

### Complications → If cholangitis...

- Stabilize patient with
  - IV fluid resuscitation
  - IV Antibiotics
  - IV analgesia
- 15% will not stabilize with conservative Mgt → requiring emergency decompression

### → If acute pancreatitis...

- Biliary pancreatitis
  - ✓ Mgt
    - Stabilize patients
    - ERCP
    - Cholecystectomy +/- CBD exploration

## 2) periampullary ca.

### 1) Pancreatic ca.

#### Palliative

- Pain → Narcotics, Celiac plexuse block
- Jaundice and pruritis
  - Stenting
  - Cholidochoduodenostomy
  - Cholidochojejunostomy
  - Cholecystojejunostomy
- Duodenal obstruction (20%) → Prophylactic bypass in unresectable disease is controversial
- Adjuvant therapy → Chemotherapy (Gemcitabine), Radiotherapy

#### Curative

- Surgical resection → Whipple's (with or without pylorus sparing)
- Adjuvant therapy
  - Chemotherapy
  - Radiotherapy



## II) cholangiocarcinoma

- **Surgery is the only curative treatment**
  - **> half patients have unresectable tumor on intraoperative finding**
    - **biliary decompression + cholecystectomy (to prevent cholecystitis)**
  - **Unresectable perihilar tumor → Roux-en-Y cholangiojejunostomy**
- **Distal bile duct tumors often resectable → Pylorus preserving pancreaticoduodenostomy**
- **No proven benefit of adjuvant chemotherapy**
- **intraoperative radiation and external beam radiation for unresectable tumor**

# SAMPLE HISTORY ON LIVER ABSCESS

Liver abscess may be due to.....Etiologic wise

## 1) Pyogenic liver abscess

### Risk Factors

- ✓ Impaired bile drainage
  - Biliary tract disease → causing ascending cholangitis
- ✓ systemic bacteremia → Hematogenous dissemination
  - Subacute Endocarditis
  - Infected indwelling catheter
  - Pyelonephritis
- ✓ Local spread of infection
  - like gangrenous cholecystitis, perforated ulcers and subphrenic abscesses
  - diverticulitis, Crohn's disease → direct extension to liver
- ✓ hepatic trauma
  - penetrating → Direct inoculation of microorganisms
  - Blunt → by causing localized hepatic necrosis + hemorrhage + bile leakage...
- ✓ May be b/c of Complication of...
  - Cholangiography, percutaneous transhepatic stents, endoscopic stent placement, and biliary-enteric anastomosis

### NB\*

- ✓ Etiology → E.coli in 2/3 of cases

### Clinical presentation

#### i) History

Usually sub-acute and nonspecific, leading to delay in presentation, Dx & Rx.

- RUQ pain → Referred pain to the right shoulder may be present
- Fever, chills
- Anorexia, malaise
- Yellowish discoloration of eyes & skin may present in 1/3<sup>rd</sup> of pts
- Anemia of chronic disease
- Cough may be present due to diaphragmatic irritation

**NB\*\*When abscesses are seen in children & adolescents, underlying immune deficiency, severe malnutrition or trauma frequently exists.**

### *ii) Physical Examination*

- **Tender hepatomegally**
  - Intercostal tenderness → differentiate it from acute cholecystitis
  - Palpable mass need not be present
- **Decreased breath sounds in the rt. basal lung zone may be present**
- **Pleural or hepatic friction rub may be present due to...**
  - Diaphragmatic irritation
  - Inflammation of glisson capsule
- **Jaundice may be present (1/3<sup>rd</sup> of pts) usually when associated with biliary tract disease**

### **Complications**

- **generalized sepsis**
- **Pleural effusions, Empyema, pneumonia.**
- **intraoperative rupture which is frequently fatal.**
  - Usually the abscess does not rupture, but develops a controlled leak resulting in a perihepatic abscess.
- **hemobilia /Hemorrhage in bile**
- **Hepatic vein thrombosis**

### **Investigations**

#### **Lab. studies**

- **CBC=Leukocytosis**
- **Raised ESR**
- **Elevated ALP level**
  - **Significant abnormality in the remaining LFTs are unusual**
- **Blood culture → only in 50% of pts show the causative organism**

#### **Imaging**

- **Liver u/s**
  - **What to look for abscess?**
    1. **Round/ oval hypoechoic lesions**
    2. **Well defined border**
    3. **Variable no# of internal echoes**
- **CT-scan**
  - **Hypodense with peripheral enhancement**
  - **May contain air fluid level**

## Mgt

### Antibiotics

- Aminoglycoside + clindamycin + ampicillin/vancomycin.
  - Fluoroquinolones can replace aminoglycosides, and metronidazole can be used instead of clindamycin
- Duration=#02 weeks

### Aspiration and Percutaneous Catheter Drainage

- Aspiration→useful in guiding subsequent antibiotic therapy
- Percutaneous catheter drainage is only beneficial for a minority of pts
  - Because most pyogenic abscesses are quite viscous
- Patients in whom percutaneous drainage is not appropriate include...
  - ✓ multiple large abscesses
  - ✓ known intra-abdominal source that requires surgery
  - ✓ an abscess of unknown etiology
  - ✓ Ascites
  - ✓ abscesses that would require transpleural drainage

### Surgical Drainage

- indications
  - pts that have failed non-operative therapy
  - those who need surgical Rx of the underlying source
  - those with multiple macroscopic abscesses
  - those on steroids
  - those patients with concomitant ascites

## 2) Amebic liver abscess

### Risk Factors

- ✓ Low socioeconomic status and unsanitary conditions are significant independent risk factors
  - Contaminated food & water
- ✓ living or visiting an endemic area
- ✓ Presence of immunosuppression

### NB\*

- ✓ *E. histolytica* → causative organism

### CPs

- May be acute with
  - fever and right upper quadrant (RUQ) pain or
- sub-acute with
  - Weight loss and less frequent fever and abdominal pain.
- The usual case of amebic liver abscess does not present with concurrent colitis, but patients may have had dysentery within the last year.

### Complications

- ✓ Peritonitis
  - due to rupture in the majority and secondary to necrotizing or perforated amebic colitis
- ✓ Thoracic amebiasis
  - empyema, bronchohepatic fistulas, and pleuropulmonary abscess
  - If the abscess ruptures into the pleural cavity, it usually occurs suddenly, collapsing the lung, filling up the pleural space.
  - If the abscess ruptures into the bronchi, this complication causes sudden onset of coughing with expectoration of copious brown sputum.
- ✓ Pericardial amebiasis
  - acute pericarditis with tamponade
- ✓ Hematogenous spread to lung, brain, skin and genitourinary tract

## INVx

### Lab. studies

- ✓ CBC=leukocytosis
- ✓ Mildly elevated ALP
- ✓ Serologic tests (fluorescent antibody test)→can remain +ve after clinical cure

### Imaging

- ✓ Ultrasound, CT, and Magnetic resonance imaging (MRI) are all excellent methods of detecting but are nonspecific.

### Diagnostic Aspiration

- ✓ Usually done when amebic serologies are negative and a pyogenic cause needs to be ruled out.
- ✓ The fluid of an amebic abscess is odorless, and Gram's stain and cultures are negative.
- ✓ Aspiration should not be done if an echinococcal cyst or a cancer is suspected.

## Mgt

### Antibiotics

- Metronidazole →DOC→750mg, tid #7-10days

### Drainage

- ✓ Indications
  - patients that have no clinical response to drug therapy within 5–7 days
  - those with a high risk of abscess rupture (cavity >5 cm in diameter)
  - The presence of lesions in the left lobe→because @ risk of rupture into the pericardium
- Drainage may be by...
  - Percutaneous→Image-guided
    - Procedure of choice for decreasing the size of an abscess.
  - Surgical→Indications
    1. abscesses that have failed to respond to more conservative therapy
    2. life-threatening hemorrhage
    3. when the amebic abscess erodes into a neighboring viscus
    4. Sepsis due to a secondarily infected amebic abscess if percutaneous treatment fails

## DDX

### 1) Biliary diseases

- Refer the topic on obstructive jaundice @ page 110

### 2) Hepatocellular ca. (HCC)

#### Risk factors

- ✓ Hep. B & C infection
- ✓ Alcoholic cirrhosis
- ✓ Hemochromatosis....

#### CPs

#### Hx

- ✓ Dull, vague, right upper quadrant pain, sometimes referred to the shoulder
- ✓ Constitutional symptoms of malignancy
- ✓ Yellow discoloration (50%)
- ✓ GI bleeding (10%)
  - esophageal varices (50%)
    - have an extraordinarily poor prognosis, with a median survival measurable in weeks.
  - intraportal thrombus
    - which further increases the portal pressure and makes bleeding varices more difficult to control

**Nb\*** slow growing tumor but majority of patients present at an advanced stage and most are beyond curative treatments

#### P/E

- G/A → chronically sick looking, looks severely malnourished
- HEENT → pale conjunctive, icteric sclera
- LGS → LAP....check Virchow's node
- Abdominal exam.
  - Hepatomegaly → nodular, irregular, hard
    - *Vascular bruit (25%)*
  - Signs of fluid collection

#### NB\*

...Signs of decompensated liver disease

- Typical symptoms include ascites, jaundice (50%), or encephalopathy.

## INVx

- **Imaging**
  - Abdominal u/s
  - CT/MRI
- Lab → AFP > 500 ng/dl
- Metastatic work-up

## Mgt

- Surgical resection but the majority of patients are not eligible because of tumor extent or underlying liver dysfunction
- Other treatment modalities available...
  - Liver transplantation
  - Radiation therapy and stereotactic radiotherapy
  - Systemic chemotherapy and molecularly targeted therapies

## 3) Hydatid cyst

- Parasitic infestation → E. granulosus

### RFs

- Hx of living or visiting an endemic area
- Ingestion of food or water contaminated by the definitive host

### CPs

- CPs depend on
  - the site, size, stage of development,
    - Site → Liver (63%) & lung (25%)
  - whether the cyst is alive or dead, and
  - whether the cyst is infected or not.
- Initially → non-specific... RUQ/ epigastric pain, cough, low-grade fever & sensation of abd. fullness
- Mass/pressure effect → long time
  - liver
    - Symptoms of obstructive jaundice & abd. pain
    - Biliary rupture → Biliary colic, jaundice & urticaria
  - Lung involvement → Chronic cough, dyspnea, pleuritic chest pain & hemoptysis
  - Cerebral involvement → Headache, dizziness & decreased level of consciousness



## INVx

### ➤ Serology

- Determination of specific antigens and immune complexes of the cyst with ELISA

### ➤ Imaging

- Ultrasound and CT → Classic findings include calcified thick walls, often with daughter cysts.
  - Ultrasound defines the internal structure, number, and location of the cysts and the presence of complications.
  - Computed tomography gives more specific information about the location and depth of the cyst within the liver.

### ➤ ERCP

- show communication between the cysts and bile ducts
- Can be used to drain the biliary tree before surgery.

## Mgt

- Most are asymptomatic on presentation, but complications such as
  - pulmonary infection, cholangitis, rupture, and anaphylaxis → give good reason to consider treatment for all.
- Basic principles of treatment are...
  - eradication of the parasite within the cyst
  - protection of the host against spillage of scoleces
  - management of complications
- The Rx may be...
  - Medical
    - Anthelmintics
  - percutaneous aspiration & drainage
  - surgical

## Other DDX

→ Pneumonia, bacterial

→ Empyema (pleuropulmonary)

## **SAMPLE Hx**

*c/c*

*Right upper abdominal pain of 04 months duration*

**HPJ**

*This pt was LRH 04 months back @ which time he started to experience gradual onset constant dull aching type right upper abdominal pain with radiation to the lower back & inter scapular region without known aggravating or relieving factor noticed by the pt. Associated with this he has low grade intermittent fever, loss of appetite & nausea but no vomiting, diarrhea or constipation. In addition he has easily fatigability & significant wt loss abt 8kg for the past 04months. 03 months prior to the re-admission he started to experience tinnitus & light headedness but no blurring of vision. 01 month prior to the re-admission his wife noticed yellowish discoloration of his eyes but no itching sensation, urine or stool color change. For the above complaints he visited a nearby health center in 'Chilga' where he was given #04 drugs; red & yellow circular, white oval & omeprazole, each to be taken 2X/day for 10days. He kept visiting the health center repeatedly but he didn't get relief from his pain. Finally, # 01 month prior to the re-admission he was referred from the LHC to our hospital for better investigation & mgt. After admission to our hospital, aspiration was taken from his right upper abdomen. Then he was discharged with metronidazole to be taken 3X/day, 3@ once for 10 days & he was given appointment for follow-up. But 20 days prior to admission the pt discontinues the medication complaining of no improvement by medical Rx & he went to was a traditional healer & cauterized on both arms & @ the back of his neck.*

- ✓ *He has no hx contact with jaundiced person, blood transfusion or MSP (hepatitis)*
- ✓ *He used to drink local 'areke' up to 50gm/day for > 20 yrs (HCC-RF)*
- ✓ *He has no hx of cough, hemoptysis or bone pain (HCC-metastasis)*
- ✓ *He has hx of palpitation but no dyspnea , orthopnea, PND or lower leg swelling*
- ✓ *He has no hx of abdominal trauma or surgery (inoculation or blunt)*
- ✓ *He has no hx of contact with chronic cougher or previous TB Rx*
- ✓ *No self or family hx of DM, HTN, asthma*
- ✓ *He has been Screened for RVI 3yrs back & found to be non reactive*

*Finally he was admitted to our hospital supported by his families.*

## INVx

See the INVx on the discussion under etiologic wise classification & the DDx.

## Mgt

See the mgt on the discussion under etiologic wise classification & the DDx.

**NB\***the above pt in the sample hx was finally Dxed to have HCC.

# SAMPLE HISTORY ON FRACTURE

## Causes

- Traumatic fracture
  - Motor vehicle accidents (MVA)
  - Gunshot injuries
  - Blast & bomb injuries
  - Assaults
    - stone, knife, sickle, axe, stick
  - Fall down injuries
  - Burn
- Stress fractures
- Pathologic fracture

## Clinical Presentations

### *i) History*

#### Write...

- Mechanism of injury (MOI)
  - ✓ MVA
  - ✓ Gunshot injury
  - ✓ Blast & bomb injury
  - ✓ Stone, knife, sickle, axe or stick assault
  - ✓ Fall down injury...
- Time of injury (duration)
- Injury Site
  - ✓ Write the site...
    - In case of gunshot injury → write the entry & exit point of the bullet
  - ✓ If there is bleeding or pooling of blood @ the scene (estimated)...
- Degree of violence
  - ✓ MVA
    - Speed of the vehicle
    - Crush/not
      - Was there external damage to the vehicle, such as deformation to the front from Head-on collision?
        - It raises suspicion of hip dislocation...

- Pedestrian/passenger
    - If passenger→
      - Pre-crash
        - What was the pre-crash location of the pt?
          - It can tell us the type of #
            - E.g. lateral compression # of the pelvis from a side impact in vehicle collision
        - Was the pt wearing seat belt/not?
      - Post-crash
        - What was the post-crash location?
          - Inside or ejected?
            - If ejected→distance thrown & landing condition...
        - Was the pt crushed by an object?
          - If so, site+weight+duration...
- ✓ Gun shot
  - Distance of shooting
  - Type of gun
- ✓ Fall down
  - Height or depth of fall
  - Landing condition
- ✓ Blast & bomb injury
  - What was the pts distance from the blast?
    - Primary blast injury Vs secondary (from the blast effect→accelerated debris or objects)
- Change in limb function
  - ✓ Is the pt able to use the injured limb/not?
- Concomitant injury
  - ✓ Head injury
    - Hx of Loss of consciousness
    - Abnormal body mov't
  - ✓ Spinal cord injury
    - Urine or fecal incontinence or unable to void
  - ✓ Bladder injury
    - Hematuria, suprapubic pain & difficulty of voiding
- As with all trauma patients, documenting any available history regarding pre-existing medical conditions, medication and drug allergies will be useful...

## ii) Physical Examination

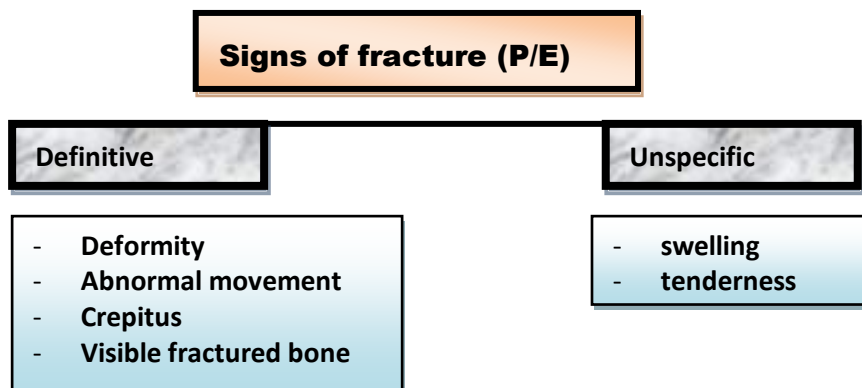
- Before taking Hx & doing P/E in traumatic patient → you should first apply ATLS primary survey ("ABCDE")

Check the "ABCDE" & act accordingly...

- A=airway
- B=breathing
- C=circulation
- D=neurological examination
- E=exposure

- Hx, P/E, INVx & Definitive mgt are part of ATLS secondary survey

*\*See page 242...MSS examination*



## Complications of fracture

1. Delayed union (if > 4month)

2. Non-union (if > 6month)

- Tests of union

i. Clinical

1. Absence of mobility between fragments
2. Absence of tenderness on firm palpation
3. Absence of pain when angulation stress is applied

ii. Radiological

1. Visible callus bridging the fracture & blending with both fragments → early → reliable
2. Continuity of the bone trabeculae across the fracture

**\*Causes of delayed union & non-union**

- Inappropriate immobilization
- Infection
- Bone loss
- Soft tissue interposition

### 3. Mal-union

- Overlapped or
- Angulated

### 4. Shortening

- Significant when >2cms
- Causes
  - i. Malunion
  - ii. Actual bone loss or crushing
  - iii. Interference with growth plate (in children)

### 5. Avascular necrosis

- Death of bone due to deficient blood supply
- Cmn sites
  - i. Head of the femur after femoral neck fracture/hip dislocation
  - ii. Proximal half of Scaphoid bone
  - iii. Body of talus

### 6. Infection

- Virtually confined to open fractures
- (*\*See page 226 on bone infection*)

### 7. Neuro-vascular injuries

- Nerves—e.g.
  - i. Humerus--Radial nerve→wrist drop
  - ii. Knee--Common peroneal nerve→foot drop
  - iii. ...
- Vascular—e.g.
  - i. Shoulder dislocation—axillary artery
  - ii. Supracondylar fracture of humerus/elbow dislocation--Brachial artery
  - iii. Knee dislocation/proximal tibial fracture --Popliteal artery

### 8. Compartment syndrome

- Signs(the 6 Ps)

- |                  |                                       |
|------------------|---------------------------------------|
| 1. Pain          | 5. Paralysis                          |
| 2. Pallor        | 6. Perishingly<br>(extremely)<br>cold |
| 3. Pulselessness |                                       |
| 4. Paresthesia   |                                       |

- Cmn sites

- |              |                   |
|--------------|-------------------|
| i. Lower leg | iv. Hand          |
| ii. Forearm  | v. Gluteal region |
| iii. Foot    | vi. Thigh...      |

## 9. Pulmonary complications...

- E.g. Fat embolism

**NB\***Normal repair of tubular bone has five stages

- Stage of hematoma
- Stage of cellular perforation
- Stage of callus
- Stage of consolidation
- Remodeling

**NB\***generally fracture is classified as Closed or Open based on its communication to its external environment.



## SAMPLE Hx

*e/e*

Bullet injury of 02 hours duration

**HPJ**

This patient was apparently healthy 02hours back @ which time he sustained a **bullet injury** to his **left leg** from about **2 meters distance** by a known offender (his neighbour) on land dispute. The bullet **entered** around his left knee **anteriorly** & **exited** on **lateral side of his left thigh**. Since then he completely failed to use his left leg. He has bleeding, swelling & persistent severe pain from the site of injury.

- ✓ No hx of loss of consciousness
- ✓ No hx of trauma to other sites
- ✓ No hx of tinnitus, vertigo or blurring of vision
- ✓ *No hx of headache, vomiting or abnormal body movement (ask u suspect head injury)*
- ✓ *No hx of urine or fecal incontinence (ask if u suspect spinal injury)*
- ✓ *No hx of lower abdominal pain or reddish discoloration of urine (ask if u suspect bladder trauma)*
- ✓ *No hx of breathlessness or confusion (if u suspect chest injury)*
- ✓ No self/family hx of DM ,HTN or Asthma
- ✓ Not screened for RVI but has no chronic diarrhea, HZA or MSP.

*Finally he was admitted to our hospital carried by his families*

## Investigations

### 1. Imaging

#### A.X-ray

- i. Antero-posterior (AP)
- ii. Lateral

#### Should Answer....

- Traumatic Vs Fatigue Vs pathologic fracture
- Displaced or not
- If displaced, in which direction
- Alignment of the fragments, satisfactory or not
- Recent fracture or not
  - If not → evidences of union may be there
- Associated injury
  - To adjacent joints or bones

#### NB\* Patterns of fracture

1. Transverse
2. Oblique
3. Spiral
4. Comminuted (>2 fragments)
5. Compression (crush)
6. Green stick (peculiar to children) → incomplete fracture

#### ...This patterns may indicate

- Nature of causative violence
  - Important for choosing easiest method of reduction
- The likely stability of fragments after reduction

#### B. CT-scan

#### C. Angiography

#### D. Arthroscopy

### 2. Lab.

#### A. Hct...

## Management

*\*See mgt of fracture on page...221*

# SAMPLE HISTORY ON HEAD INJURY

- Normal intracranial contents are...
  - ✓ Brain tissue
  - ✓ CSF &
  - ✓ Arterial and venous blood
- Monro-kellie doctrine
  - States that the **total volume** of the intracranial contents must remain *constant*.
    - ✓ Why?
      - Because the cranium is a rigid, non-expandible container.
    - ✓ Total volume=Brain tissue +CSF fluid + intravascular blood
      - Venous blood & CSF fluid may be displaced out of the container to provide pressure buffering by keeping the total volume constant.
      - So early after injury the pt may have normal ICP, but once the limit of displacement reached→ICP rapidly increases.
- Classification of head injury
  - *Based on GCS*
    - Mild head injury
      - ✓ GCS=13-15
    - Moderate head injury
      - ✓ GCS=9–12
    - Severe head injury
      - ✓ GCS=3–8
  - *Based on type of injury*
    - ✓ Blunt
    - ✓ Penetrating
      - High velocity→like gunshot injury
      - Low velocity→like stab injury

## Scalp injury

- ❖ Highly vascularized→significant blood loss can occur
- ❖ Mgt
  - Direct pressure initially controls the bleeding, allowing close inspection to the injury
  - Simple laceration→copiously irrigate & close primarily
  - Laceration→short, a single layer→percutaneous suture
  - Laceration→long or has multiple arms →debridement & closure in OR

## Skull fracture

### ➤ *Based on site*

#### ❖ Skull vault fracture

##### ❖ Open Vs Closed

- ✓ Closed # do not normally require specific Rx
- ✓ Open # require repair of the scalp & operative debridement

##### ❖ Linear Vs comminuted

##### ❖ Depressed Vs non-depressed

#### Indications for craniotomy

- ✓ Depression if greater than cranial thickness
  - To elevate the #, repair dural disruption & hemostasis
- ✓ Intracranial hematoma
- ✓ Frontal sinus involvement

#### ❖ Skull base fracture

- ✓ May or may not be associated with CSF rhinorrhoea, otorrhoea or cranial nerve palsy.
  - ✓ CSF leak → elevation of head off the bed for several days may heal it. In addition lumbar drain can augment this method.
    - Lumbar drain = allow the defect to heal by eliminating normal hydrostatic pressure.
  - ✓ Traumatic cranial neuropathy
    - Facial nerve palsy → steroids
      - If no response after 48-72hrs → surgical decompression of the petrous portion of CN-VII may be considered
- ✓ Anosmia (CN-I damage → loss of smell)
- ✓ Battle's sign (bruising over the mastoid process)
- ✓ Raccoon eyes (bilateral periorbital bruising)

## Traumatic brain injury (TBI) – closed head injury

- *Primary brain injury* → occurs @ the time of impact and includes injuries such as ...
  - ❖ brainstem and hemispheric contusions
  - ❖ diffuse axonal injury &
  - ❖ Cortical lacerations
- *Secondary brain injury* → occurs @ some time after the moment of impact and is often preventable. The causes of secondary brain injury include...
  - ❖ hypoxia
  - ❖ hypotension → SBP <90mmHg
  - ❖ raised ICP → ICP >20mmHg
  - ❖ reduced cerebral perfusion pressure
    - cerebral perfusion pressure (CPP) = mean arterial pressure (MAP) – ICP
      - So, CPP will be reduced if low MAP or high ICP
      - In order to maintain the CPP we have to control not only rise in ICP but also decline in MAP (i.e. hypotension)
  - ❖ metabolic disturbances
  - ❖ pyrexia
- **Types of closed head injury**
  - **Concussion**
    - ❖ A temporary neuronal dysfunction following non-penetrating head trauma
    - ❖ CT-Scan = normal
    - ❖ Deficit resolve over minutes to hrs
  - **Contusion**
    - ❖ A bruise in the brain
    - ❖ Mechanism
      - either coup (at the point of impact) or
      - countre-coup (on the other side of the head) or
      - as the brain slides forwards and backwards over the ridged cranial fossa floor
    - ❖ cmnly affected sites
      - frontal, occipital and temporal poles
    - ❖ Edema may develop → mass effect
    - ❖ CT-scan = contused areas appear bright

- Traumatic intracranial hematomas

- ❖ May be...

- Extradural hematoma

- Cmn site→temporal bone--the pterion
  - the thinnest part of the skull + overlies the largest meningeal artery

- Subdural hematoma

- ✓ Acute Vs Chronic

- Acute SDH--Due to disruption of a cortical vessel (venous)→accumulation
- Chronic SDH—collection of blood break down products that is @least 2-3wks old

- Intraparenchymal hemorrhage

- Most often associated with
  - HTNsive hemorrhage
  - AV malformation
- In traumatic one--bleeding may occur from the contused area→mass effect...

### Initial steps in head injury →as in all trauma pts →ATLS

- Primary survey & resuscitation

- “ABCDE” of life

- **D=Disability...**

- pupillary size & reactivity
- GCS
- Presence of focal neurological deficit

...Consider cervical spine injury before 2<sup>o</sup> survey...

- Then...Secondary survey

- Hx, P/E, INVx & Definitive mgt

- *see below for secondary survey components*

# Clinical presentations

## 1) History

- **MOI**
  - ✓ **MVA**
    - *Collisions between vehicles*
    - *Pedestrians stuck by motor vehicle*
    - *Bicycle accidents...*
  - ✓ **Fall down injury**
  - ✓ **gunshot**
  - ✓ **Assaults**
  - ✓ **Sport related injuries...**
- **Hx of LOC**
  - ***Was the patient responding, moving and talking appropriately after the incident? ...GCS @ the scene***
    - NB\***
      - A head injury with LOC but no clear accidental mechanism of injury...you should think of non-accidental causes of collapse, such as...*
        - *Syncope, Aneurysmal subarachnoid haemorrhage, medical conditions (such as hypoglycaemia)*
- **Hx seizure activity at the scene**
- **Hx of forgetfulness for events after the injury or preceding the injury**
  - **Amnesia (may be antegrade or retrograde)**
- **As with all trauma patients, the following should be asked...**
  - **Medical hx**
  - **Medication and drug allergies**
    - *In particular, the use of medications such as anti-coagulants or anti-platelet drugs will be relevant to a patient with an intracranial haematoma.*
- **Hx of prior head injuries**
- **Is there history of alcohol or illicit drug use?**
  - **remote/active**
- **carefully consider past psychiatric disease & pre-morbid hx of headaches**

## 2) Physical examination

➤ G/A

➤ V/S

➤ HEENT

✓ Head

▪ Inspect

- *There may be evidence of external head injury such as subgaleal haematoma or scalp laceration...*

- *Which may be a cause of significant external blood loss*

▪ Palpation of a scalp laceration

- *May reveal an underlying skull fracture with or without a CSF leak*

✓ On HEENT → *Look for clinical evidence of skull base fracture*

▪ Head= Battle's sign

▪ Ear= CSF otorrhea

▪ Eye= Raccoon eyes

▪ Nose=CSF rhinorrhea, haemotympanum or active bleeding

➤ Nervous system examination

✓ GCS

✓ Eyes opening (E)

▪ Spontaneously → 4

▪ To verbal command → 3

▪ To painful stimulus → 2

▪ Do not open → 1

✓ Verbal (V)

▪ Normal oriented conversation → 5

▪ Confused → 4

▪ Inappropriate/words only → 3

▪ Sounds only → 2

▪ No sounds → 1

▪ Intubated patient → T

✓ Motor (M)

▪ Obeys commands → 6

▪ Localises to pain → 5

▪ Withdrawal/flexion → 4

▪ Abnormal flexion (decorticate) → 3

▪ Extension (decerebrate) → 2

▪ No motor response → 1



✓ **MMSE...**

✓ **Cranial nerve examination—focus on...**

- **Pupillary size & reactivity**
  - *Asymmetrical sluggish response → may suggest partial third nerve dysfunction on that side*
    - *implying uncal herniation as a result of a mass on the ipsilateral side of sluggish pupil*
  - *As the third nerve becomes increasingly compromised the ipsilateral pupil will become fixed and dilated.*
- **Anosmia (CN-I)**
  - *Associated with rhinorrhea → this pts are @ risk of ascending meningitis*
- **CN VI palsy**
  - *Raised ICP*
- **CN VII & VIII palsy**
  - *Basal skull fracture*

✓ **A peripheral nerve examination should record...**

- **Muscle tone**
- **Muscle strength**
- **reflexes &**
- **sensory loss**

**Clinical presentation based on the underlying mechanism....**

**Extradural hematoma pts**

✓ **CPs**

- **Typical presentation**
  - *Initially unconscious*
  - *Then awoken & has lucid interval when the patient complains of a headache but is fully alert and orientated with no focal deficit*
  - *After minutes or hrs → a rapid deterioration occurs, with*
    - *contralateral hemiparesis,*
    - *reduced conscious level and*
    - *ipsilateral pupillary dilatation as a result of brain compression and herniation.*

## Subdural hematoma pts

### ➤ *Acute SDH*

- *Due to brain atrophy, elderly & alcoholics are @ high risk*
- ✓ CPs
- *present with an impaired conscious level from the time of injury, but further deterioration can occur as the hematoma expands*

### ➤ *Chronic SDH*

- *usually occur in alcoholics, the elderly and in those pts on anti-coagulant/anti-platelet agents*
- *usually but not always a history of minor head injury in the weeks or months prior to presentation*
- ✓ CPs
- *Headache, seizures, cognitive decline, focal neurological deficits, or coma.*
  - *It is important to exclude hypoxic, metabolic and endocrine disorders in this group of patients*

## Long term complications of head injury

### ➤ neuropsychology

- Post-concussional symptoms include
  - headache, dizziness
  - impaired short-term memory and concentration
  - easy fatigability, emotional disinhibition and depression

### ➤ Seizures

### ➤ Delayed CSF leak

## NB\*\*\*

### 1) Symptoms of raised ICP

- a. Projectile Vomiting
- b. Headache
  - ➔ Classically...a morning headache which may wake the pt from sleep...worsen by coughing / sneezing, bending & progressively worsens over time...
- c. Seizure
- d. Decreased consciousness...

### 2) Signs of raised ICP

- a. Papilledema (swelling of optic disc)
- b. CN VI palsy
- c. Lateralizing signs
- d. Cushing's triad
  - i. BP=increased systolic blood pressure
  - ii. PR=widened pulse pressure, bradycardia, and
  - iii. RR=an abnormal respiratory pattern

## SAMPLE Hx

*c/c*

Axe injury of #10 hrs duration

**HPJ**

This Patient was last relatively healthy #10 hrs back at that time she sustained an **axe attack** to the head & distal forearm by a known offender, her psychiatric brother in law. She was attacked 02 times; one left side of **the head** and the other on the right distal part of **her forearm**. After the injury she immediately **lost her consciousness**. She was found falling on cement floor by her mother immediately after the attack. They took her to local health center where they try to stop the bleeding by wound dressing and referred her to our hospital for better mgt & INVx. 01 hrs prior to admission she gained her consciousness, while she was on the way to our hospital. She was **totally unable to use** her right upper extremity. In addition she experienced 02 episodes of projectile, bilious **vomiting** on her arrival to our hospital & throbbing type of generalized **headache** which worsen during bending. The only thing she remembered about accident was running & trying to escape from the attacker but **no hx of forgetfulness** for events that happened before the accident or those events after she re-gained her consciousness. She **has tinnitus, blurring of vision & light headedness**.

- No hx of failure to use the extremities except the injured one (localizing sign-- ICP)
- No hx of watery or bloody discharge from the ear or nose.(oto/rhinorrhea + bleeding from ear→basal skull fracture)
- She has no hx of urine or fecal incontinence (spinal injury)
- She has no hx of breathlessness, confusion or chest pain (chest injury+peural. effusion)
- No hx of abnormal body mov't
- No hx previous headache of head trauma
- No hx of illicit drug use or alcohol abuse
- No self and family hx of DM, HTN or asthma
- Not screened for RVI but has no hx of chronic diarrhea, MSP or HZA.

*Finally she was admitted to our hospital carried by an ambulance.*

## Investigations

### Imaging studies

- a. Skull x-ray
  - AP & lateral
- b. CT-scan

#### What to look on CT-scan?

##### Extradural hematoma

1. hyperdense (bright) lesion
2. lentiform (lens-shaped or biconvex)
3. well defined border (between the skull and brain)
4. may or may not cross the midline

##### Subdural hematoma

- Acute SDH
  1. Hyperdense (acute blood)
  2. crescent shaped (lunate)
  3. may have less distinct border
  4. doesn't cross midline
- Chronic SDH
  1. Variable appearance
    - a. Acute blood (up to 3dys)--hyperdense
    - b. Subacute blood— isodense relative to brain
    - c. Chronic (>2wks)—hypodense
    - d. Acute-on-chronic SDH

- c. MRI

### Lab. studies

- Na, Mg level
- PT, PTT, platelet count
- RFT

## Mgt

### Mild head injury

- Criteria for discharge
  - ✓ Pt must have GCS=15/15 with no focal neurological deficit
  - ✓ verbal and written head injury advice must be given to the pt and pt's attendant
    - advice to return when the pt experiences persistent or worsening headache despite analgesia, persistent vomiting, drowsiness, visual disturbance such as double or blurred vision, and development of weakness or numbness in the limbs.

### Moderate to severe head injury

- Aim of the mgt
  - To prevent secondary brain injury
- The cervical spine must be immobilized

#### ✓ Cerebral contusions mgt

- admit for observation
  - because these lesions will tend to mature and expand 48–72 hours following injury
  - rarely requires emergent evacuation
  - some pts may require delayed evacuation to reduce mass effect

#### ✓ Extradural (epidural) haematoma mgt

- neurosurgical emergency
- immediate surgical evacuation via craniotomy & hemostasis

#### ✓ Subdural haematoma mgt

- *Acute SDH*
  - Evacuation via craniotomy
    - Indication
      - Thickness >1cm
      - Midline shift >5mm
      - GCS drop > or =2 from the time of injury to hospitalization

➤ *Chronic SDH*

- Indication for drainage
  - Chronic SDH >1cm or
  - Symptomatic pt
- Evacuation via burr hole(s)

✓ Intraparenchymal hemorrhage

- Pts with contusion on the initial CT-scan should be reimaged 24 hrs after the trauma
- Indication for craniotomy
  - Any clot volume >50cm<sup>3</sup>
  - clot volume >20cm<sup>3</sup> with
    - neurologic deterioration (GCS=6-8) &
    - midline shift >5mm or basal cistern compression

Medical mgt of raised ICP

- Position head up 30<sup>0</sup>
- Avoid obstruction of venous drainage from head → check the collar
- Sedation +/- muscle relaxant
- Normocapnia
- Diuretics: furosemide, mannitol
- Seizure control
- Normothermia
- Sodium balance
- Barbiturates

# SAMPLE HISTORY ON ESOPHAGEAL CA.

By-Eyasu Feleke (sms)

## Risk factors

- Hereditary factors
- Cigarette smoking
- Chronic alcohol exposure
  - $\geq 30$  gm/day → for non-smokers and  $\geq 15$  gm/day for smokers
- High BMI especially those with central obesity ( $\geq 25$  kg/m<sup>2</sup>)
- GERD and associated Barrett esophagus
- Diet
  - Drinking scalding hot liquids
  - Vitamin deficiency (e.g. Riboflavin )
  - Certain food staff e.g. betel quid and areca nuts
  - Zink deficiency & low selenium level
- Underlying esophageal diseases like achalasia, caustic stricture
- Infectious conditions
  - HPV infection (serotype 16 & 18)
  - H. pylori infection
- Prior gastrectomy
- Atrophic gastritis
- Tylosis

## NB\*

- SCC accounts for the majority of esophageal ca. followed by adenocarcinoma.
- SCC is cmn in middle 1/3 & adenocarcinoma is cmn in the lower 1/3
- More common in men than women (men: women → 3-4: 1)
- Occurs at the age of 6<sup>th</sup> and 7<sup>th</sup> decade

## Clinical presentations

### 1. History

- Dysphagia
  - most common presentation
  - Initially for solid foods eventually progressing to include liquid food
- Weight loss (2<sup>nd</sup> most common)
- Bleeding (from the tumor)
- Epigastric or retrosternal pain
- Bone pain (with metastasis)
- Hoarseness of voice (with RLN infiltration)
- Respiratory symptoms (due to invasion or aspiration)
  - Persistent cough

### 2. Physical Examination

- Typically, normal examination results unless the cancer has metastasized
- G/A
  - may look chronically sick (with cachexia)
- HEENT
  - signs of anemia and metastasis
  - look for signs of aero-digestive neoplasia (malignancy of the mouth & throat)
- LAP in the lateral cervical or supraclavicular areas (esp. Virchow's nodes)
- Chest finding (in case of metastasis)
- CVS
  - Ejection systolic murmur, gallop ← → high output failure
- Abd. Examination
  - Hepatomegaly (if liver metastasis),
  - signs of fluid collection

## DDx

### 1. Esophageal Stricture

- majority of the strictures result from long-standing gastroesophageal reflux
- Rx usually involves dilation combined with acid-suppressive therapy



## 2. Benign esophageal tumors

- Esophageal leiomyoma (accounts for  $\geq 50\%$ )

## 3. Achalasia

- Is characterized by

- Aperistalsis
- Partial or incomplete relaxation of the LES
- Increased resting tone of the LES

- Pathogenesis

- 1<sup>o</sup> → poorly understood
- 2<sup>o</sup> → chagas disease → trypanosome cruzi → distraction of myoenteric plexuses
- Other causes → DM, polio, sarcoidosis, amyloidosis, malignancy and caustic stricture.

- Clinical feature

- Similar to that of SCC of the esophagus
- Sensation of food sticking in the lower esophagus
- Nocturnal cough
- Retrosternal Chest pain induced by eating

## 4. Gastric cancer

- Most pts with gastric ca are symptomatic and already have advanced incurable disease at the time of presentation

- Clinical features

- Wt. loss and persistent abdominal pain are the most common symptoms at initial diagnosis.
- *Read more on gastric ca @ page 55*

## 5. Esophageal perforation

- Most esophageal perforations are iatrogenic (59 %)

- Causes of non-iatrogenic esophageal perforation is

1. spontaneous rupture 15 % (Most common cause)
2. foreign body ingestion 12 %
3. trauma 9% and
4. malignancy

## SAMPLE Hx

*e/e*

Difficulty of swallowing of 6 months duration

**HPJ**

This patient was LRH six months back @ which time he began to experience difficulty of swallowing initially for solid foods like 'injera' and bread but latter it progressed to liquid foods like juice with non-radiating aching type of retrosternal pain with no known aggravating or relieving factor. Associated with this he also have unquantified weight loss to the extent his trousers became loose but no cough, night sweating, fever, chills or rigors. He also has history of easily fatigability at minimal exertion, tinnitus and light headedness for the past 3 months.

Since 6 years back he had been having retrosternal pain and also epigastric pain for which compliant he visited our hospital and told to have peptic ulcer disease and was given 3 unspecified but different tablets to be taken twice a day for 14 days; but no history of hematemesis.

- ❖ He has hx of chronic alcohol intake of 20gm/day for the past 25 years but no hx of smoking.
- ❖ He has usually eats "Ingera" made of "Teff" with "Shiro wot" and "Key wot", sometimes row meat and occasionally packed refined foods.
- ❖ He has no hx of radiation therapy of the neck or chest.
- ❖ He has no hx of multiple sexual partners (RF→HPV).
- ❖ He has no hx of drug use other than mentioned above.
- ❖ He has no hx of previous surgery.
- ❖ He has no hx of similar illness in the family.
- ❖ He has no hx of bone pain, swelling over chest or the neck, axillae or groin.
- ❖ He has no hx of change in voice or voice fatigue.
- ❖ He has no hx of cough, dyspnea or hemoptysis.
- ❖ He has no hx of vomiting, diarrhea or hematochesia.
- ❖ He has no self or family hx of DM, HTN or Asthma.
- ❖ He was screened for RVI and found to be non-reactive.

*Finally he was admitted to this hospital walking by himself.*

## Investigations

- ❖ **Esophagoscopy**
  - to visualize growth and take biopsy.
- ❖ **Ultrasound**
  - Endoscopic ultrasound is the most sensitive for determining
    - Depth of penetration (T → staging)
    - Presence of enlarged periesophageal lymph nodes (N → staging)
- ❖ **Barium swallow**
  - Very sensitive for detecting strictures and intraluminal mass
  - Detect mucosal irregularities and filling defects
  - Helps to study the distal anatomy in obstructing tumors that are not accessible for endoscopy
  - Does not allow staging or biopsy
- ❖ **Bronchoscopy**
  - To exclude invasion of the trachea or bronchus (for ca. of the upper & middle 1/3 esophagus)
- ❖ **PET scan**
  - Detect occult distant lymph node metastasis & bone spread
- ❖ **Esophageal Monometry**
  - Measures the motility and function of the esophagus and esophageal sphincter.
  - The pressure of the sphincter and contraction waves is recorded.
  
- ❖ **Chest x-ray to**
  - Rule out aspiration pneumonia
  - Mediastinal widening or posterior tracheal indentation
- ❖ **Baseline investigations**
  - CBC, Urinalysis, Serum electrolyte, FBS

## Mgt

Rx plan depends on the following

- Staging : nearby structures involvement, lymph nodes involvement , other organs
- Cancer location within the esophagus
- General health of the patient

### Treatment options

- Endoscopic Mucosal Resection (EMR)
- 

- Surgery:
  - Transhiatal
  - Rt. Thoracotomy (Ivor – Lewis)
  - Lt. thoracotomy
  - Radical – En – Block
- Chemotherapy
  - Cisplatin, 5-FU, Paclitaxel, and Anthracyclines
- Radiotherapy (relieving dysphagia )
- Combined-modality therapy
- Palliative Therapy
- Laser

# APPENDICEAL MASS

By-Elshaday Amare(sms)

## Right iliac fossa mass

DDx

### 1. Parietal swellings → become more prominent on head or leg raising test

#### a. Parietal wall abscess

- Pyogenic that occurs in hematoma or pyaemic abscess in DM pts
- Tender(very), warm surface with fever, chills & rigor

#### b. Desmoids tumor

- Unencapsulated fibroma
- In multiparous(repeated stretching of abd. Wall), abd.wall injury (e.g. laparotomy)
- Firm to hard in consistency
- Rx → no capsule..so, wide excision followed by reconstruction by using mesh

### 2. Intra-abdominal swellings

#### a. From normal structures

##### i. From intestine

#### 1. Appendicular mass

- Tender, soft to firm
- 48-72hrs after appendicitis (*see below for appendicitis*)
- Consists of omentum, terminal ileum, caecum, with pericaecal fat & inflammatory edema
- Rx → conseratively by oshner-sherren's regime. Because attempt to remove the appendix may result in fecal fistula
  - 6-8wks late → appendicectomy

#### 2. Appendicular abscess

- Very tender, firm, fixed
- Fever chills & rigor

#### 3. Ileocaecal TB

- Chronic, non-tender, firm, nodular, may have mobility & slightly higher side (lumbar area)

- Features of TB are present
  - Rx→limited resection followed by ileocolic anastomosis
4. Carcinoma caecum
    - More in females, 40-50yrs
    - Bleeding per rectum, severe anemia
    - Hard, irregular, fixity/restricted mobility
    - Psoas spasm→indicate infiltration
    - Rx→Rt.radical hemicolectomy
  5. Ameboma
    - Tender, soft to firm
  6. Intussusceptions
    - Tender soft to firm
    - *For detailed info read @ page 61*
  7. Actinomycosis
    - Rare, 2-3months after appendicectomy
    - Hard, indurated, tender mass with multiple sinuses
    - Unlike TB→no narrowing of gut lumen & LN enlargement
- ii. From LNs
    1. Acute lymphadenitis
    2. Lymphoma
    3. Secondaries
  - iii. Retroperitoneal structures
    1. Sarcoma
      - Cmn in young
      - Huge, nodular, fixed(to the posterior abd. Wall), edema of legs (IVC obstruction), hydronephrosis (pressure on ureter)
      - Rx→wide excision then radio/chemotherapy
    2. Aneurysm
      - Ileac artery→rare, in older age pts
      - Soft pulsatile, bruit & thrill
    3. Iliopsoas abscess
      - TB of thoracolumbar spine

- Young...back pain referred to abd. Wall
- Spine mov't limited, Gibbus
- Dx→cross fluctuation test
  - Fluctuation present on both sides of inguinal ligament
- 4. Chondrosarcoma of ileac crest
  - Hard, fixed...can't be separated from the bone
- iv. In females
  1. Ovarian cyst
    - Smooth surface, round border, cystic, freely mobile & can be pushed back to pelvis
  2. Fibroid of uterus
    - Firm to hard, nodular
  3. Tovo-ovarian mass
    - Tender, soft to firm, can be bilateral, pelvic infection present

#### b. From abnormal structures

- i. Undescended kidney
  - Lobular mass
- ii. Normal mobile kidney
  - Can be pushed into the loin
- iii. Undescended testis (seminoma)
  - Hard, irregular, fixed, absent testis in scrotum
  - Para-aortic & supraclavicular LAP

### *Note on Acute appendicitis*

- Peak in teens & early 20's

#### Etiology +RFs

- Extremes of age
- Diet
  - Reduced dietary fiber & increase refined CHO intake
- Obstruction by faecalith (calcium +PO4+bacteria+epithelial debris) or strictures
- Obstruction by carcinoma of caecum (middle age & elderly)
- DM
- Pelvic appendix
- Previous abd. Surgery

*Hx*

- Poorly localized colicky abdominal pain
- Pain 1<sup>st</sup> noticed in the peri-umbilical area associated with anorexia, nausea & vomiting
- Then the pain shift to the right iliac fossa
- Cough & sudden mov't exacerbate the pain
- Atypical
  - Predominantly somatic or visceral & poorly localized (elderly)
  - Inflamed appendix in the pelvis never produce pain in abdominal wall instead supra-pubic discomfort & tenesmus with tenderness on DRE.

*P/E*

- Low grade pyrexia
- Localized abdominal tenderness
- Muscle guarding, rebound tenderness
- Limitation of respiratory mov't in lower abdomen
- *McBurney's pt*=point of maximum tenderness
  - 1/3 from ASIS & 2/3 from umbilicus

- Point sign
  - pt is asked to point where pain began & where it moved
- Rovsing's sign
  - deep palpation of Lt iliac fossa → pain in Rt iliac fossa
- Psoas sign
  - pt lie with right hip flexed for pain relief
- Obturator sign
  - hip is flexed & internally rotated → pain in hypogastrium



## Sample case for report (Hx & P/E)

### History

#### ID

Here is Ato Mamo Lakew a 55 years old male married orthodox xtn farmer from koladba admitted to GUH department of surgery ,surgical ward, bed no# 20 on Miazia 20/2009 e.c

#### Previous Admission

None

#### C/C

Difficulty of urination of 06 months duration

#### HPI

This patient was last relatively healthy 06 months back at which time he started to experience difficulty of urination associated with straining to initiate & maintain his urination. In addition he started to experience urgency & frequency of urination with D:N ratio of 10 to 6 which made his bed time difficult. He has also a feeling of incomplete voiding & post micturation dribbling.

1 month back he was totally unable to pass urine after drinking about 1 & ½ Liters of local tella on a social gathering. On the next day he visited our hospital & he was catheterized which enable him to urinate.

10days prior to admission he returned on the appointed date for catheter replacement & his catheter was changed. Currently he presented with total failure to pass urine of 01 day duration after he removed the second catheter because he felt discomfort.

- No hx reddish discoloration of urine, bone pain
- No hx of anorexia, easily fatigability or significant wt loss
- No hx of cigarette smoking, radiation therapy, previous medical Rx
- Has hx of river water contact but can't recall post RWC itching
- No family hx of similar illness
- No hx of fever, chills or rigor
- No hx penile discharge, geital ulcer , or MSP
- No hx of position dependent sudden cessation of urine
- No hx trauma to the pelvis
- No hx chronic cough, contact with a chronic cougher or previous TB Rx
- No self /family hx of DM, HTN or Asthma
- Screened for RVI & found to be NR 06 months back.

Finally he was admitted to our hospital supported by his families.

## Past illnesses

- No hx of childhood illnesses like chicken pox, mumps or small pox. Not vaccinated.
- No hx of previous surgery, trauma, psychiatry problems or drug allergy.

## Review of system (ROS)

### H.E.E.N.T

- **Head:** No hx of headache or head injury
- **Eyes:** No hx of blurring of vision, pain in the eyes, eye itching, or spontaneous lacrimation
- **Ears:**
  - No hx of Earache, deafness, ear discharge, vertigo or tinnitus
- **Nose:**
  - No hx of nasal bleeding or discharge
- **Mouth and throat:**
  - No hx gum bleeding, tooth extraction

### Lymphoglandular system (LGS):

- No hx of swelling in the neck, axilla or groin.
- No hx of heat or cold intolerance.

### Respiratory System (RS):

- No hx of cough, chest pain or fast breathing

### Cardiovascular system (cvs):

- No hx dyspnea, orthonea or PND

### Gastrointestinal system (GIS):

- No hx of diarrhea or constipation

### Genitourinary system (GUS):

- No hx of flank pain, see HPI

### Integumentary system (IGS):

- No hx of skin rash or ulcers

### Muskuloskeletal system (MSS):

- No hx of loss of limb function or joint pain.

### Central nervous system (CNS):

- No forgetfulness, abnormal body mov't or insomnia.

## Personal History

- He was born and raised in koladba, where he lived all his life. He had a healthy childhood and was an active boy who liked helping his father around the farm. There is no school near his village and like his parents, he never went to school. But he is able to read and write numbers.
- He is a farmer and also raises cattle, sheep and goat.
- He usually eats 'injera' made of 'teff & 'shiro' made of 'atter'
- He is currently married and has ten children. All are alive & healthy.
- He occasionally drinks alcohol but no smoking

## Family History

### Father and mother:

- Both his father and mother are dead. His father died around 30 years ago at unknown age by unknown cause while his mother died two years ago at age 86 by natural cause.

### Siblings:

- He has two sisters and four brothers. All are alive & well.

### Family Diseases:

- No family history of DM, hypertension, Asthma, tuberculosis, allergy or sudden deaths.

## Physical Examination

## General Appearance

Acutely sick looking, not in cardiopulmonary stress, looks well nourished, conscious & alert

## Vital signs

BP: 110/70mmHg, right arm, sitting position

PR: 95bpm, Rt radial artery, regular & full volume

RR: 18 breath/min, shallow & regular

T<sup>0</sup>: 36.2<sup>0</sup>c, axillary, @10 AM

Weight: 65kg

Height: 160cms

BMI: 25.4

## H.E.E.N.T

Head: Normal size, shape and hair distribution.No scar or tenderness

Ears: Normal contour of pinna.Clear external ear canal.

Eyes: No periorbital edema, ptosis, exophthalmoses or strabismus.

- Pink conjunctivae, Non icteric sclera

Nose: The nasal septum is central. There is no polyp or active discharge

Mouse and throat: The lips show no fissure or ulceration

- The gums are intact with no ulceration. There are no carious teeth, extraction, dentures or filling.
- Tongue – no atrophied papillae, The buccal mucosa is pink & wet.

## Lymphoglandular system

- There is no significantly enlarged lymph node over the neck ,axilla or groin
- The thyroid gland is not enlarged
- Descended testicles bilaterally

## Respiratory System

### Inspection:

- No peripheral or central cyanosis or clubbing or the finger nails
- Breathing is shallow and regular
- No SC or IC retraction
- No chest wall deformity or surgical scar
- No chest lag

### Palpation:

- Trachea is central
- No subcutaneous emphysema
- No chest wall tenderness
- Tactile fremitus is comparable on both sides
- Chest expansion is symmetrical

### Percussion:

- Resonant all over lung fields

### Auscultation:

- Vesicular breath sound all over the lung field
- No added breath sound (wheezing, crepitations, stridor or pleural friction rub)

## Cardiovascular system

### Arterial:

- All peripherally accessible arteries are palpable
- No thickening of vessels wall
- No radio-femoral delay

### **Venous:**

- JVP is not raised
- No distended neck vein
- Negative Hepato-jugular reflex

### **Precordial examination**

#### **Inspection:**

- No precordial bulging
- Quite precordium
- The apical impulse is not visible

#### **Palpation:**

- No palpable heart sound
- The PMI is at the 5<sup>th</sup> ICS lateral to MCL, localized & tapping.
- There is no parasternal or apical heave. There is no thrill.

#### **Auscultation:**

- S1 & S2 well heard
- No murmur or gallop

## **Abdominal examination**

### **Inspection:**

- The abdomen is flat & symmetrical
- It moves with respiration.
- The flanks are not full
- No distended abdominal vein
- No surgical scar
- The umbilicus is inverted with circular slit
- Hernia sites are free
- No visible pulsation or peristalsis

**Auscultation:**

- Normo-active bowel sound (8/min)
- No bruit over renal artery, abdominal aorta or liver area

**Palpation:**

- ❖ **Superficial palpation:**
  - There is no tenderness
  - No superficially palpable mass
- ❖ **Deep palpation:**
  - No organomegally

**Percussion:**

- No sign of fluid collection (shifting dullness/fluid thrill)
- Total vertical liver span (TVLS) along the right mid-clavicular line = 6cms

**DRE**

---

- **Inspection**
  - No ulceration or visible mass
- **Palpation**
  - Normal anal sphincter tone
  - There is a mass which has smooth surface, regular border, firm consistency, not fixed to rectal mucosa & palpable medial sulcus but the upper border isn't reachable
  - No blood on the examining finger

**Genitourinary System**

- No costo-vertebral angle tenderness (CVAT)
- Kidneys are not bimanually palpable

## Integumentary System

- No palmar or plantar pallor
- No rash, scar or ulcer

## Musculoskeletal System

- No muscle tenderness or spasm.
- No bone deformity or tenderness.
- No stiffness of joints
- No edema.

## Nervous system

### Mental Status:

- GCS
  - 15/15→E4V5M6
    - conscious & alert
- MMSE
  - He knows what day it is, where he is and what his name is.→Orientation
  - He remembers what he ate for breakfast. He also remembers where he used to live→Memory
  - He speaks in moderate voice with no hesitancy or gaps in the flow and rhythm of his words. →Speech

### Cranial Nerve examination:

#### CN-I:

- can smell soap via each nostril.

#### CN-II:

- He can differentiate 2 fingers at about 6 meters. (Visual Acuity)
- He sees wagging of finger approximately 100° from axis of eye. (Visual Fields)
- He differentiates green and red colors. (Color Appreciation)

**CN-III, IV & VI:**

- The eyes can move in all directions. There is no nystagmus or diplopia. The pupils are round, regular in outline and equal in size. They react to light directly and consensually.

**CN-V:**

- He identifies light touch and pin prick over the mandibular, maxillary and ophthalmic areas of the face. He closes his eyes at the touch of the cornea with a cotton swab. Contraction of the temporal and masseter muscles is symmetrical and strong.

**CN-VII:**

- The face is symmetrical at rest and during voluntary movements (smiling, frowning). He can close both eyes equally and forcefully.

**CN-VIII:**

- He can hear rubbing of the fingers on both ears.

**CN-IX & X:**

- The soft palate rises in the midline when saying 'ah!'
- He can swallow his saliva

**CN-XI:**

- The Sternocleidomastoid and trapezius muscles contract on turning the head and on shrugging the shoulder against resistance, respectively.

**CN-XII:**

- The tongue protrudes in the midline and shows no fasciculation or atrophy.

**Motor examination:**

- Muscle bulk:
  - There is no muscle bulk difference between the left and the right side. There is also no spontaneous as well as induced fasciculation.



- Muscle tone and power;

	TONE		POWER	
	Upper	Lower	Upper	Lower
<b>Right</b>	Normo-tonic	Normo-tonic	5	5
<b>Left</b>	Normo-tonic	Normo-tonic	5	5

### Reflexes:

- Superficial reflexes:
  - Abdominal reflex is absent both in upper and lower quadrants.
  - Corneal reflex is intact in both eyes .
  - Plantar reflex is down going on both sides.
- Deep tendon reflexes:

	Biceps	Triceps	Supinator	Patellar	Ankle
Right	++	++	+	++	+
Left	++	++	+	++	+

- Clonus: No clonus

### Coordination:

Finger to nose, heel to shin and rapid alternating movement of the arm were done without any abnormalities.

### Sensory:

- He identifies light touch and pin prick over the extremities and trunk.
- He appreciates the form of a key by means of only touch (Stereognosis)
- He recognizes writings of different numbers on his palm (Graphesthesia)
- He is able to differentiate 2 pin pricks up to 4 mm apart over the finger tips (2 pt discrimination).
- He is able to recognize different movements of the toes with his eyes closed.(Position sense)
- Vibration sense was not assessed due to lack of Tuning Fork.

### Meningeal Sign:

- No neck stiffness.
- Kernig's Sign is negative.
- Brudzinski's Sign is negative



# SHORT CASES



# RESPIRATORY RELATED

## *SHORT CASES*

# CHEST INJURY

By-Elshaday Amare(sms)

- 25% of all injuries
- *Investigations*
  - Radiography is the first choice after resuscitation
  - Ultrasound
  - Chest tube (Dx & Rx)
  - CT with contrast → rib & vertebral #, hematomas, pneumothorax, pulmonary contusion & thoracic aorta.

## Immediate life threatening

### 1. Airway obstruction

- Dentures, teeth, secretion & blood
- Bilateral mandibular #, expanding neck hematomas, laryngeal trauma (thyroid & cricoid #) or tracheal injury
- Mgt → intubation with cervical spine protection

### 2. Tension pneumothorax

- 1-way valve air leak from lung or chest wall → air forced into thoracic cavity without any means to escape → collapse of lung → mediastinal displacement → decreased venous return → compromising opposite lung
- CPs
  - Tachypnea, dyspnea, distended neck veins, tracheal deviation, hyper-resonance & absent breath sound
- Mgt
  - Immediate decompression
    - Large bore needle into the 2<sup>nd</sup> ICS in MCL
    - Chest tube in 5<sup>th</sup> ICS in anterior axillary line

### 3. Pericardial Tamponade

- Similar CPs as tension pneumothorax
- All pts with penetrating chest injury near the heart + shock → cardiac injury unless proven otherwise
- Classically → increased venous pressure, decreased arterial pressure, tachycardia & muffled heart sounds
- Dx → CXR of enlarged heart shadow
  - Echo — fluid in pericardial sac

- Mgt → needle pericardiocentesis → stabilization until definitive mgt
  - But high risk of iatrogenic injury to the heart
    - Definitive mgt → operative (sternotomy or left thoracotomy & repair of the heart)

#### 4. Open pneumothorax (sucking chest wound)

- Large open defect in the chest (>3cm) → equilibrium between intrathoracic & atmospheric pressure → air in hemothorax not lung → hypoventilation
- Mgt → closing defect with sterile occlusive plastic dressing taped on #3 sides to form a #1 way valve (prevents tension pneumothorax) & chesttube inserted in a site remote from injury site.
  - Definitive mgt → formal debridement & closure

#### 5. Massive hemothorax

- Usually from IC vessels or internal mammary artery
- CPs
  - Hemorrhagic shock (flat neck veins), absent breath sounds & dull on percussion
- Mgt → correct the shock (*see page 264 on shock*)
  - Insert IC drain
  - Intubation (in some cases)
  - Thoracotomy → indications
    - Drainage of 1500ml of blood or ongoing hemorrhage of >200ml/hr over 3-4hrs

#### 6. Flail chest

- 3 or more contiguous ribs are #ed in @least 02 locations
- Paradoxical mov't of free floating segment of chest wall
- Mgt → mechanical ventilation until fibrous union of broken ribs occur
  - O<sub>2</sub> administration, adequate analgesia & physiotherapy

### Potentially life threatening injuries

#### 1. Thoracic aortic disruption

- CPs
  - Asymmetry of upper or upper & lower extremity BP
  - Widened pulse pressure
  - Chest wall contusion
- CXR → widened mediastinum

## 2. Tracheobronchial injuries

- Subcutaneous emphysema with respiratory distress
- Dx→bronchoscopy
- Mgt→intubation of unaffected bronchus followed by operative repair

## 3. Blunt myocardial injury

- Suspected when in pts with blunt trauma + EEG abnormality
- Echo→wall motion abnormalities
- @ risk of developing sudden onset dysarrhythmia

## 4. Diaphragmatic injuries

- Any injuries to or below 5<sup>th</sup> ICS
- Herniation of abdominal contents to chest & strangulations
- Most are silent
- Dx→CXR after NGT insertion—herniation of stomach
  - Contrast studies of the upper & lower GI tract
  - CT-scan

## 5. Esophageal injury

- Usually from penetrating trauma
- CPs
  - Odynophagia/ pain on swallowing foods & fluids
  - Subcutaneous/mediastinal emphysema
  - Pl. effusion
  - Unexplained fever within 24hr of injury
- Mgt →operative repair & drainage

## 6. Pulmonary contusion

- Major cause of hypoxemia after blunt trauma
- CPs
  - Natural progression of worsening of hypoxemia for 1<sup>st</sup> 24-48 hrs
- Dx→contrast CT-scan—confirmatory
  - Hemoptysis or blood in endotracheal tube
- Mgt →
  - Mild—O<sub>2</sub> administration, aggressive pulmonary toilet & adequate analgesia
  - Severe—mechanical ventilation

# CHEST TUBE INSERTION (THORACOSTOMY)

## Indications

1. *Pneumothorax*
2. *Hemothorax*
3. *Chylothorax*
4. *Empyema*
5. *For pleurodesis...*

## Relative Contraindications

1. *Bleeding diathesis*
2. *Skin infection over the chest tube insertion site*
3. *Transudative pleural effusion...*
  - ❖ *2<sup>o</sup> to liver failure or CHF*
    - *Because it can resolve with diuretics only*

## Site of insertion

- + **Generally**
  - *@ 5<sup>th</sup> Intercostal Space (ICS) in mid axillary line*
  - *@ 2<sup>nd</sup> ICS in mid clavicular line for small pneumothorax*
- + **Safe triangle**
  - *Anterior border of the latissimus dorsi,*
  - *The posterior border of the pectoralis major and*
  - *The superior border of the fifth rib*

## When to remove?

- + *To minimize the risk of infectious complications, the tube should be removed as soon as it is safe to do so.*
  - **Removal Criteria: Pneumothorax**
    - *When the lung is fully expanded*
    - *No visible air leak is present and air does not accumulate when suction is removed.*
  - **Removal Criteria: Effusion**
    - *When the lung is fully expanded*
    - *Fluid output is less than ~ 200 mL/day.*

## Complications

1. Hemorrhage
2. Organ injury (lung, mediastinum...)
3. Damage to intercostals nerves & vessels
4. Introduction of pleural infection
5. Subcutaneous emphysema (usually @ the site of insertion)
6. Pulmonary edema

Why?...Due to rapid pulmonary expansion (RPE) because of rapid drainage of large volumes of pleural fluid. To minimize the risk it's better to limit initial drainage to 1-1.5 liters

## Procedural note on Chest tube insertion

### Materials

- Sterile sheets, gloves and gown
- Antiseptic solution, swabs
- Local anesthesia(lidocaine)
- Syringe, scalpel blade and suture
- Needle holder, dissecting forceps, scissors
- Chest drainage tube and
- underwater seal drainage bag containing about 200 mL sterile water
- one straight clamp, one curved clamp,
- Dressing and adhesive tape

### Procedure

- Patient lies comfortably in bed with the backrest lifted to about 45 degrees.
- Wash hands and put on sterile gloves and gown.
- Clean the area with an antiseptic solution (savolon, iodine, alcohol) and drape.
- The skin, subcutaneous tissue and the parietal pleura are infiltrated with 3-5mg/kg injection lidocaine without epinephrine.
- A short skin incision is made with a scalpel blade at the level of the upper border of the rib at the selected site.
- Using the curved clamp the intercostal muscles are separated and reached up to the parietal pleura.
- The blunt dissection is completed with the index finger down up to the pleura.
- The chest tube held by a haemostatic forceps is thrashed through the pleura, puncturing it and the tube is inserted into the pleural cavity.
  - Alternatively the tube may be inserted by using a stilette or a trocar to puncture the pleura.
- The tube is clamped with a haemostatic forceps and the closed end is cutoff...the tube is connected to a water seal drainage bag so that the tube inside the bag remains under the level of the water.
- The drain is fixed to the skin by inserting a stitch through the skin but not piercing the drain.
  - Insert a stitch in circular fashion through the skin around the tube and kept untied (Which will be tied after removal of the tube).
- A sterile dressing is applied at the exit of the tube.
- Control chest x-ray should be done after 08hrs of the procedure to check proper insertion

#### **NB\***

**To check functionality of chest tube, see**

- **Continuous bubbling in the bottle**
- **oscillations**



# TRACHEOSTOMY

## Indications

- For mgt of pts who require prolonged artificial ventilation
- Acute upper airway obstruction
  - E.g. an inhaled foreign body, a large pharyngo-laryngeal tumor, or acute pharyngo-laryngeal infections in children
- Bilateral vocal cord paralysis
  - E.g. if RLN is injured during thyroidectomy
- Laryngeal fracture or laryngo-tracheal separation in whom cricothyroidectomy may cause further damage
- To get access for frequent pulmonary suctioning
- After major surgery involving the oral cavity, pharynx, larynx or neck
  - Since there is a potential risk for upper airway obstruction...because of the likely of edema of upper aero-digestive tract.
- For pts with neurologic deficits that impair protective airway reflex
  - to protect them from aspiration

## Strong relative contraindication

- anticipation that the blockage is due to laryngeal carcinoma

## Site

- 2<sup>nd</sup> & 3<sup>rd</sup> tracheal rings

## Complications

- Intra-op
  - hemorrhage
  - injury to paratracheal structures
    - ✓ carotid artery, recurrent laryngeal nerve (RLN)...
- Early
  - Hemorrhage
  - Pneumothorax
  - Pneumo-mediastinum
  - Tube blockage
- Late
  - Local infection
  - Tracheal stenosis
  - Difficulty in decannulation
  - Persistent tracheo-cutaneous fistula

## Procedural note on tracheostomy

### 1) Open tracheostomy

### 2) Percutaneous tracheostomy

## Open Tracheostomy

- Position the unconscious or anesthetized patient supine with the neck extended and the shoulders elevated on a small roll. The awake patient does not tolerate this; therefore, the procedure is performed with the patient in a sitting or semirecumbent position.
- Palpate the landmarks (eg, thyroid notch, sternal notch, cricoid cartilage) and mark them. Plan a 3-cm vertical incision that extends inferiorly from the cricoid cartilage and infiltrate lidocaine with epinephrine.
- Make the vertical incision.
  - Many advocate the horizontal skin incision, which is made along relaxed skin tension lines and gives better cosmetics.
- Subcutaneous fat may be removed with electrocautery to aid in exposure and to prevent later fat necrosis. Dissection proceeds through the platysma until the midline raphe between the strap muscles is identified.
- Palpate the inferior limit of the field to assess the proximity of the innominate artery. Cauterize or ligate aberrant anterior jugular veins and smaller vessels. Midline dissection is essential for hemostasis and avoidance of paratracheal structures.
- The strap muscles are separated and retracted laterally, exposing the pretracheal fascia and the thyroid isthmus. The lateral retraction also serves to stabilize the trachea in the midline.
- Although the thyroid isthmus, which typically lies anteriorly over the first 2-3 tracheal rings, may be retracted out of the field, it must often be divided in some cases.
- When preparations for transfer of circuitry tubes are complete, deflate the endotracheal tube balloon and enter it to the trachea.
- Securing the cricoid with a hook and elevating it superiorly facilitates control of the tracheal entry.
- For a T-shaped tracheal opening, make a 2-cm incision horizontally through the membrane between the second and third or third and fourth tracheal rings.
- For a U- or H-shaped tracheal opening, reflect tracheal flaps inferiorly or both inferiorly and superiorly.
- A permanent stoma can be created with skin flaps developed and sutured to a rectangular tracheal opening. Removal of small anterior portions of the tracheal rings is required.
- After the trachea is entered, suction secretions and blood out of the lumen. Insert previously tested tracheostomy tube.
- After the airway is confirmed intact based on carbon dioxide return and bilateral breath sounds, secure the tracheostomy tube to the skin with 4-0 permanent sutures.
- Attach a tracheostomy collar with the head flexed.
- To avoid the risk of subcutaneous emphysema and subsequent pneumomediastinum, the skin is not closed. Place a sponge soaked with iodine or petrolatum gauze between the skin and the flange for 24 hours.

...ctd

## Percutaneous Tracheostomy

Percutaneous tracheostomy is generally carried out in the intensive care unit on a patient who is intubated and ventilated with continuous monitoring under deep intravenous sedation/analgesia.

- The patient is preoxygenated with 100% oxygen, which is continued during the procedure. A shoulder roll is placed to extend the patient's neck.
- A 1.5- to 2-cm incision is made through the skin of the neck approximately 2 cm below the palpable cricoid cartilage.
  - Blunt horizontal and vertical dissection with a hemostat is used to carry the dissection down to a pretracheal plane, attempting to sweep the thyroid isthmus inferiorly. Finger dissection is used to palpate the cricoid cartilage and tracheal rings.
- A small-caliber, flexible bronchoscope attached to a video camera and monitor is passed via a swivel adaptor down the endotracheal tube, allowing for ventilation around the scope. The bronchoscopist withdraws the endotracheal tube and bronchoscope, after deflating the endotracheal tube cuff, to a subglottic level. Care should be taken not to completely withdraw the tube from the larynx.
- The surgeon can use the light from the bronchoscope and digital palpation to guide passage of the needle from the percutaneous tracheostomy kit through the anterior tracheal wall under direct bronchoscopic visualization.
- Ideally the puncture should be made between the second and third tracheal rings. High placement of the tracheostomy in the immediate subcricoid position is associated with fracture of the cricoid cartilage and subglottic stenosis and should be avoided.
- The wire guide is then inserted, the tract is dilated per the kit instructions, and the tracheostomy tube is inserted over a special introducer that is then withdrawn. The endotracheal tube and bronchoscope are withdrawn from the mouth, and the tracheostomy tube is sutured into position and secured with a tracheostomy tube tie.

# ENDOTRACHEAL INTUBATION

## Indications

- **Airway problems** → inability to maintain a patent airway with potential airway compromise due to...
  - *inhalational injury*
  - *Retropharyngeal hematoma*
  - *facial fractures*
- **Breathing problems** → inability to maintain adequate oxygenation...
  - *by face-mask O<sub>2</sub> supplementation*
  - *presence of apnea*
- **Disability problems** →
  - *Inability to protect airway due to altered mental status (GCS < or = 8)*
  - *Risk of aspiration of blood or vomitus*
  - *Sustained seizure activity*

## Contraindication (relative)

- **Unstable cervical spine injury** → needs care to insert

## How to know the correct placement of the tube?

by...

1. **Audible breath sound (bilaterally)**
2. **Hearing no borborygimi in the epigastrium**
  - *If u hear it during inspiration → suggests esophageal intubation*
3. **CO<sub>2</sub> detector (capnograph or calorimetric CO<sub>2</sub> monitoring device)**
4. **CXR**

## Complications

- **Malposition** → esophagus
- **Vomiting**
- **Bronchospasm**
- **Exacerbation of spinal cord injury**

## Procedural note on endotracheal tube insertion

### Materials

- Laryngoscope (check size – the blade should reach between the lips and larynx – size 3 for most patients), turn on light
- Cuffed endotracheal tube
- Syringe for cuff inflation
- Monitoring: end-tidal CO<sub>2</sub> monitor, pulse oximeter, cardiac monitor, blood pressure
- Tape
- Suction
- Ventilation bag
- Face mask
- Oxygen supply
- Medications in awake patient: hypnotic, analgesia, short-acting muscle relaxant (to aid intubation)

### Laryngoscope insertion technique

- Give medications if required
- Pre-oxygenate patient with high concentration oxygen for 3-5mins
- Position patient
  - Neck flexed to 15°, head extended on neck (i.e. chin anteriorly), no lateral deviation
- Stand behind the head of the patient
- Open mouth and inspect: remove any dentures/debris, suction any secretions
- Holding laryngoscope in left hand, insert it looking down its length
- Passing the tongue
  - Slide down right side of mouth until the tonsils are seen
  - Now move it to the left to push the tongue centrally until the uvula is seen
- Advance over the base of the tongue until the epiglottis is seen

### Tube insertion technique

- Apply traction to the long axis of the laryngoscope handle (this lifts the epiglottis so that the V-shaped glottis can be seen)
- Insert the tube in the groove of the laryngoscope so that the cuff passes the vocal cords
- Remove laryngoscope and inflate the cuff of the tube with 15ml air from a 20ml syringe
- Attach ventilation bag/machine and ventilate (~10 breaths/min) with high concentration oxygen and observe chest expansion and auscultate to confirm correct positioning
- Consider applying CO<sub>2</sub> detector or end-tidal CO<sub>2</sub> monitor to confirm placement
- Secure the endotracheal tube with tape
  - if it takes more than 30 seconds, remove all equipment and ventilate patient with a bag and mask until ready to retry intubation

# GASTRO-INTESTINAL RELATED

## *SHORT CASES*

# ABDOMINAL INJURY

By *Eshetie Endalew (sms)*

- One of the commonest surgical emergency
- Based on post resuscitation physiologic condition → Patient with Abdominal injury can be;
  - a. Hemodynamically normal
  - b. Hemodynamically stable
  - c. Hemodynamically unstable

## Types

- I. Blunt abdominal injury (BAT)
- II. Penetrating abdominal injury

## BAT

- BAT with poly trauma is the commonest cause of death in young population.
- Etiology of BAT;
  - I. Road traffic accident (commonest)
  - II. Fall down injury
  - III. Seat belt syndrome
  - IV. Assault
- Mechanism of BAT injury;
  1. Rapid deceleration
  2. Crushing (compression) effect

## ➤ Approach for BAT patient

- Primary survey (ABCDE) and act accordingly
- Resuscitation by crystalloid solution if hypovolemic or shock
- Secondary survey
  - HX; pain, abdominal distention, fever
  - P/E; Abdominal tenderness, tachycardia, tachypnea
    - Abrasion, contusion, ecchymosis over the abdomen
    - Decrease bowel sound, guarding, febrile (peritonitis)

## • INVESTIGATION

### Baseline;

- CBC
- Cross match
- Organ function test
- Pancreatic enzyme; poor ppv & Npv

*Urinalysis; show renal injury (micro hematuria)*

## Imaging

- Plain x-ray; give limited information
  - Use metal marker for penetrating injury on external wound
- Contrast CT; gold standard for intra-abdominal diagnosis.
  - ✓ Give more accurate information than plain x-ray
  - ✓ Demonstrate vascular & visceral perfusion of solid organ & severity grading.
  - ✓ Sensitive for blood so very important in dx of retroperitoneal injury.
  - ✓ Difficult in dx of hollow viscous injury (sensitive only 29%-35%)
  - ✓ Used for stable patient.
- Focused abdominal sonar for trauma (FAST); U/S evaluation of abdomen to look for intrabdominal blood.
  - ✓ Bedside investigation of choice to detect intrabdominal fluid.
  - ✓ Accurate to detect >10ml of free blood (+ve) but operator & experience dependent.
- Diagnostic laparoscopy
- Diagnostic peritoneal lavage (DPL); used to assess presence of intrabdominal blood.
  - Steps;
    - I. Empty stomach and bladder by gastric tube & catheter respectively.
    - II. Insert cannula below the umbilicus & push posterior caudally
    - III. Aspirate blood, if >10ml, insert 1000ml RL solution to the abdomen & aspirate again
- Interpretation; If RBC >100000/ul & WBC >500/ul it is +ve w/c is equivalent to 20ml of blood. i.e laparotomy is needed.

## Management

- ABC of life
- Resuscitation & look for hemodynamic stability
- For stable patient CT for assessment of injury
- For unstable patient laparotomy.



## LIVER INJURY

- Is the Second common after blunt abdominal trauma.
- The most common after penetrating abdominal injury.
- Occurred in 2.9% of all patients and 39.8% of those with blunt abdominal trauma.
- The mortality associated with these blunt hepatic injuries is 14.9%.

### Mechanisms of blunt hepatic injury

1. Rapid deceleration
  - Tear hepatic tissue, vascular and ligament attachment.
2. Crushing effect
  - Compress b/n force of rib cage and vertebral column.

### On Hx

- ✓ Trauma to the right upper quadrant, right rib cage, or right flank
- ✓ Complain of pain in the right upper abdomen, right chest wall, or the right shoulder due to diaphragmatic irritation.

### On P/E

- Due to hemorrhage
  - Hypotension up to shock
  - Abdominal distention
  - Tachycardia
  - Metabolic acidosis
- Symptom of Peritonitis
- right upper quadrant or generalized abdominal tenderness
- abdominal wall contusion or hematoma (e.g, seat belt sign)
- Right lower chest wall tenderness, contusion, or instability due to rib fracture.

Grade	hematoma(s.a)	laceration(cm)	vascular injury
1	Subcapsular tear (<10%of surface area)	<1cm parenchymal depth	-
2	Sub capsular tear 10_50%	1_3cm depth <10cm length	-
3	Sub capsular tear >50%	>3cmdepth	
4		Parenchymal disruption(25_75% of H.lob)	
5		Parenchymal disruption(>75% of H.lobe)	Juxtahepatic vein injury (Vena cava Major hepatic vein)
6	-		Hepatic avulsion

### Management; depends upon

- ✓ The hemodynamic status of the patient,
- ✓ Grade of liver injury, and
- ✓ Presence of other injuries and medical comorbidities.
- The unstable patient with a positive (fast) scan or (dpa/dpl) requires emergent abdominal exploration and control of bleeding may be through a damage-control approach or by using specific techniques for liver hemostasis.
- stable patient who do not have other indications for abdominal exploration can be observed.
- stable patients with right-sided penetrating thoracoabdominal injuries that lacerate the liver can also be observed, provided there are no associated intraabdominal injuries.

## Splenic injury

- Splenic injuries appear as disruptions in the normal splenic parenchyma, frequently with surrounding hematoma and free intra-abdominal blood.
- The spleen is the most commonly injured abdominal organ in the NTDB, with 3.2% of all injured patients and 50.7% of patients with blunt abdominal trauma.
- A significant mortality of 10.8% is associated with blunt splenic injury, Mainly by associated injuries and pre hospital delays.
- Penetrating splenic trauma is less common but is still present in 14.5% of all penetrating abdominal injuries in the NTDB.
- Spleen is commonly the bleeding intra-abdominal organ in unstable patient undergoing laparotomy.

### Mechanism of blunt splenic injury can include;

- direct compression of the organ in the left upper quadrant of the abdomen
- deceleration mechanism that tears the splenic capsule or parenchyma, mainly at areas fixed or tethered to the retro peritoneum.

### SPLenic INJURY GRADING

- Grade I — Hematoma: 10% of surface area.  
Laceration: <1 cm in depth into the parenchyma
- Grade II — Hematoma: 10 to 50% of surface area.  
Laceration: 1 to 3 cm in depth.
- Grade III — Hematoma: >50% of surface area.  
Laceration: >3 cm in depth or involving a trabecular vessel.
- Grade IV —segmental or hilar vessels laceration & >25 % of spleen is devascularizes.
- Grade V — Hematoma: shattered spleen.  
Laceration: hilar vascular injury which devascularizes spleen.

### EVALUATION;

- ✓ initial resuscitation,
- ✓ diagnostic evaluation and
- ✓ management of the patient based on (ATLS) program

### History

- trauma to the left-upper quadrant, left rib cage, or left flank
- left shoulder pain (ie, Behr's sign) due to irritation of the phrenic nerve.
- medical comorbidities and medical conditions, like coagulopathy
- Associated injuries — to adjacent organs, rib fractures, pelvic fracture, and spinal cord injury.

### On P/E

- left-upper quadrant or generalized abdominal tenderness,
- abdominal wall contusion or hematoma (eg, seat belt sign)
- sign of intrabdominal hemorrhage

### INVX

- FAST — hypo echoic (ie, black) rim of sub capsular or intraperitoneal fluid
- On Contrast CT
  - ✓ Hemi peritoneum
  - ✓ Hypo density
  - ✓ Contrast blush-hyper dense areas within the splenic parenchyma
  - ✓ Active extravasation of contrast -ongoing bleeding
- Plain films,
- organ-based ultrasound imaging and
- MRI

### MANAGEMENT

- ✓ Unstable & positive FAST scan or DPA/DPL requires emergent abdominal exploration
- ✓ Stable & low-grade (I to III) blunt or penetrating splenic injuries, observed safely by contrast CT.
- ✓ Splenectomy may be a safer option, especially in the unstable patient with multiple potential sites of bleeding

## Small Bowel Injuries

The small intestine is one of the most frequently injured organs after penetrating abdominal trauma, due to large percentage of the abdomen it occupies.

- Incidence of small bowel injury involves 60% of penetrating abdominal trauma.
- Blunt, small intestinal injuries are less common, present in 2.7% of all blunt abdominal injuries in the NTDB, but the small bowel is frequently injured as a result of blunt trauma.
- Mortality rates range from 10% to 25%, with most caused by associated vascular injuries.

Penetrating injuries can vary from tiny perforations to large destructive injuries that destroy circumferential segments of small bowel.

Mechanisms of blunt small bowel injury include;

- crushing between the steering wheel or seatbelt and a rigid structure such as the vertebral column,,
- Rupture during which the intraluminal pressure rapidly increases, causing a blowout along the ant mesenteric border.

Deceleration result in a shearing of the serosa or muscularis throughout a segment of small bowel. Mesenteric injuries can cause devascularization of sections of small bowel

- Small intestinal injuries are often identified at the time of laparotomy.
  - The repair of small bowel injuries depends on the extent of intestinal wall destruction in relation to the luminal circumference.
  - ✓ Small perforations that can be closed without compromising the intestinal lumen can be debrided and repaired with one or two layers..
  - ✓ Injuries occupying over 50% of the intestinal wall circumference should be addressed with resection and anastomosis either by stapled or hand sewn anastomoses for intestinal resections. Hand-sewn anastomoses are frequently constructed in two layers
- The damage control approach is important for rapid closure of perforations to control contamination and to control bleeding.

#### Damage control surgery

Is operation done until the physiological derangement can be corrected.

It has two goals:

- stopping any active surgical bleeding;
- Controlling any contamination.

The initial surgical focus is hemorrhage control, which is followed by control and limitation of contamination. This is achieved by;

- ✓ Simple ligation of bleeding vessels,
- ✓ Shunting of major arteries and veins, drainage,
- ✓ Temporary stapling off of bowel, and
- ✓ Therapeutic packing.

The key philosophy of damage control is:

- ✓ to keep the patient alive at any cost
- ✓ Be part of the resuscitation process, in which there is initial surgical control of hemorrhage and contamination followed by rapid closure.

The stages of damage control surgery

- I. Patient selection
- II. Control of hemorrhage and control of contamination
- III. Resuscitation continued in the intensive care unit
- IV. Definitive surgery
- V. Abdominal closure

# NGT (Naso-Gastric Tube)

## Indications

1. Gastric decompression
  - Removal of accumulated gastrointestinal air & fluid to relieve its pressure effect
2. Bowel irrigation
  - To lavage (wash) the stomach in case of poisoning or overdose of medications
3. For feeding
  - To clients unable to eat by mouth or swallow a sufficient diet without aspirating food or fluids into the lungs
4. For administration of medication
  - To clients unable to swallow medications without aspirating it to the lungs
5. To obtain specimen from gastric contents
  - For lab. analysis
6. After bowel surgery
  - To promote healing
7. To administer radiographic contrast media to GIT for imaging

## Contraindications

- Absolute
  1. severe mid-face trauma
  2. Recent nasal surgery
- Relative
  3. coagulation abnormality
  4. Esophageal stricture → fear of perforation
  5. Esophageal varices → fear of bleeding

## How to confirm that the tube is in stomach?

- Aspirate the tube with a syringe → if the aspiration is greenish gray colored fluid → the tube is in the stomach
- Inject about 50mL of air through the tube then listen with a stethoscope over the epigastrium → audible gurgling sound in the epigastrium → the tube is in the stomach
- Listen to the end of the tube @ the nose → the sound of moving air will indicate that → the tube is in trachea, not in the stomach.
- X-ray

## Complications

- Some degree of pt discomfort
  - Placement of the tube can induce gagging or vomiting
- GERD
- Esophageal perforation
- Epistaxis
- Respiratory tree intubation /malposition/

## Procedural note on NGT insertion

### Materials

- Nasogastric tube
  - ✓ Adult → 16-18F
- Glass of water with a straw
- Water-based lubricant
- drainage bag
- adhesive tape
- gloves
- Syringe
- stethoscope

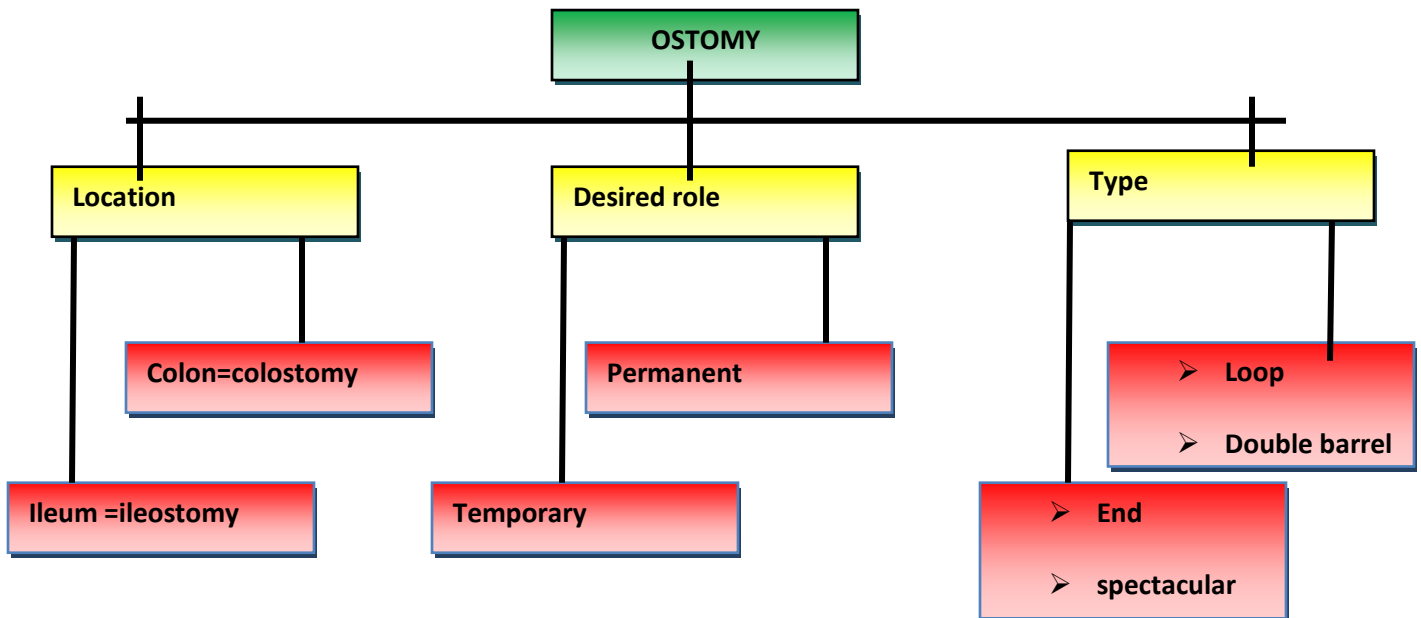
### Procedure

- Explain the patient that a tube is going to be inserted through his nose & that...
  - ✓ He/she has to swallow the tube
  - ✓ There may be some cough during insertion of the tube
- Measure distance from the nostril to the tip of ear lobe then from the earlobe to the tip of xiphoid process → mark
- Lubricate the NG tube (Usually no#16Fr or 14Fr) & choose the nostril which has the wider channel
- Pass the NG tube horizontally through the nose. As the tube touches the posterior pharyngeal wall the patient will gag
  - ✓ Patient may be given a little water to sip. The tube is then slowly advanced as the patient is asked to swallow the tube. During swallowing the cricopharyngeus muscle will relax and the tube will enter into the esophagus.
  - ✓ when the pt breathes → Stop inserting the tube for a moment
  - ✓ don't use force
- The tube is further advanced till the second ring in the tube lies at the level of nostril when the tip will lie in the stomach
- The tube is secured to the nose with an adhesive tape.
- The tube is then connected to a plastic drainage bag to siphon out the stomach contents.
- If required the stomach content may be sucked out hourly.

# OSTOMY

## General indication

- When restoration of intestinal continuity is contraindicated or not feasible



## Indication for temporal "ostomy"

1. Gangrenous LBO
2. Penetrating injuries
  - ✓ Penetrating colon injuries
3. High risk of anastomosis leak
  - ✓ In...
    - Immunocompromised pts
    - Severely malnourished pts
4. Hemodynamic instability
  - In Pts with...
    - ✓ Trauma
    - ✓ Sepsis
5. Complex perianal fistulas

## ***Indication for permanent “ostomy”***

1. After excision of the rectum for carcinoma
2. Total abdominal proctocolectomy for severe IBD
  - CD
  - UC

## ***“Stoma” complications***

- **Early (<3months)**
  - ✓ Leakage
  - ✓ Skin irritation
    - Cmn in ileostomy
  - ✓ Stomal necrosis
  - ✓ Stomal retraction
- **Late**
  - Parastomal hernia
  - Stomal prolapse
  - Stomal stenosis
- **Psychosocial problem**

## ***Colostomy***

- **Colostomy refers to a surgical procedure where a portion of the large intestine is brought through the abdominal wall to carry stool out of the body.**
- **Colostomy bypasses distal colon, rectum or anus.**
- **May be**
  - **Temporary**
    - ✓ To decompress an obstructed or perforated distal colon
    - ✓ To permit healing of fistulous tract or acute inflammatory process distally
    - ✓ For protection of distal anastomosis when delayed healing is anticipated
  - **Permanent**
    - ✓ In case if distal rectum & anorectal sphincter mechanisms are removed

**NB\***

**colostomy diarrhea may be present**



# Ileostomy

- ✓ Ileostomy refers to a surgical procedure where a portion of the small intestine (the ileum) is brought through the abdominal wall to carry stool out of the body.
- ✓ Ileostomy bypasses the entire colon & rectum.
- ✓ May be temporary or permanent

**NB\***

Ileostomy patients are more likely to develop fluid and electrolyte problems ++ skin irritation

## How to differentiate stomas?

1. The content that comes out...
  - ✓ Mucus discharge
    - in colostomy
  - ✓ watery discharge
    - in ileostomy
2. Skin around the stoma...
  - ✓ More skin irritation in ileostomy
  - ✓ Pink in colostomy
3. Odor
  - ✓ Foul smelling in colostomy
4. Size of stoma
  - ✓ Wider in colostomy than ileostomy
5. If u insert ur hand in stomas...
  - ✓ U will be able to differentiate
    - Loop Vs end ostomy
6. ?Site?

# BOWEL PREPARATION

By-Daniel Belhu(sms)

- Aim → To decrease the bacterial load...
  - Which in turn decreases risk of infection & anastomosis leak
- Duration → For #03 days
- Methods used for bowel preparation

## 1) Prepare the bowel using...

i) Mechanical bowel preparation

- ✓ Using cleansing enema
  - water & soap

Or

ii) Pharmacological bowel preparation

- ✓ Laxatives
  - Castor oil (15ml)
  - Polyglycol solution/PEG

## 2) Keep on fluid diet → For #03 days

### 4) Antibiotics

- Which drug to choose? Criteria;
  - Coverage → Broad spectrum
  - Route → PO
  - Poorly absorbable from GI system
- Drug of choice (DOC)
  - Metronidazole & Neomycin
    - If neomycin isn't available we can use others like Ampicillin, Amoxicillin, erythromycin...
- When?
  - If the surgery is scheduled tomorrow morning, the antibiotic should be given today @ 1:00 PM then @ 2:00PM & 11:00PM. (i.e. 7, 8 in the afternoon & 5 O'clock in the night)
  - Antibiotics also should be given 30 minutes prior to surgery
    - Gentamycin was DOC but nowadays Ceftriaxone is being used.

## 4) NPO (nothing per os) → #06 hrs prior to surgery

NB\*

Contraindications for bowel prep.

- Complete bowel obstruction
- perforation

# HERNIA

- Abnormal protrusion of viscus through its containing wall.

## Etiologies

- Any condition that raise intra-abdominal pressure
  - ☞ Chronic cough
  - ☞ Straining on micturation and defecation
  - ☞ ascites
- Abdominal surgery
- Anatomical weaknesses...
  - ☞ Where structures pass through the abdominal wall
  - ☞ Where muscles fail to overlap
  - ☞ Where there is no muscle → only scar tissue
- Congenital → persistent processes vaginalis sac
  - indirect hernia
- Collagen fiber disorder
  - Acquired → smoking

## Composition of hernia

Consist of 3 parts

1. The sac
  - Has mouth, neck, body and fundus
2. Covering of the sac
3. Content of hernia
  - A. Omentum → omentocele
  - B. Intestine → enterocele
  - C. Portion of intestine → richter's hernia
  - D. Bladder
  - E. Ovaries
  - F. fluid
  - G. Meckel's diverticulum → litre's hernia

## Classification

### <<>>Irrespective of the site

- **Reducible**
  - ❖ content can be returned to the abdomen
- **Irreducible**
  - ❖ content cannot be reduced but no complication
- **obstructed**
  - ❖ bowel in the hernia has good blood supply but bowel is obstructed
- **Incarcerated**
  - ❖ The lumen of that portion of the colon occupying a hernial sac is blocked with feces. But the hernia has good blood supply
- **Strangulated**
  - ❖ irreducible + impaired blood supply

### Characteristics of asymptomatic/reducible hernias are

---

- ☞ Swelling or fullness at the hernia site
- ☞ Aching sensation
- ☞ No true pain or tenderness upon examination
- ☞ Enlarges with increasing intra-abdominal pressure and/or standing

### Characteristics of incarcerated hernias are

---

- ☞ Painful enlargement of a previous hernia or defect
- ☞ Irreducible either spontaneously or manually
- ☞ Nausea, vomiting, and symptoms of bowel obstruction(possible)

### Characteristics of strangulated hernias are

---

- ☞ Patients have symptoms of an incarcerated hernia
- ☞ pain and tenderness
- ☞ Systemic toxicity secondary to ischemic bowel is possible

<<>>Depending on the site → in order of decreasing frequency

1. Inguinal
2. Incisional
3. Umbilical and epigastric
4. Femoral

## INGUINAL HERNIA

### Boundary of inguinal canal

---

- ✓ Anteriorly → external oblique aponeurosis
- ✓ Posteriorly → fascia transversalis
- ✓ Superiorly → conjoined muscle of internal oblique and transversalis
- ✓ Inferiorly → inguinal ligament

NB\*

Inferior epigastric vessels lie posteriorly and medially to deep inguinal ring.

### Contents of inguinal canal

---

- ✓ Spermatic cord
- ✓ Ilioinguinal nerve and
- ✓ Genital branch of genitofemoral nerve
  - Round ligament replace the spermatic cord in females

### Hesselbach's triangle

---

- ✓ Lateral boarder of rectus sheath
- ✓ Inguinal ligament
- ✓ inferior epigastric vessels

### *Indirect/oblique inguinal hernia*

- most common form of hernia
- mostly due to Congenital causes → persistent processes vaginalis sac
- young male

### *Direct/acquired inguinal hernia*

- older male
- due to poor lower abdominal musculature (Hesselbach's triangle)

## DDx

### In males

- Vaginal hydrocele
- Encysted hydrocele of the cord
- Spermatocele
- Undescended or ectopic testis
  - empty scrotum on affected side
- Lipoma of cord
- Femoral hernia

### In females

- Hydrocele of the canal of nuck (females)
- Femoral hernia

## FEMORAL HERNIA

- common in multiparous women

## DDx

- Inguinal hernia → medial & above to inguinal ligament
  - femoral hernia → lateral & below to inguinal ligament
- Saphenavarix
  - fluid thrill may present
- An enlarged femoral lymph node
- Lipoma
- Femoral aneurysm
- Psoas abscess
- Distended psoas bursa
- Rupture of the adductor longus with hematoma formation

## INCISIONAL HERNIA

### Risk factor

-Obesity

-DM

-Ascites

-Steroid

-Smoking

- Wound infection

# Physical examination of hernia

## Inspection → on standing position

- Shape of the swelling
- location of the swelling
- unilateral or bilateral
- overlying skin
- see for expansile cough impulse
  - Ⓢ Hernia with no expansile impulse
    - omentocele with adhesion
    - obstructed hernia
    - strangulated hernia
- see position of penis

## Palpation →

- temperature
- Tenderness
- Consistency
  - ✓ Soft and elastic → enterocele
  - ✓ Firm and doughy → omentocele
  - ✓ Tense and tender → strangulation
  - ✓ Bag of warm → varicocele
- Reducibility
  - ✓ Direct inguinal hernia reduce by itself on lie down
  - ✓ Indirect inguinal hernia manually reduce
  - ✓ Enterocele → the first part difficult to reduce but the last reduce easily
  - ✓ Omentocele → the first part reduce easily but the last reduce with difficulty due to adhesion
  - ✓ Not reduce → strangulated
- Invagination of scrotal skin by index finger to examine
  - ✓ Size of superficial inguinal ring
  - ✓ Direction of the hernia sac
  - ✓ Direction of expansile impulse
  - ✓ Not performed in children
- Do Internal ring occlusion test
- Examine normal side
- Examine abdomen → for any surgical scar

Watch video on how to examine hernia @

<https://www.youtube.com/watch?v=JR27rKrhvKE>

# Hemorrhoids, anal fissure & fistula in ano

## Hemorrhoids

Hemorrhoids are pathologically swollen blood vessels in the lower rectum.

### Classification

- |                          |                 |
|--------------------------|-----------------|
| I. Internal hemorrhoids  | By dentate line |
| II. External hemorrhoids |                 |

### Risk Factors

- Constipation & Straining
- Pregnancy
  - Postpartum hemorrhoids from straining during labor
- Low fiber diet
- Age (elderly)
- Family hx
- Chronic diarrhea
- prolonged toilet sitting
- Colon malignancy
- IBD
- Heavy weight lifting

### Clinical Presentations

#### i) Hx

- Rectal...
  - Bleeding
    - Usually bright red
    - If it's darker or blood mixed with stool → better to suspect a more proximal cause of bleeding
  - Pain
    - External Vs internal
    - External → painful → because of somatic innervation
  - Pruritis
  - Prolapse
    - Ask if reducible (by itself or manually) or not
- Change in bowel habit
- Ask pt's immune status...



## ú) P/E

- Inspection of the rectum
  - Skin tags → Redundant tissue from old thrombosed external hemorrhoids
  - Fissure
  - Fistula
  - Signs of infection or abscess formation
  - Rectal /hemorrhoidal prolapse
- DRE
  - Indurated/ulcerated area
  - Masses, tenderness, mucoid discharge or blood
  - Rectal tone
  - Palpate the prostate in all men

## Grading of internal hemorrhoids

- I. Projection into the anal canal + often bleed + no prolapse
- II. Protrusion beyond anal verge with defecation + spontaneous reduction
- III. Protrusion + manual reduction
- IV. Chronic protrusion + not reducible
  - This pts are @ risk of strangulation

## DDx

- Condyloma acuminata
- Anal fissure
- Anal fistula
- Anal abscess
- Proctitis
- Rectal prolapse
- Colorectal ca

## HPI

- This pt was LRH 02 weeks back @ which time he started to experience bright red bleeding per rectum at the end of defecation. In addition he has manually reducible, painless per rectal swelling...

## Investigations

- Lab
  - CBC
    - Infection, anemia

➤ **Anoscopy & flexible sigmoidoscopy**

**Mgt**

1. **Conservative Rx**
  - a. Give stool softener
  - b. Advice on
    - i. high fiber diet
    - ii. increasing fluid intake
    - iii. Avoidance of straining
    - iv. Good hygiene
2. **Non-surgical**
  - a. Rubber band ligation
  - b. Infrared photo-coagulation
  - c. Sclerotherapy
3. **Surgical**
  - a. Excision of thrombosed external hemorrhoids
  - b. Operative hemorrhoidectomy

**Complications of hemorrhoidectomy**

- Post-op pain
- bleeding
- Urinary retention
- Infection
- Transient incontinence
- Anal stenosis

# Anal fissure

- Anal fissure is a tear in the anoderm distal to the dentate line.
  - ✓ Acute if <6wks
- Tend to occur in younger & middle aged persons

## Risk Factors

- Trauma
  - From passage of hard stool or
  - Chronic diarrhea
- Low fiber diet
- Prior anal surgery

## Clinical Presentations

- Severe pain during bowel mov't...
  - Afraid of bowel mov'ts→constipation(hard stool)→more anal pain
  - Burning, tearing or cutting type of pain
- Bright red blood (hematochezia) on the toilet or stool (few drops)
- Spasm of the anus
- Fissures can often be seen in the anoderm
- Cmn site→posterior mid line
  - Off the midline ...raise the possibility of
    - CD(IBDs), AIDs, Syphilis, TB, leukemia
- Pts are always too tender to tolerate DRE

## Mgt

### 1) Conservative Rx→to minimize anal trauma

- Bulk agents
- Stool softeners
- Warm sitz baths
- Analgesic creams

### 2) Surgical Rx→for chronic fissures that failed medical therapy

- Lateral sphincterotomy
  - To decrease spasm of internal sphincter by dividing a portion of the muscle

# Fistula in ano

Fistula in ano is an abnormal tract or cavity with an external opening in the perianal area by identifiable internal opening.

## Risk Factors

- ✓ Previous anorectal abscess
- ✓ Cryptoglandular infection
  - Infection → abscess → fistula
- ✓ Trauma
- ✓ CD ( Crohn's disease)
- ✓ Anal fissures
- ✓ Anal carcinoma
- ✓ Radiation therapy for prostatic ca.
- ✓ Actinomycosis
- ✓ TB
- ✓ LGV

## Parks classification

- I. Inter-sphincteric
    - ✓ 70%
  - II. Trans-
  - III. Sub-
  - IV. Extra-
- } sphincteric

## Clinical Presentations

### i) Hx

- ✓ Perianal discharge
- ✓ Pain
- ✓ Swelling
- ✓ Bleeding
- ✓ Diarrhea
- ✓ Skin excoriation

### ii) P/E

Look for

- ✓ an external opening
- ✓ Spontaneous discharge

DRE/digital rectal examination/

- ✓ Fibrous/chord like tract beneath the skin
- ✓ Abscess if not yet drained
- ✓ Indurations

## Mgt

- ✓ Drainage
- ✓ Eradicating the fistulous tract

# GENITO-URINARY RELATED

## *SHORT CASES*

# URETHRAL CATHETERIZATION

## Indications

### ➤ Therapeutic

- ✓ Acute Urinary Retention(AUR)
  - Due to BPH or
  - Blood clots
- ✓ For initiation of continuous bladder irrigation
- ✓ Chronic urinary retention that causes hydronephrosis
- ✓ Hygienic care for bedridden pts with incontinence
- ✓ To Instill medication

### ➤ Diagnostic

- For collection of uncontaminated urine specimen
- To monitor urine output
- Imaging of the urinary tract

## Contraindications

- In presence of traumatic injury to lower urinary tract
  - E.g. Urethral tear
    - This condition must be suspected in patients with a pelvic or straddle-type injury.
- Relative contraindication
  - Urethral stricture
  - Recent urethral or bladder surgery

## Complications

- UTI
- Urethral stricture
- Urethral perforation
- bleeding
- Paraphimosis
- Non deflating retention balloon
- Chronic catheterization may lead to...
  - Bladder calculi formation
  - Bladder ca.

## Procedural notes on urethral catheterization

### Types of catheter

- 1) condom catheter
- 2) straight catheter(1 way)
- 3) Indwelling catheter(2 way)  
E.g. Foley catheter
- 4) suprapubic catheter
- 5) #3 way catheter  
\*for continuous bladder irrigation

### Materials

- ✓ Sterile gloves, sterile dressing, sterile draping sheet
- ✓ Foley's catheter, urobag
- ✓ lubricant,antiseptic soln.
- ✓ syringe, distilled water
- ✓ lidocaine

### Procedure

- ✓ Explain to the patient that a catheter is going to be introduced through his urethral orifice.
  - Reassure that it will be a painless procedure.
- ✓ Scrub and put-on sterile gloves
- ✓ Position → supine with legs apart (frog leg position with knees flexed)
- ✓ clean the genitalia with antiseptic solution and drape the area
- ✓ The uncircumcised foreskin is retracted, and the glans penis and the corona exposed
  - The glans penis is cleaned with antiseptic solution
- ✓ Using a syringe with no needle, instill 5-10 mL of lidocaine gel 2% into the urethra. Place a finger on the meatus to help prevent spillage of the anesthetic lubricant. Allow 2-3 minutes before proceeding with the urethral catheterization
- ✓ The penis is held vertically upwards to straighten the penile urethra
  - by encircling a sterile gauge around the penis
- ✓ The lubricated Foley's catheter is then pushed gently through the external urethral meatus and gradually advanced till it reaches the bladder
  - **urine will be seen coming through the catheter**
- ✓ The catheter is advanced a little further
- ✓ About 15–20 mL of water is introduced through the side channel of the catheter to inflate the balloon
- ✓ After the balloon is inflated the catheter is gently pulled outward to confirm that the balloon is properly inflated
- ✓ The catheter is then connected to urobag.
- ✓ The preputial skin is brought back over the glans penis to prevent development of paraphimosis
- ✓ In case of chronic retention the bladder should be emptied slowly.

### What may be the cause of failure to insert a catheter?

- catheter may be too large
- Stricture of urethra
- Prostatic enlargement
- Bladder neck stricture
- tight phimosis
- Meatal stenosis.

# Suprapubic cystostomy

## Indications

### 1. AUR

- When urethral catheter cannot be passed 2<sup>o</sup> to
  - ✓ Urethral stricture
  - ✓ Bladder neck contractures...

### 2. Urethral trauma

- Have high index of Suspicion in
  - ❖ Pelvic fracture
  - ❖ Saddle-type injuries

#### Triad (CFs)

1. Blood @ urethral meatus
2. Inability to urinate &
3. Palpably distended bladder

### 3. Mgt of complicated lower genito-urinary tract infection

- E.g. acute bacterial prostatitis

### 4. Requirement for long term urinary diversion

- E.g. neurogenic bladder<<>>unable to void

## Contraindications

### 1. Absolute

- a. If the bladder is not distended
- b. Hx of bladder ca.

### 2. Relative

- a. Coagulopathy
- b. Previous lower abdominal or pelvic surgery
- c. Pelvic cancer

## Complications

- Inadvertent urethral catheterization
- Intraperitoneal & or extraperitoneal extravasation
- Obstruction of tubing (by blood, mucous, or kinking)
- Immediate complications include gross hematuria (which is usually transient)
- Serious complications of the procedure include bowel perforation and other intra-abdominal visceral organ injuries
- Possible complications from long-term catheter use include; recurrent symptomatic UTI, bladder and renal calculi formation, deterioration of renal function, and increased risk of bladder cancer.
- Suprapubic catheter use may be additionally complicated by exit site infections or leakage.



## Procedural note on suprapubic cystostomy

### Percutaneous Suprapubic Cystostomy

#### Initial steps

- ✓ Clean the abdominal wall. Shave the suprapubic operative field with clippers. Prepare the site with an antiseptic
- ✓ Create a surgical field with 4 sterile towels, ensuring that the pubic symphysis can be visualized and palpated.
- ✓ Remove the introducer and catheter from the packaging, using aseptic technique, and place in the sterile field.
- ✓ Ensure that the patient has a full and palpable bladder to confirm urine return. Palpate the distended bladder, and use a marking pen to note the site of percutaneous catheter placement,
  - 2 finger breadth above the pubic symphysis in the midline
  - avoid placing the catheter in natural skin creases
- ✓ Fill a 10-mL Luer-Lok syringe with 5 mL of 1% lidocaine and 5 mL of 0.25% bupivacaine.
  - Attach the syringe to a 22-gauge, 7.75-cm spinal needle.
- ✓ Raise a skin wheal at the marked site, and infiltrate the anesthetic into the subcutaneous tissue and rectus abdominis muscle fascia, aiming the needle at a 10-20° angle toward the pelvis.
- ✓ Advance the needle in this direction, while aspirating the syringe; urine should be easily aspirated when the bladder is entered.
- ✓ After this point, placement techniques depend on the type of the catheter set...
  - 1) *Cystostomy with Peel-Away Sheath suprapubic catheter set*
  - 2) *Cystostomy With Rutner Suprapubic Catheter Set.....*

#### 1) *Cystostomy with Peel-Away Sheath suprapubic catheter set*

- Once needle entry into the bladder has been confirmed by aspiration of urine
- Remove the Luer-Lok syringe from the spinal needle, and advance a guide wire through the needle into the bladder.
- While holding the wire securely (this is now the route of access to the bladder), carefully remove the needle over the wire, leaving the wire in place.
- Directly posterior to the wire, use a scalpel with a No#11 blade to make a stab incision through the skin and subcutaneous tissue.
- Pass the Peel-Away Sheath and the indwelling fascial dilator together over the wire and into the bladder.
- Remove the guide wire and the fascial dilator, leaving only the Peel-Away Sheath inside the bladder.
- Pass a Foley catheter (of appropriate size) through the indwelling intravesical sheath and into the bladder.
- Aspirate urine to confirm proper placement.
- Inflate the Foley balloon with 10 mL of sterile water, using a Luer-Lok syringe.
- Gently withdraw the Peel-Away Sheath from the bladder and anterior abdominal wall; using each side of the Peel-Away Sheath, split the sheath into 2 parts, leaving the catheter in place.
- Connect the indwelling suprapubic Foley catheter to a drainage bag.
- secure the catheter to the skin of the anterior abdominal wall. & Place 2 drain gauze pads (4 × 4 in) at the cystostomy site.

# Scrotal swelling

## DDX for scrotal swelling

1. Hernia (*see hernia @ page195*)
2. Hydrocele
  - Fluid collection in the tunica vaginalis of the scrotum or along the spermatic cord.
  - ✓ May be vaginal or infantile hydrocele
3. Hematoma
4. Epididymal cyst
  - Cystic degeneration of the epididymis filled with crystal clear fluid.
5. Testicular torsion (*see below...*)
6. Epididymo-orchitis (*see below...*)
7. Testicular tumor
  - Seminoma=carcinoma of the seminiferous tubules
  - Non-seminoma=malignant germ cell tumor
8. Varicocele
  - is a result of dilation of veins that drain into the internal spermatic veins
  - the left side→most commonly affected
  - Examination of a man with varicocele when he is upright reveals a mass of dilated, tortuous veins lying posterior to and above the testis. It may extend up to the external inguinal ring, and the Valsalva maneuver can increase the degree of dilation
9. Syphilitic gumma

## How to differentiate?

Answer the following during your Physical Examination...

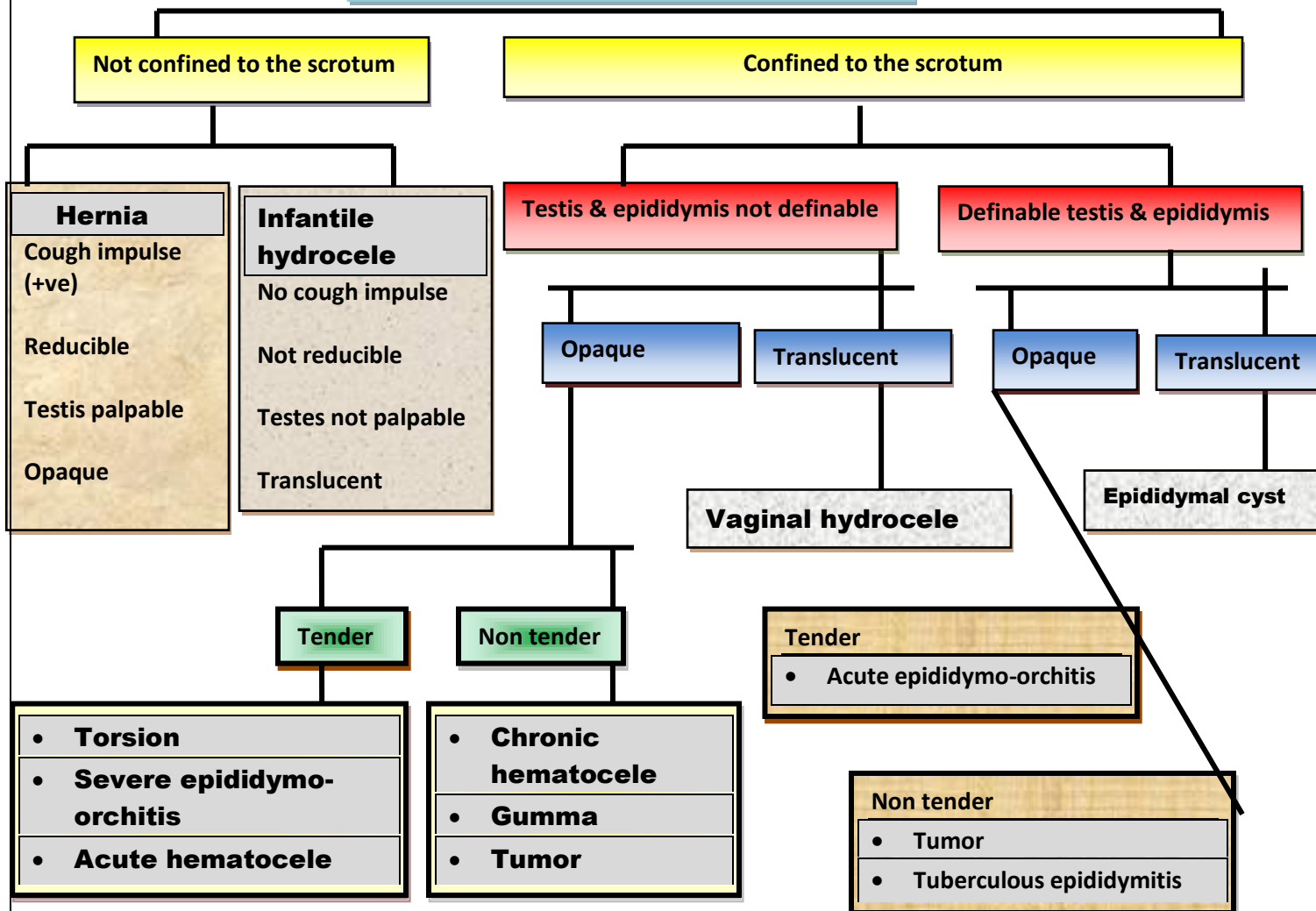
1. Can you get above the swelling?
2. Can you identify the testis & epididymis?
3. Is the swelling translucent?
4. Is the swelling tender?

Watch video on how to examine scrotal swelling @

<https://www.youtube.com/watch?v=CCpxEePuc24>

Then use the algorithm below...

# Scrotal swelling



## Possible investigations to rule out the DDx

### Lab.studies

- CBC → leukocytosis -- In case of epididymo-orchitis/strangulated hernia...
- Serum a-fp , HCG → Testicular tumor
- Urinalysis & culture → Epididymo-orchitis...

### Imaging

- Ultrasound → Testicular tumor...
- Doppler u/s → Torsion/ epididymo-orchitis...
- Plain abdominal X-ray
  - Acute hydrocele Vs incarcerated hernia → Gas overlying the groin

## **Testicular torsion**

- Testicular torsion refers to the twisting of the spermatic cord structures resulting in subsequent loss of blood supply to the epididymis & the testis.
- a urologic emergency that requires rapid diagnosis and intervention in order to maintain viability of the testicle

### **RFs for torsion**

- Undescended testis
- Testicular tumor
- “bell clapper deformity”
  - High investment of the tunica vaginalis causes the testis to hang within the tunica vaginalis like a clapper in a bell
- Precipitants
  - Straining on stool
  - Lifting of a heavy wt
  - coitus

### **CPs**

- History
  - Sudden onset of testicular pain
    - at a distinct point in time
  - Subsequent swelling
  - The patient feels nauseated & may vomit
- Physical examination
  - Inspection
    - Swollen, asymmetric scrotum
  - Palpation
    - Tender, firm testicle
    - high riding testicle
    - may have horizontal lie of testicle
    - The posteriorly positioned epididymis may be positioned differently
    - No pain relief with elevation of the testicle → makes it worse
    - The spermatic cord may appear thickened
    - cremasteric reflex → lost

## • Investigation

- Doppler ultrasound
  - What to look?
    - Decreased intra-testicular blood flow relative to the contra-lateral testis
  - Other advantages
    - Can rule out an associated testicular tumor
- NB\*Diagnostic testing should not delay treatment

## • Mgt

- Immediate surgical exploration
  - Early diagnosis and treatment are vital to saving the testicle and preserving future fertility.
  - The rate of testicular viability decreases significantly after 6 hours from onset of symptoms
    - Immediate surgical exploration (<6hrs after the onset of symptoms) can salvage an ischemic testis in >80% of pts
    - if 12 hrs lapsed the rate decreases to 20%
- During surgical exploration
  - Detorsion
    - the testicle is rotated to its normal position to restore blood flow to the testicle.
    - Assess for viability after being given time for normal blood flow to resume
      - Intra-op blood flow ass't
        - Doppler u/s or
        - Incising the tunica vaginalis & examining for blood
  - If viable
    - orchiopexy of the affected and the contralateral testicle is completed.
  - If the affected testicle is nonviable
    - orchiectomy of the affected testicle
      - To avoid later risk of abscess formation if the testis is clearly necrotic
    - orchiopexy of the contralateral side
      - Fixed to dartos fascia
  - Why the contralateral normal testis also explored?
    - because of the possibility that the same anatomic defect allowing torsion exists on the contra-lateral side

## Epididymo-orchitis

- Inflammation confined to the epididymis is epididymitis...
- Infection spreading to the testis is epididymo-orchitis.

### Causes

- Is typically result of bacterial infection originating in the urinary tract
- Generally epididymitis arises
  - ❖ In sexually active young men from a genital infection
    - ✓ Common causative agent of epididymitis → chlamydia trachomatis
  - ❖ Older male → from urinary infection (as in case of BOO) or May be secondary to urethral catheterization

### CPs

- History
  - ❖ Unilateral scrotal pain
    - ✓ The onset is fairly rapid, but not as sudden as testicular torsion
  - ❖ swelling of the epididymis & or testis
  - ❖ Often with fever
  - ❖ May have initial symptoms of urinary or genital infection
- Physical examination
  - ❖ The scrotum wall become red, edematous & shiny
  - ❖ May become adherent to the epididymis
  - ❖ Elevation of the testis reduces the pain

### Investigations

- ❖ CBC
  - ✓ WBC count is often raised
- ❖ Ultrasound
  - ✓ May provide supporting evidence
    - Such as increased blood flow to the epididymis
    - A reactive hydrocele may be present
    - Reduced testicular blood flow → In case of ischemic orchitis 2<sup>o</sup> to intratesticular infection
- ❖ U/A → pyuria
  - ✓ Will usually show leukocytosis
- ❖ In young pts urethral swabs → chlamydial testing

## Mgt

- **Antibiotics**
  - ✓ **Route-PO**
    - If the pt is not markedly febrile & is otherwise stable
  - ✓ **Route-Parenteral**→hospitalization
    - If high fever or significantly elevated WBC or if hemodynamically unstable
  - ❖ **Initial DOC in young pts**
    - Doxycycline (100-200mg daily) or
    - Quinolone
  - ✓ **Contact tracing** →Rx if necessary
  - ❖ **Initial DOC in older pts**
    - ✓ Quinolone
    - ✓ If evidence of systemic sepsis
      - IV antibiotics directed @ urinary pathogens
  - ❖ **Duration**
    - ✓ It should continue for at least 02 wks or until the inflammation has subsided
- **Other measures**
  - ❖ All pts should drink plenty of fluid
  - ❖ Local measures include;
    - ✓ Scrotal support
    - ✓ Analgesia
- **Surgery**
  - ❖ **Drainage**
    - ✓ If suppuration occurs

# Hypospadiā, epispadiā & bladder atrophy

By-Bruh Alem(sms)

## Hypospadias

→ is the most common congenital abnormality of the urethra in males in which it opens abnormally on the ventral surface of the penis (one in 200–300 male live births).

There are 3 characteristic features

- external meatus opens on the underside of the penis or the perineum,
- ventral aspect of the prepuce is poorly developed ('hooded prepuce') and
- ventral deformity of the erect penis (chordae).

## Classification

- ✓ **Glandular hypospadias**
  - placed on the glans penis, but proximal to the normal site of the external meatus (blind pit).
- ✓ **Coronal hypospadias**
  - placed at the junction of the underside of the glans and the body of the penis.
- ✓ **Penile and penoscrotal hypospadias**
  - on the underside of the penile shaft.
- ✓ **Perineal hypospadias**
  - bifid scrotum, urethra opens between its two halves with testicular maldescent, rarest and most severe

## Features

- ✓ **Absence of urethra and corpus spongiosum distal to abnormal urethral orifice.**
- ✓ **Bowing or bending of penis distal to abnormal urethral opening (*chordee*), with poorly developed prepuce over inferior aspect.**
- ✓ **Urine soakage over the scrotum with dermatitis and infection.**
- ✓ **Associated congenital anomalies are known to exist.**

## Treatment

- ✓ **Does not cause either obstruction or urinary tract infection. Surgery is indicated to improve sexual function, to correct problems with the urinary stream and for cosmetic reasons.**



## Epispadias

→ Urethral opening is on the dorsum of the penis and is associated with an upward curvature of the penis. Epispadias are very rare but often coexists with bladder exstrophy and other severe developmental defects. Most common site is at the abdominopenile junction.

### Treatment

- ✓ Correction of incontinence of urethra
- ✓ Urinary diversion.

## Bladder exstrophy

→ Incomplete development of the infraumbilical part of the anterior abdominal wall and anterior wall of the bladder. Associated with the spina bifida and other anomalies. 1:50 000 births (m:f-4:1)

### Features

- ✓ penis is broad and short ± bilateral inguinal hernia.
- ✓ Red mucus membrane of posterior bladder wall protrudes out
- ✓ with visible urine efflux from ureteric orifice.
- ✓ Umbilicus absent with separation of the pubic bones.
- ✓ females, defective external genitalia

### Problems

- ✓ Repeated soakage,
- ✓ Ulceration,
- ✓ Pain,
- ✓ Recurrent pyelonephritis,
- ✓ Renal failure (50% of pt die)

### Long-term complications

- ✓ stricture at the site of anastomosis,
- ✓ hyperchloremic acidosis,
- ✓ adenoma and adenocarcinoma at the site of a ureterocolic anastomosis(20-fold)

### Treatment

- ✓ bladder is closed in the 1<sup>st</sup> yr of life, osteotomy of both iliac bones, reconstruction of the bladder neck and sphincters.
- ✓ urinary diversion ( ureterosigmoid anastomosis, ileal or colonic conduit, continent urinary diversion)

# MUSCULO-SKELETAL RELATED

## *SHORT CASES*

# AMPUTATION

## Indications

1. PVD/peripheral vascular disease/
  - DM accounts around 50%
2. Trauma
  - High grade open fractures with associated nerve injury, soft tissue loss & ischemia + un-reconstructable neurovascular injury
3. Tumor
  - Malignant bone & soft tissue tumors
4. Infections
  - fulminating gas gangrene
  - acute/ chronic bone infection that is unresponsive to antibiotic/ surgical debridement
5. Congenital anomalies/ deformities
6. Burns & frostbite

## Contraindications

- Poor health that impairs the patient's ability to tolerate anesthesia & surgery

## Types of limb amputations

- ✓ Leg amputations → can be divided into 2 broad categories:

### Major amputations:

- ✓ Below-knee amputation/BKA.
- ✓ Knee disarticulation
- ✓ Above-knee amputation (transfemoral)
- ✓ Rotationplasty  
Foot being turned around and reattached to allow the ankle joint to be used as a knee
- ✓ Hip disarticulation
- ✓ hemi-pelvectomy

### Minor amputations:

- ✓ Amputation of digits
- ✓ Partial foot amputation
- ✓ Ankle disarticulation

- ✓ Arm amputations

- Amputation of digits
- Metacarpal amputation
- Wrist disarticulation
- Forearm amputation (transradial)
- Elbow disarticulation
- Above-elbow amputation (transhumeral)
- Shoulder disarticulation and forequarter amputation
- Krukenberg procedure

## Complications of Amputation

1. Phantom pain
2. Hematoma
3. Infection
4. Failure of wound to heal
5. edema
6. Contracture
7. Neuroma
8. Psychological distress
9. Complications due to immobility & pressure

## Amputation procedure

- General principle of amputation
  - Appropriate mgt of...
    - Skin
    - Bone
    - Nerves
    - Vessels
- Procedure
  - Remove the diseased tissue and any crushed bone
  - Smooth uneven areas of bone
  - Seal off blood vessels and nerves
  - Cut and shape muscles so that the stump, or end of the limb, will be able to have an artificial limb (prosthesis) attached to it

## Types of prosthesis

1. Endoprosthesis → implants used in orthopedics surgery
2. Exoprosthesis → external replacement for lost limb
  - May be temporary or permanent

# FRACTURE MANAGEMENT

## ATLS

### 1. Primary survey & resuscitation

- ATLS assess “ABCDE” → & act accordingly...
  - ✓ Air way
  - ✓ Breathing
  - ✓ Circulation
  - ✓ Neurological exam
  - ✓ Exposure

### 2. Secondary survey

- Take Hx
- Do P/E
- Work up the pt

- *Definitive mgt*
  - *Reduction*
  - *Immobilization*
  - *Rehabilitation*

## Definitive mgt of fracture

### A. Reduction

#### 1. Closed manipulation

- Using general anesthesia → sometimes local/regional -- may be possible
- Grasp the fragments through the soft tissue then adjust them as nearly as possible to their correct position

#### 2. Mechanical traction (with or without manipulation)

- ❖ Used when the contraction of large muscles exert a strong displacing force
- ❖ Traction
  - Weight or
  - Screw device

#### 3. Operative reduction

- ❖ Reduction under direct vision

## B. Immobilization

...Why we immobilize them?

- To prevent angulation/displacement
- To prevent mov't that may interfere with union
- To relieve pain
- Immobilization must include the joint above & below the #

...How???

### 1) POP (plaster of Paris)

Indications

1. Undisplaced fractures
2. Tolerable displacement
3. Closed reduction of displacement possible
4. Fracture in children ( Upper and lower extremities)

Types

- Padded
- Un padded
- Circular
- Slab
- Hip spica

Application of POP

- Long arm POP
- Short arm
- Long leg
- Short leg

Advantages;

- Easy
- No risk of infection

Disadvantages;

- Damage to vessels & nerves by compression

*Compartment syndrome*

Mgt =

- All constrictive dressings must be released
- If no significant change after 30-60 min monitoring → fasciotomy is required

- Difficult for wound care
- Needs strict control

## 2) Splinting==continual traction

### <<>> Traction

#### A. Skin traction

- In children

#### B. Skeletal traction

- Pin insertion sites

- condyle of the femur (distal femur)
- proximal tibia

- Pin, insert from → lateral to medial

- Where? → 1 finger below then 1 finger lateral to tibial tuberosity
- Why?...to prevent neurovascular damage
  - If cmn peroneal nerve is affected → foot drop

\*\*Weight applied =  $1/6^{\text{th}}$  up to  $1/10^{\text{th}}$  of pts weight

- Calcaneus

- Pin, insert from → medial to lateral
- Weight applied → usually up to 3kg
- Cmnlly used for femoral neck fracture

#### Disadvantages

- Long immobilization time (usually up to 06 wks)
- bed sore
  - on bony prominences
- Infections (pin site infection...)

- *Pin site infection grading*

- Grade I → pain (tenderness)
- G II → all cardinal signs of inflammation present
- G III → Serous discharge
- G IV → Purulent discharge
- G V → Bone involvement (osteomyelitis)

- When to act

- G V → remove
- G IV + loose pin → remove
- G III → Antibiotics
- ...

- iv. Joint and muscle contracture
- v. Deep vein thrombosis, pulmonary embolism
  - Should be given heparin prophylaxis

**\*Follow-up after traction**

=Follow by measuring the true length

=Shortening up to 2cms may be acceptable

=For a significant shortening → add weight & for lengthening the vice versa.

### 3) External & internal fixation

#### I) Internal fixation

##### Methods

- Metal Plate & held by screws
- Intramedullary nailing with or without cross screw fixation
  - Site=femur, Tibia, Humerus
- Tension band wiring
  - Site=patella , olecranon , Ankle
    - *wire tied over 2 kirschner wires or pins*

#### II) External fixation

- For grade III open fractures (see the Gustilo and Anderson grading below)
- External fixator should be applied 1.5-2cms away from the wound site
- Advantage
  - wound accessible for treatment<<>>wound care
  - skin graft or flap rotations possible after wound healing
- Disadvantage
  - pin tract infection

#### **Operative treatment** → Advantages;

\*Anatomical reduction

\*Early mobilization & return of function

#### → Disadvantages;

➤ Expensive

➤ Risk of infection



## C. Rehabilitation

- Purpose
  - to preserve & restore functions to normal as far as possible
- Should begin as soon as fracture comes under definitive treatment
- By Physiotherapist

### \*Gustilo and Anderson Open Fractures classification

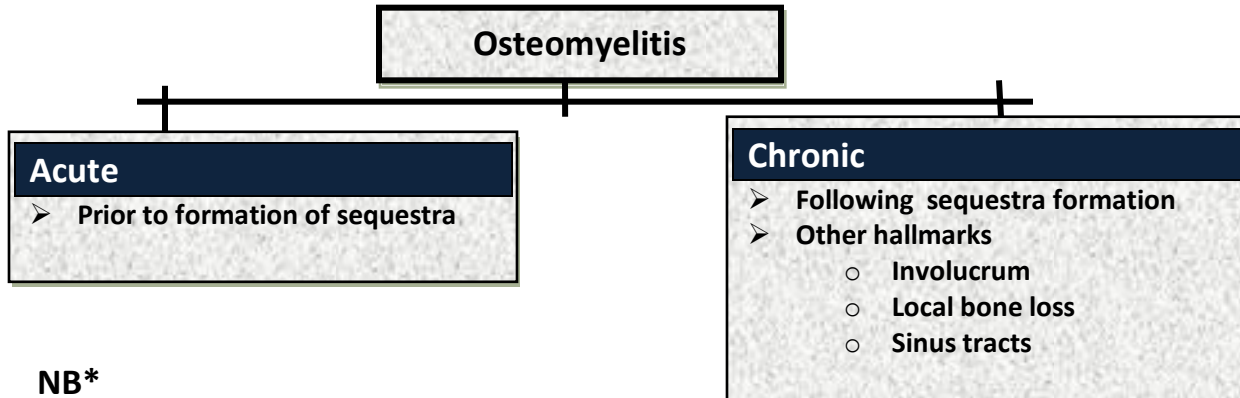
#### Criteria for the classification

- Wound size
- Level of contamination
- Soft tissue injury (STI)
- Bone injury

Type	Wound	Level of Contamination	Soft Tissue Injury	Bone Injury
I	<1 cm long	Clean	Minimal	Simple, minimal comminution
II	>1 cm long	Moderate	Moderate, some muscle damage	Moderate comminution
III				
A	Usually >10 cm long	High	Severe with crushing	Usually comminuted; soft tissue coverage of bone possible
B	Usually >10 cm long	High	Very severe loss of coverage; usually requires soft tissue reconstructive surgery	Bone coverage poor; variable, may be moderate to severe comminution
C	Usually >10 cm long	High	Very severe loss of coverage plus vascular injury requiring repair; may require soft tissue reconstructive surgery	Bone coverage poor; variable, may be moderate to severe comminution

# Bone Infection & Tumor

## I) OSTEOMYELITIS



**NB\***

Sequestrum=necrotic bone

Involucrum=new bone formation around the dead bone

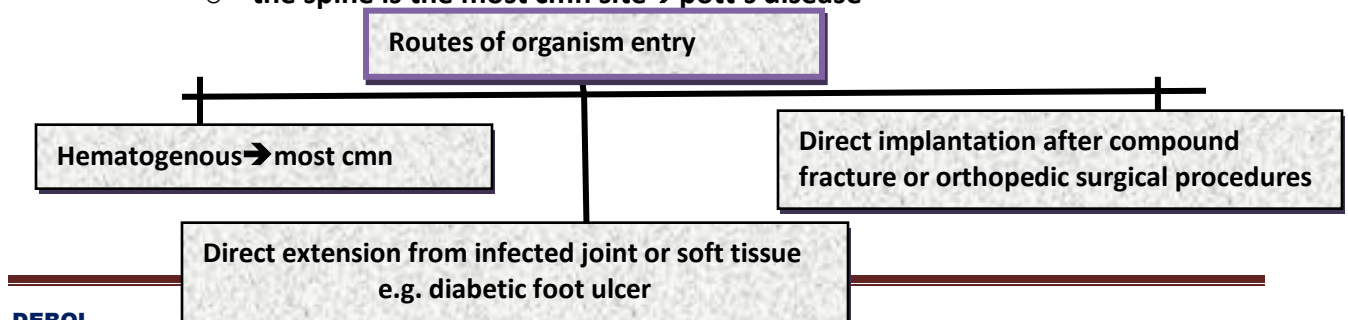
**NB\***

□ Although the time limits delineating one category from the other are somewhat arbitrary, as a rule

- ✓ infections up to 3 months' duration are termed acute,
- ✓ While those enduring longer than 3 months are termed chronic.
- ✓ Some include a third category, "subacute," for patients who exhibit symptoms that endure longer than 3 months but who have not developed extensive necrotic bone

### Etiology

- Pyogenic osteomyelitis /Staph.aureus/→cmn
  - Cmn Sites→
    - ✓ In children
      - long bones--metaphysis
    - ✓ in adults
      - Vertebrae
- tuberculous osteomyelitis
  - the spine is the most cmn site→pott's disease



## Risk factors

- Immunodeficiency disorders
- Sepsis
- Minor trauma coincident with bacteremia
- Indwelling vascular catheters
- Chronic hemodialysis vascular access
- Sickle cell disease

## Clinical features

- **Classic signs of inflammation**
  - local pain/bone pain
  - swelling
  - Redness...
- **Fever**
- **Draining sinus**

## Investigations

- **CBC**
  - Leukocytosis may be observed in the setting of acute osteomyelitis but is unlikely in the setting of chronic osteomyelitis
- **Increased ESR & CRP**
- **Blood culture**
  - may be positive in about half of cases of acute osteomyelitis
- **Discharge analysis → Culture and Gram staining**
- **Radiograph → may be normal up to 10dys**
  - Within 72 hr → deep-soft tissue edema (swelling) with displacement of the deep muscle planes
  - In 5-7 days → Periosteal reaction
  - After 7-14 days → Lytic bone changes, which are not visible until 30-50% of the bony matrix is destroyed.
  - Infection in flat and irregular bones can take longer to appear.
- **Radionuclide scanning**
- **MRI**
  - MRI is very sensitive for the detection of acute osteomyelitis and demonstrates abnormal marrow edema as early as three to five days following onset of infection

## Complications of chronic osteomyelitis

- Pathologic fracture
- Sepsis, endocarditis
- Squamous cell carcinoma (Marjolin's ulcer) of sinus tract
- Osteosarcoma
- Growth plate involvement in children may result in impaired bone growth
- Septic arthritis

# Mgt

## Acute recent infection

### 1. Establish free drainage

### 2. Antibacterial medication

- Antibiotics choice depends on
  - Age
  - Underlying medical condition
  - Suspected pathogens and their susceptibility pattern
  - Antibiotic safety and efficacy and availability
- DOC
  - Cloxacillin /Naficillin /clindamycin plus
  - Ceftriaxone /cefotaxime /cefuroxime or chloramphenicol
- Duration of treatment 3-6 weeks
- Changing antibiotics from the intravenous route to oral administration
  - When patient condition has stabilized, usually 5 -10day of IV antibiotics
  - The patient has been afebrile for 48 to 72 hours
  - Local signs and symptoms of infection are reduced considerably
  - Peripheral leukocyte count has normalized
  - ESR has decreased by at least 20 percent or there has been a 50 percent decrease in the concentration of CRP

#### ➔ Indicators of quiescence are...

- Discharge of pus ceases
- Wound becomes lined by healthy granulations

*NB\*➔@ this stage wound closure may be attempted either by 2<sup>o</sup> suture, if practicable or alternatively by grafting with split skin or covering with a local flap*

### 3. Indication & Principles of surgical Rx

- Indications
  - When unresponsive to specific antimicrobial Rx
    - Prolonged fever
    - Persistent pain and swelling
  - When there is evidence of persistent soft tissue abscess or subperiosteal collection
  - If concomitant joint infection is suspected
  - **Chronic osteomyelitis**
- Principle of surgical mgt
  - Adequate drainage
  - Extensive debridement of necrotic tissue
  - Mgt of dead space
  - Adequate soft tissue coverage
  - Restoration of blood supply

# II) Bone Tumors

## Risk Factors

- Paget's disease
- Radiation
- Fibrous dysplasia
- hereditary

## Classification of bone tumors

### Primary

#### osteogenic tumors

1. Benign
  - a. Osteoid osteoma
  - b. osteoblastoma
2. malignant
  - a. osteosarcoma

#### Chondrogenic tumors

1. Benign
  - ✚ Osteochondroma
2. Malignant
  - ✚ chondrosarcoma

#### Marrow derived

- ✚ Malignant
  - Myeloma
  - lymphoma

### Secondary/metastasis → cmn

1. Breast
2. Prostate
3. Lung
4. Renal
5. Thyroid

#### Others

- Ewing's sarcoma

# Primary

## Bone forming/ osteogenic tumors

### ❖ Benign

Osteoid osteoma	Osteoblastoma
> < 2cm in diameter	> Larger
> < 25yrs of age	> Relatively older
> Affect appendicular skeleton esp. femur & tibia	> Affect mostly the spine
> Very painful (nocturnal) which responds to aspirin	> Dull achy pain which does not respond to aspirin
> Elicits tremendous amount of reactive bone	> Less reactive bone

### ❖ Malignant/ Osteosarcoma

- > Most common primary bone malignancy
- > Most cmn in distal femur, followed by proximal tibia
- > aggressive lesions that metastasize through the blood stream early in their course
  - The lungs are common sites of metastases

## Cartilage tumors

- Osteochondroma
  - benign cartilaginous capped bony projection → growing away from the joint towards the diaphyseal region
  - can be pedunculated or sessile
- chondrosarcoma
  - 2<sup>nd</sup> most common malignant bone tumor
  - They arise in central portions of the skeleton
  - Patients present with painful progressively enlarging masses
  - Metastases show predilection for lungs and skeleton

## Others

- Ewing's sarcoma
  - Tends to arise in the diaphyses of long bones/pelvis
  - CPs → painful mass + general symptoms with fever, anemia
  - Increased ESR
  - X-ray → 'moth-eaten' bone + 'onion skin' periosteal rxn

## Metastatic (2<sup>o</sup>) tumor

- ❖ Can be
  - > Lytic → Kidney, Lung...
  - > Sclerotic → Prostatic ca.
  - > Mixed...

### Comn sites of metastasis

- Spine
- Proximal femur
- Proximal humerus

# FOOT DEFORMITY

By- Endalkachew Belayneh (sms)

- ❖ It is a disorder of the foot and can be congenital or acquired
  - Examples of acquired causes
    - bunion/Hallux valgus
    - Hallux virus
    - hammer toe
    - foot drop
    - flat feet
  - Examples of congenital causes
    - pigeon toe
    - club foot
    - pes caves
    - rocker bottom foot....etc

## Club foot (congenital talipes equinovarus)

It is a congenital deformity involving one foot or both. The affected foot appears to have been rotated internally at the ankle. Without treatment, people with club feet often appear to walk on their ankles or on the sides of their feet. However, with treatment, the vast majority of patients recover completely during early childhood and are able to walk and participate in athletics just as well as patients born without the deformity.

- ❖ It is a relatively common birth defect, occurring in about one in every 1,000 live births. Approximately half of people with clubfoot have it affect both feet, which is called bilateral club foot. In most cases it is an isolated disorder of the limbs. It occurs in males twice as frequently as in females.

## Diagnosis

- By looking after birth → inspection
- Foot x-ray → Dr's interest
- In-utero ultrasound

## Treatment

- French method
- ponseti method
- surgery

# HEENT + LYMPHO-GLANDULAR RELATED *SHORT CASES*



# SALIVARY GLANDS

## Major

1. Parotid
2. Submandibular
3. sublingual

## Minor

Dispersed throughout the aerodigestive tract

## I) Salivary gland tumors (SGTs)

### • Clinical Presentation of benign SGTs

- Painless, slow growing mass
- Well circumscribed
- Almost always freely mobile
  - Face → parotid gland
    - unaffected facial nerve function (benign)
  - Angle of jaw → DDx
    - Submandibular gland
    - Tail of parotid gland
  - Floor of mouth → Sublingual gland
- Parotid → 80% of the SGTs
  - 80% benign
    - pleomorphic adenomas → mst cmn-60%
    - warthin tumor → 5-15% -- 2<sup>nd</sup> cmn

### • Clinical signs of malignancy

- Rapid growth
- pain
- Bleeding
- Airway compromise
- Nerve dysfunction
  - E.g. paresthesia, facial palsy...
- Skin fixation
- *See how to examine mass on page... 239*

## II) Salivary gland infection & calculi

- 80% in Submandibular gland

### Submandibular calculi/ sialolithiasis/

- factors which encourage stasis in the submandibular duct
  1. Anatomy of the duct → gravity
  2. Quality of mucus

#### CPs

- The main symptoms are
    1. swelling
      - ✓ start to worsen just before eating
    2. Pain
      - ✓ dull aching
      - ✓ worsen during eating
      - ✓ goes away before the swelling
- \*\*\*purulent saliva may be present

### Submandibular sialadinitis

- 2<sup>o</sup> to the presence of a stone in its duct or
  - the damage done by a stone which has passed through the duct.
- Staphylococcus → cmn

#### CPs

- Pain, which is
  - severe, throbbing, continuous
  - Exacerbated by eating.
- Heat & tenderness

# CLEFT LIP & PALATE

By-Bruh Alem(sms)

- ✓ Clefing of the lip and/or palate is felt to occur around the eighth week of embryogenesis, either by failure of fusion of the medial nasal process and the maxillary prominence or by failure of mesodermal migration and penetration between the epithelial bilayer of the face.

## Etiology---Multifactorial

- Familial—more common in cleft lip or combined cleft lip and palate (Risk increased by 4%).
- increased parental age, drug use (steroids /diazepam) and infections during pregnancy
- Protein and vitamin deficiency.
- Rubella infection.
- Radiation.
- Chromosomal abnormalities.
- smoking during pregnancy

## Classification

### I. Cleft lip alone

- ✓ Central
  - Rare→In upper lip. Between two median nasal processes. (Hare lip)
- ✓ Lateral
  - maxillary and median nasal process, commonest; can be unilateral or bilateral
- ✓ Incomplete →cleft lip does not extend into nose
- ✓ Complete → cleft lip extends into nasal floor
- ✓ Simple → cleft lip is only cleft in the lip
- ✓ Compound →cleft lip is cleft lip with cleft of alveolus

### II. Cleft of primary palate (in front of incisive foramen) only

- Complete—means absence of pre-maxilla (anterior hard palate)
- Incomplete—means rudimentary pre-maxilla
  - Unilateral.
  - Bilateral.
  - Median.

### III. Cleft of secondary palate (behind the incisive foramen) only

- Complete—nasal septum and vomer are separated from palatine process.
- Incomplete
- Sub mucous
  - It can be - Cleft with soft palate involvement.
  - Cleft without soft palate involvement.

#### IV. Cleft of both primary and secondary palates

#### V. Cleft lip and cleft palate together

- Defect is often associated with other congenital anomalies of cardiac, gastrointestinal, neurological system e.g., Pierre-Robin syndrome, Klippel-Feil syndrome, Stickler's syndrome, Shprintzen's syndrome, Down's syndrome, Treacher-Collin's syndrome, Apert's syndrome and trisomy.

#### Problems in Cleft Disorders

- Difficulty in sucking and swallowing. This is commonly observed in cleft palate than in cleft lip.
- Speech is defective especially in cleft palate, mainly to phonate B, D, K, P, T and G.
- Altered dentition or supernumerary teeth.
- Recurrent upper respiratory tract infection.
- Respiratory obstruction (in Pierre Robin syndrome)
- Chronic otitis media, middle ear problems.
- Cosmetic problems.
- Hypoplasia of the maxilla.
- Problems due to other associated disorders.

#### Treatment for Cleft Lip

- Principles of cleft lip repair
  - ❖ "Rule of 10' should be fulfilled
    - 10 pound in weight
    - 10 weeks old
    - 10 gm % hemoglobin
  - ❖ Before 6 months it should be operated
  - ❖ Proper postoperative management like control of infection, training for sucking, swallowing and speech.
  - ❖ Millard advancement flap is commonly used for unilateral cleft lip repair
  - ❖ Bilateral cleft lip repair can be done either in single or two stages (with 6 months gap between each stage)
  - ❖ Management of associated primary or secondary cleft palate deformity.

## Cleft Palate

- It is due to failure of fusion of the two palatine processes.
- Defect in fusion of lines between premaxilla (developed from median nasal process) and palatine processes of maxilla one on each side.
- When premaxilla and both palatine processes do not fuse, it leads into complete cleft palate (Type I cleft palate)
- Incomplete fusion of these three components can cause incomplete cleft palate beginning from uvula towards posteriorly at various lengths. So it could be Type II a–bifid uvula, Type II b–bifid soft palate (entire length) or Type II c –bifid soft palate and posterior part of hard palate (but anterior part of hard palate is normal).

### Feature

- Small maxilla with crowded teeth, absent/poorly developed upper lateral incisors.
- Bacterial contamination of upper respiratory tract with recurrent infection is common.
- Chronic otitis media with deafness may occur.
- Swallowing difficulties to certain extent and speech problems can occur.
- Cosmetic problems can occur.

### Treatment for Cleft Palate

- cleft palate is usually repaired in 12-18 months. Early repair causes retarded maxillary growth (probably due to trauma to growth center and periosteum of the maxilla during surgery if done early). Late repair causes speech defect.
- Both soft and hard palates are repaired called palatoplasty.
- Regular examination of ear, nose and throat during follow up period
- Postoperative speech therapy.
- Secondary management:
  - Hearing support is given using hearing aids if defect is present; control of otitis media.
  - Speech problems – speech therapy is given.
  - Dental problems corrected by proper dentist opinion, and reconstructive surgery.
  - Orthodontic management with alveolar bone graft, maxillary

# MISCELLANEOUS

## SHORT CASES

# Examination of mass, ulcer & MSS

## Examination of swelling/mass

### Inspection

- Site/location
- Overlying skin color change
- Any ulceration

### Palpation

- Warmness → compare
- Tenderness
- Size
  - Measure or estimate
- Number
- Surface
  - Smooth
  - Nodular
- Border
  - Regular
  - irregular
- Fixity
  - To the overlying or underlying tissue
- Consistency
  - Soft
  - firm
  - hard

### For soft swelling

- Fluctuation
  - Ⓢ Indicate fluid within the swelling
- Transillumination
- Reducibility
- Compressibility
  - Ⓢ Characteristic of vascular hemangioma
- Pulsatility

**Watch video on how to examine swelling @**

<https://www.youtube.com/watch?v=GUX6UpRiU9c>

**NB\***

*When you are asked to list DDx for a swelling...think of the structures that are found under/overlying the swelling like fibrous connective tissue, adipose tissue, vessels, skeletal muscles, nerves & bones...then list the benign & malignant disease forms of each structure.E.g. fibroma, fibrosarcoma (for fibrous CT)*

# Examination of ulcer

## Inspection

- Location of ulcer
  - e.g.
    - Varicose ulcer → lower leg
    - Rodent ulcer → face-nose
    - Tuberculosis ulcer → over the neck
- Size
- Number
  - Single or multiple
  - Is there any similar ulcer in other part of body?
- Margin
  - Type of margin
    1. Healing ulcer
      - ✓ Have 3 line
        - white-outer
        - blue-center
        - red-inner
    2. Inflamed margin
      - ✓ Red, irregular with inflamed surrounding skin
    3. Fibrosed margin
      - ✓ Thicken white skin margin without the blue line of growing epithelium
- Floor of the ulcer (surface of ulcer)
  - ✓ Granulation
  - ✓ slough
  - ✓ discharge
- Surrounding skin
  - ✓ Redness
  - ✓ Pigmentation
    - Dark pigmentation of skin → typical for varicose ulcer
    - Hypopigmentation of surrounding skin → in non-healing ulcer



## Palpation

- ✓ Surrounding skin for hotness and tenderness
- ✓ Ulcer → Edge → confirm size
- ✓ Floor
  - see if it bleeds on touch
- ✓ check the involvement of underlying structures

## Related examination

- ✓ Related lymph node
- ✓ Related arteries, veins and nerves
- ✓ Movement in neighboring joints
  - Restriction to movement indicates muscle involvement or painful inflammation...

**Watch video on how to examine ulcer @**

<https://www.youtube.com/watch?v=S1FpVuyUJ6Q>

# Examination of musculoskeletal system(MSS)

## General approach

- ❖ Inspection [look]
- ❖ Palpation [feel]
- ❖ Range of Motion (ROM) [move]
- ❖ Measurement [measure]

## i) Look

- Expose both sides , adequate light

### *Specific to the site of interest*

- Look for asymmetry between sides
- Deformity
- Visible fractured bone
- Swelling
- Laceration
- Bruising /discoloration
- Abnormal movement
- Atrophy

## ii) Feel

- Temperature
  - Compare both sides of extremities for warmness with ur back of hand
- Tenderness
- Never forget to check pulses
  - ✓ If lower extremity
    - ⊕ Dorsalis pedis artery
    - ⊕ Posterior tibialis artery
    - ⊕ Popliteal artery...

- ✓ If upper extremity
  - ⊕ Radial artery
  - ⊕ Brachial artery
- Compare muscle bulk
  - By measuring with tape meter
- Asses capillary refill
  - If >2sec → abnormal
- Swelling → characterize...

## iii) Move

### *Range of motion (Active )*

- Ask the patient to move the affected site
- Watch for decreased or increased movement of the joint compared to the other side as well as the normal
- Watch for pain with movement
- Listen for crepitus or “popping”
- Watch for abnormal movements

### *ROM (passive)*

- Move the joints passively, comparing the end points to the active
- Again note any decreased or increased movement
- Pain with the movement
- Crepitus or “popping”

## *iv) Measure*

### Apparent length

- From xiphisternum or umbilicus to medial malleolus

### Real length

- From greater trochanter of the femur up to the medial malleolus

### True length

- Between two bony prominences

#### **NB**

*During short examination on fracture mgt, first u will be asked "What do u see on this patient?" So, start by commenting if there is anything visible...like*

- ⊕ *External fixation*
- ⊕ *POP*
- ⊕ *Traction*
- ⊕ *Surgical dressing....*

*\*For fracture mgt see page 221*

# WOUNDS

By -Bruh Alem(sms)

**Definition**→A wound is a break in the integrity of the skin or tissues, associated with disruption of the structure and function.

## CLASSIFICATION OF WOUNDS

### I. Rank and Wakefield Classification

#### a. Tidy wounds

- Incised (sharp objects), clean, healthy wound without any tissue loss. Healing by primary intention. Primary suturing is done.

#### b. Untidy wounds

- crushed, devitalized, unclean. Wound dehiscence, infection, delayed healing is common. Liberal excision of devitalized tissue and heal by secondary intention is the management. Secondary suturing, skin graft or flap may be needed. E.g--crushing, tearing, avulsion, devitalized, vascular injury, multiple irregular wounds and Burns

### II. Classification based on Type of Wound

a. Clean incised wound→clean-cut wound with linear edge.

b. Lacerated wounds→ragged edges with devitalization.

c. Bruising and contusion

- soft tissue injury with discoloration and haematoma formation without skin break.

d. Hematoma→blood collection in subcutaneous/intramuscular/ subfascial/intra-articular.

- Small hematoma get absorbed. Large hematoma once get infected should be drained under general/regional anesthesia adequately.

e. Closed blunt injury

f. Puncture wounds and bites.

g. Abrasion→superficial shearing of skin (only epidermal injury). heals by epithelialization.

h. Traction and avulsion injury.

i. Crush injury→caused by war wounds, road traffic accidents, tourniquet.

--leads to Compartment syndrome, Muscle ischemia Gangrene and loss of tissue.

j. War wounds and gunshot injuries.

k. Injuries to bones and joints, may be open or closed

l. Injuries to nerves, either clean cut or crush.

m. Injuries to arteries and veins (major vessels).

n. Injury to internal organs, may be of penetrating or nonpenetrating (blunt) types.

o. Penetrating wounds

- Commonly due to stab injuries. Common example is stab injury abdomen.

### III. Classification based on Thickness of the Wound

- Superficial wound → only epidermis and dermal papillae.
- Partial thickness → deep dermis with only deepest part of the dermis, hair follicle shafts and sweat glands are left behind.
- Full thickness → entire skin and subcutaneous tissue causing spacing out of the skin edges.
- Deep wounds → across deep fascia into muscles or deeper structures.
- Complicated wounds → associated with injury to vessels or nerves
- Penetrating wound → penetrates into either natural cavities or organs.

### IV. Classification based on Involvement of Structures

- Simple wounds → only one organ or tissue.
- Combined wounds → mixed tissues.

### V. Classification based on the Time Elapsed

- Acute wound → up to 8 hours of trauma.
- Chronic wound → after 8 hours of trauma. e.g. pressure ulcer

### VI. Classification of Surgical Wounds

#### a. Clean wound

- Herniorrhaphy, Excisions, Surgeries of the brain, joints, heart, transplant. Infective rate is less than 2%.

#### b. Clean contaminated wound

- Appendicectomy, Bowel surgeries, Gallbladder, biliary and pancreatic surgeries. Infective rate is 10%.

#### c. Contaminated wound

- Acute abdominal condition, Open fresh accidental wounds. Infective rate is 15-30%

#### d. Dirty infected wound

- Abscess drainage, Pyocele, Empyema gallbladder, Fecal peritonitis. Infective rate is 40-70%

## WOUND HEALING

→ Wound healing is complex method to achieve anatomical and functional integrity of disrupted tissue

### Types of Wound Healing

#### Primary Healing (First Intention) →

- clean incised wound or surgical wound. Wound edges are approximated with sutures. more epithelial regeneration than fibrosis. heals rapidly with complete closure. Scar will be linear, smooth, and supple.

#### Secondary Healing (Second Intention) →

- extensive soft tissue loss like in major trauma, burns and wound with sepsis. heals slowly with fibrosis. a wide scar, often hypertrophied and contracted. may lead into disability.

Healing by Third Intention (Tertiary Wound Healing or Delayed Primary Closure) →

- After wound debridement and control of local infection, wound is closed with sutures or covered using skin graft. Primary contaminated or mixed tissue wounds heal by tertiary intention.

#### Stages of Wound Healing

- Stage of inflammation.
- Stage of granulation tissue formation and organization. fibroblastic activity synthesis of collagen and ground substance occurs.
- Stage of epithelialization.
- Stage of scar formation and resorption.
- Stage of maturation.

#### Phases of Wound Healing

##### Inflammatory Phase (Lag or Substrate or Exudative Phase)

- It begins immediately after wound healing. It lasts for 4-6 days.
- Features of inflammation are rubor, calor, tumour, dolor and loss of function.
- Macrophages secrete fibroblastic growth factor which enhances angiogenesis.
- Polymorphonuclear leukocytes (PMN leukocytes) appear after 48 hours which secrete inflammatory mediators and bactericidal oxygen derived free radicals.
- These cells also remove clots, foreign bodies and bacteria.
- Chemical factors involved in wound healing are: Growth factor—platelet derived, epidermal, transforming. Interleukin. Tumour necrosis factor. Prostaglandins. Collagenase. Elastase.

These actions are reduced in diabetes mellitus, Cushing's syndrome and immunosuppression increasing the rate of sepsis.

##### Proliferative Phase (Collagen/Fibroblastic Phase)

- Collagen and glycosamines are produced by fibroblasts.
- It begins in 7 days and lasts for 6 weeks.
- Hydroxyproline and hydroxylysine are synthesized by specific enzymes using iron, alpha ketoglutarate and vitamin C.
- Tropocollagen is produced which aggregates to form collagen fibrils.
- 80–90% of their final strength (in postoperative wounds) is achieved in 30 days.

##### Remodeling Phase (Maturation Phase)

- It begins at 6 weeks and lasts for 2 years.
- There is maturation of collagen by cross-linking which is responsible for tensile strength of the scar.
- Collagen production is not present after 42 days of wound healing.

Scar strength is 3% in 1 week; 20% in 3 weeks; 80% in 12 weeks. But it will never get its original strength.

## Management of Wounds

- ❖ ABCD of life
- ❖ Incised wound-----primary suturing after thorough cleaning.
- ❖ lacerated wound -----wound is excised and primary suturing
- ❖ Crushed or devitalized wound ----- there will be edema and tension in the wound. So, after wound debridement or wound excision edema is allowed to subside for 2-6 days. Then delayed primary suturing is done.
- ❖ Deep devitalized wound ----- after wound debridement it is allowed to granulate completely. Later, if the wound is small secondary suturing is done. If the wound is large a split skin graft is used to cover the defect.
- ❖ Wound with tension ----- fasciotomy is done so as to prevent the development of compartment syndrome.
- ❖ Vascular or nerve injuries are dealt with accordingly
- ❖ Internal injuries (intracranial by craniotomy, intrathoracic by intercostal tube drainage, intra-abdominal by laparotomy) has to be dealt with accordingly. Fractured bone is also identified and properly dealt with.
- ❖ Antibiotics, fluid and electrolyte balance, blood transfusion, tetanus toxoid (0.5 ml intramuscular to deltoid muscle), or antitetanus globulin (ATG) injection.
  
- ❖ Wound debridement (wound toilet, or wound excision) →
  - is liberal excision of all devitalized tissue at regular intervals (of 48-72 hours) until healthy, bleeding, vascular tidy wound is created.
- ❖ Primary suturing →
  - means suturing the wound immediately within 6 hours. It is done in clean incised wounds.
- ❖ Delayed primary suturing →
  - means suturing the wound in 48 hours to 10 days. It is done in lacerated wounds. This time is allowed for the edema to subside
- ❖ Secondary suturing→
  - means suturing the wound in 10-14 days or later. It is done in infected wounds. After the control of infection, once healthy granulation tissue appears, secondary suturing is done.



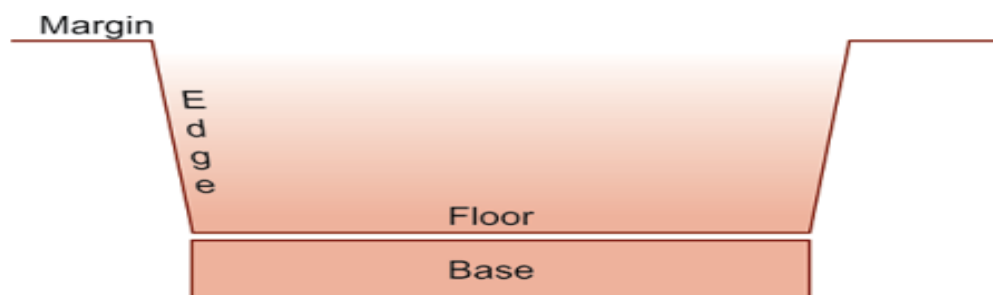
# ULCER

By -Bruh Alem(sms)

**Definition**→An ulcer is a break in the continuity of the covering epithelium, either skin or mucous membrane.

## Parts of an Ulcer

- **Margin:** It may be regular or irregular. It may be rounded or oval.
- **Edge:** Edge is the one which connects floor of the ulcer to the margin.  
Different edges are:
  - ❖ **Sloping edge**→ It is seen in a healing ulcer. Its inner part is red because of red, healthy granulation tissue. Its outer part is white due to scar/fibrous tissue. Its middle part is blue due to epithelial proliferation.
  - ❖ **Undermined edge**→ is seen in a tuberculous ulcer. Disease process advances in deeper plane (in subcutaneous tissue) whereas (skin) epidermis proliferates inwards.
  - ❖ **Punched out edge**→ is seen in a gummatous (syphilitic) ulcer and trophic ulcer. It is due to endarteritis.
  - ❖ **Raised and beaded edge (pearly white)**→ is seen in a rodent ulcer (BCC). Beads are due to proliferating active cells.
  - ❖ **Everted edge (rolled out edge)**→It is seen in a carcinomatous ulcer(SCC) due to spill of the proliferating malignant tissues over the normal skin.
- **Floor:** It is the one which is seen. Floor may contain discharge, granulation tissue or slough
- **Base:** Base is the one on which ulcer rests. It may be bone or soft tissue.



## Classification

### ✓ Clinical

#### a. Spreading ulcer:

- ❖ Here edge is inflamed and edematous

#### b. Healing ulcer:

- ❖ Edge is sloping with healthy pink/red granulation tissue with serous discharge.

#### c. Callous ulcer:

- ❖ Floor contains pale unhealthy granulation tissue with indurated edge/base. It lasts for many months to years. Ulcer does not show any tendency to heal. It is due to callous attitude of the patient.

### ✓ Pathological

#### ❖ Specific ulcers:

- ✓ Tuberculous ulcer
- ✓ Syphilitic ulcer → It is punched out, deep, with “wash-leather” slough in the floor and with indurated base
- ✓ Actinomycosis

#### ❖ Malignant ulcers:

- ✓ Carcinomatous ulcer
- ✓ Rodent ulcer
- ✓ Melanotic ulcer

#### ❖ Nonspecific ulcers:

##### 1. Traumatic – (Footballers ulcer)

- Physical → Electrical
- Chemical → Caustics
- Mechanical → Dental ulcer, pressure from splint, etc...

##### 2. Arterial--Atherosclerosis, TAO, Raynaud's disease

##### 3. Venous--Venous ulcer, Postthrombotic ulcer, gravitational ulcer

##### 4. Neuropathic

- ✓ (Neurotrophic or Perforating) Diabetes, leprosy, tabes dorsalis, spina bifida, paraplegia, syringomyelia

##### 5. Tropical ulcers--Tropical countries

##### 6. Metabolic → Diabetes – Gout

##### 7. Secondary to diseases like

- Rheumatoid arthritis
- Erythrocyanosis frigida
- Osteitis Deformans (Paget's disease of the bone)
- Avitaminosis

8. Ulcers complicating blood diseases
  - Sickle cell anemia
  - Mediterranean anemia
  - Felty's syndrome (look for spleen)
9. Ulcer occurring on paralysed leg
  - ✓ usually seen in anterior poliomyelitis
10. Factitious ulcer (Artefact ulcer)
11. Diphtheritic desert sore
12. Yaws
13. Decubitus ulcer
14. Iatrogenic ulcer → extravasation of IV fluid
15. Ulcers in congenital arteriovenous fistula
16. Miscellaneous → Martorell's ulcer

### Types of discharges and the probable causes

Discharge	Cause
• Serous discharge	In healing ulcer
• Serosanguineous discharge	Tuberculous ulcer
• Greenish/bluish pseudomonas	Ulcer infected with
• Yellow discharge and creamy pus	Staphylococci
• Watery and opalescent	Streptococcus
• Yellow granules	Actinomycosis

## GRANULATION TISSUE

It is proliferation of new capillaries and fibroblasts intermingled with red blood cells and white blood cells with thin fibrin cover over it. Granulation tissue signifies healing. It is usually pink with red dots. The red dots are seen at the sites of capillary loops.

### Types

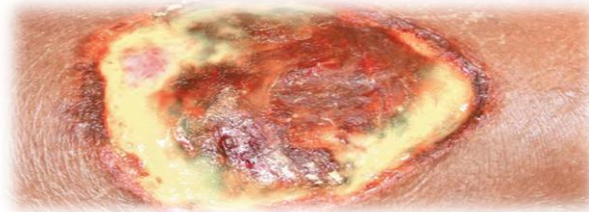
#### → Healthy granulation tissue

- It occurs in a healing ulcer. It has got sloping edge. It bleeds on touch. It has got serous discharge. 5 Ps of granulation tissue → Pink, Punctate hemorrhages, Pulsatile, Painless, Pinhead granulation. Skin grafting takes up well with healthy granulation tissue.



#### → Unhealthy granulation tissue

- Pale with purulent discharge. Its floor is covered with slough. Its edge is inflamed and edematous. It is a spreading ulcer



### Classical sites for commonly seen ulcers

Type of ulcer	Site
Venous ulcer	Just above the medial malleolus ( <b>Gaiter area</b> )
Arterial ulcer	<b>Tips of toes and between the toes</b> (where the pressure is lowest), over the malleoli and heel (pressure areas)
Neuropathic ulcer	Over the <b>heads of the first and second metatarsal</b> .
Traumatic ulcer (footballer's ulcer)	<b>Shin</b> (the tibia is subcutaneous and there is lack of underlying muscle with resultant reduced blood supply)
Rodent ulcer (BCC)	<b>Above a line joining the angle of the mouth to the lobule of the ear</b>
Tuberculous ulcer	Seen in <b>neck, axilla and groin</b> (where tuberculous lymph nodes are seen)
Gummatous ulcer	Over the <b>subcutaneous bones</b> such as sternum, skull, tibia, etc.
Trophic ulcers	On the heel and ball of the foot

## INVESTIGATIONS FOR AN ULCER

- Study of discharge → Culture and sensitivity, AFB study, cytology.
- Edge biopsy → Biopsy is taken from the edge because edge contains multiplying cells. Usually two biopsies are taken. Biopsy taken from the centre may be inadequate because of central necrosis.
- X-ray of the part to look for periostitis/osteomyelitis.
- FNAC of the lymph node.
- Chest X-ray, Mantoux test in suspected case of tuberculous ulcer

## Assessment of an Ulcer

- Cause of an ulcer should be found—diabetes/venous/arterial/infective
- Clinical type should be assessed.
- Assessment of wound is important—anatomical site; size and depth of the wound; edge of the wound; mobility; fixity; induration; surrounding area; local blood supply. Wound perimeter may be useful in assessing this. *see page 240 for ulcer examination*
- Wound imaging is done by tracing it on a transparent acetate sheet at regular intervals.
- Presence of systemic features; regional nodal status; function of the limb/part; joint movements; distal pulses; sensations should be assessed
- Severity of infection should be assessed—culture of discharge.
- Specific investigations like edge biopsy; X-ray of part; blood sugar; arterial/venous Doppler; angiogram.

## Debridement of an ulcer

- It is removal of devitalized tissue. Small ulcers are debrided in ward. Large ulcers are debrided in operation theatre under general anaesthesia. All dead, devitalised, necrotic tissues are removed. Slough should be separated adequately before debridement. Often devitalised tissue separates on its own by autolysis if nt enzymes like collagenase are used for debridement. Hydrotherapy and dressings are mechanical nonselective method of debridement.

### • Ulcer cleaning

- is done using dilute povidone iodine and normal saline (better and ideal). It should be done daily or two times a day depending on the severity.

### • Dressing of an ulcer

- is done to keep ulcer moist, keep surrounding skin dry, reduce pain, soothen the tissue, protect the wound and as an absorbent for the discharge

## Some common ulcer types

### TRAUMATIC ULCER

- ◆ Such ulcer occurs after trauma. It may be mechanical— dental ulcer along the margin of the tongue due to tooth injury; physical like by electrical burn; chemical like by alkali injury.
- ◆ Such ulcer is acute, superficial, painful and tender. Secondary infection or poor blood supply of the area make it chronic and deep.
- ◆ Footballer's ulcer is a traumatic ulcer occurring over the shin of males due to direct knocks on the shin. It is staphylococcal infection with a chronic and deep ulcer.
- ◆ Traumatic ulcers can occur anywhere in the body due to trauma.
- ◆ Trauma causes infection, necrosis, fasciitis, crush injury, endarteritis of the skin leading into formation of large/deep nonhealing ulcer.
- ◆ Treatment depends on size and extent of ulcer. Regular dressing, later skin grafting is done.

### TROPHIC ULCER (PRESSURE (BED) SORE/ DECUBITUS ULCER)

Pressure sore is tissue necrosis and ulceration due to prolonged pressure. Blood flow to the skin stops once external pressure becomes more than 30 mmHg (more than capillary occlusive pressure) and this causes tissue hypoxia, necrosis and ulceration. It is more prominent between bony prominence and an external surface.

#### Clinical Features

- ◆ Occurs in 5% of all hospitalised patients.
- ◆ Painless ulcer which is punched out.
- ◆ Ulcer is nonmobile with base formed by bone.

#### Investigations

- Study of discharge, blood sugar, biopsy from the edge, X-ray of the part, X-ray of spine.

#### Treatment

- ◆ Cause should be treated.
- ◆ Nutritional supplementation.
- ◆ Rest, antibiotics, slough excision, regular dressings.
- ◆ Vacuum assisted closure (VAC):
  - It is the creation of intermittent negative pressure of minus 125 mmHg to promote formation of healthy granulation tissue. Negative pressure reduces tissue oedema, clears the interstitial fluid and improves the perfusion, increases the cell proliferation and so promotes the healing. A perforated drain is kept over the foam dressing covered over the pressure sore. It is sealed with a transparent adhesive sheet. Drain is connected to required vacuum apparatus.
- ◆ Once ulcer granulates well, flap cover or skin grafting is done.
- ◆ Excision of the ulcer and skin grafting.
- ◆ Flaps—local rotation or other flaps (transposition flaps).
- ◆ Cultured muscle interposition

### PREVENTION

- ◆ **Proper care:** Change in position once in 2 hours; lifting the limb upwards for 10 seconds once in 10 minutes; nutrition; use of water bed/air bed/air-fluid floatation bed and pressure dispersion cushions to the affected area; urinary and faecal care; hygiene; psychological counselling. Regular skin observation; keeping skin clean and dry (using regular use of talcum powder); oil massaging of the skin and soft tissues using clean, absorbent porous clothing; control and prevention of sepsis helps in the management.

## DIABETIC ULCER

### Causes

- ◆ Increased glucose in the tissue precipitates infection.

### Sites

- ◆ Foot-plantar aspect—is the most common site.
- ◆ Leg.
- ◆ Upper limb, back, scrotum, perineum.
- ◆ Diabetic ulcer may be associated with ischaemia.
- ◆ Ulcer is usually spreading and deep.

### Investigations

- ◆ Blood sugar both random and fasting.
- ◆ Urine ketone bodies.
- ◆ Discharge for culture and sensitivity.
- ◆ X-ray of the part to see osteomyelitis.
- ◆ Arterial Doppler of the limb; glycosylated haemoglobin estimation.

### Treatment

- ◆ Control of diabetes using insulin.
- ◆ Antibiotics.
- ◆ Nutritional supplements.
- ◆ Regular cleaning, debridement, dressing.
- ◆ Once granulates, the ulcer is covered with skin graft or flap.
- ◆ Toe/foot/leg amputation.
- ◆ Microcellular rubber (MCR) shoes to prevent injuries; care of foot

## TUBERCULOUS ULCER

It is due to *Mycobacterium tuberculosis*. It is usually due to cold abscess later forming ulcer in the neck, chest wall, axilla and groin.

- It can also be primary tuberculosis of the skin (commonly in face).
- Ulcer can be single or multiple; oval or rounded; with undermined edge (due to progression of disease outwards underneath and healing inwards by skin), painful and tender with caseating material on the floor.
- Ulcer is usually not deep. Regional lymph nodes may be enlarged matted, firm, and nontender.

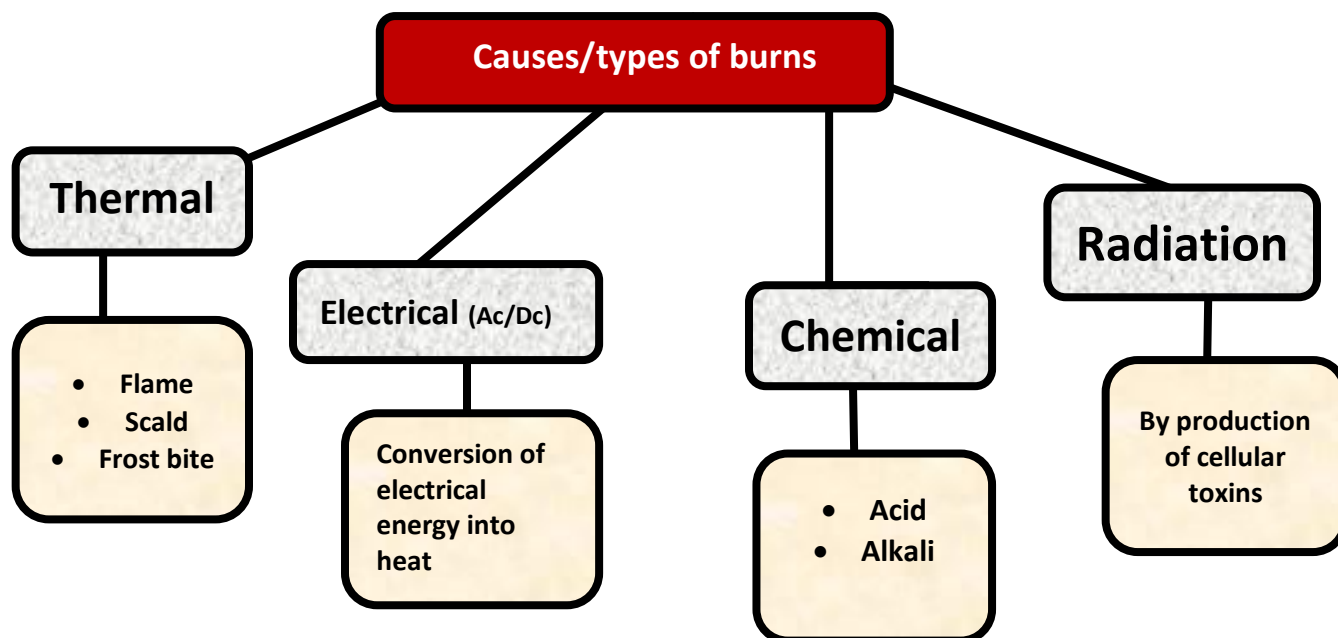
### Management:

Discharge study for epithelioid cells (modified histiocytes), AFB; edge biopsy, antituberculous drugs

# BURN

By -Dan Alemayehu(sms)

**Definition:** Burn is a type of coagulative necrosis caused by heat(usually > 44°C) transferred from the source to the body.



## Pathophysiology

- In burn by far the most common organ affected is the skin. However, burns can also damage airway and lungs. As in all trauma related deaths burn deaths occur immediately after the injury or weeks later as a result of multisystem organ failure.
- The following mechanisms have been proposed in the pathophysiology of burns shock
  - Increased capillary permeability
  - Decreased plasma oncotic pressure
  - Increased capillary hydrostatic pressure
  - Reduced clearance of fluid and protein
  - intracellular fluid accumulation
  - increased osmotic pressure in burned tissue
  - increased Evaporative water loss
  - depressed myocardial function



## Burn wound assessment

Classified according to depth of injury or extent of BSA involved

Degree	Extent	Characteristics	Remark
<b>First degree or superficial</b>	Localized to the Epidermis	Erythema,blanch to touch,painful	Eg.Sunburns Doesn't result in scars
<b>Second degree</b>	Superficial	Epidermis + portion of dermis(papillary)	Erythema,blanch,painful,often blister and weeping
	Deep	Epidermis + dermis( up to reticular dermis)	More pale,mottled,do not blanch to touch,not sensitive to touch but sensitive to pin prick
<b>Third degree</b>	Full thickness(epidermis +dermis), no epidermal or dermal appendages remain	Hard,leathery,eschar,painless and nonblanching	Require excision with skin grafting
<b>Fourth degree</b>	Involving organs beneath the skin such as muscle or bones		Common in electrical burn

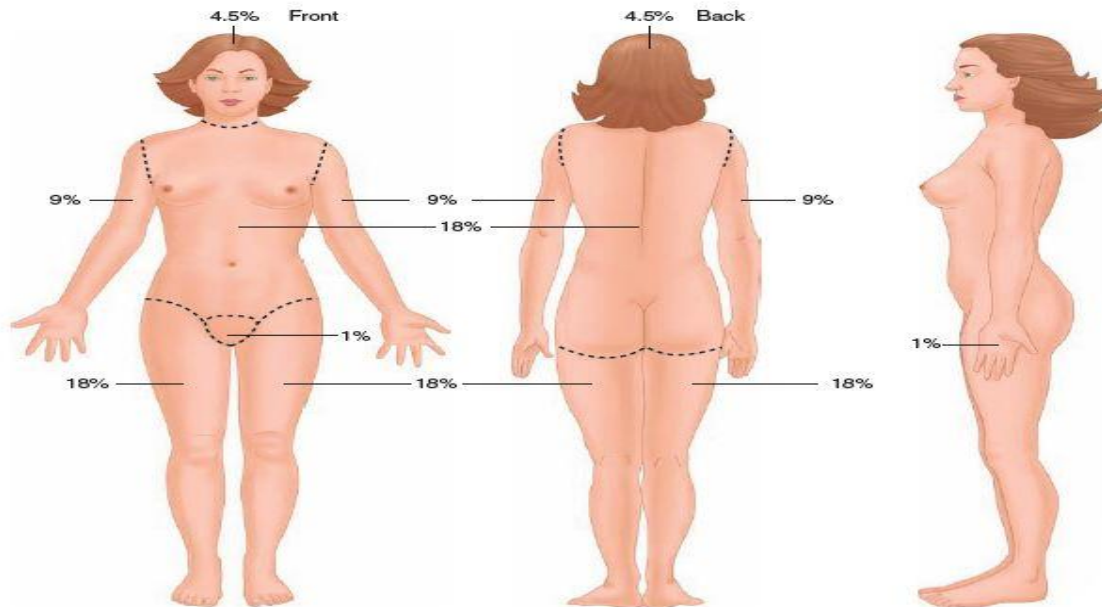
## Local changes in burn

The area of cutaneous or superficial injury has been divided in to 3 zones

Zones	Damage	Blood flow	Remark
Zone of coagulation (center of the wound)	Irreversible	None	
Zone of stasis	Can be reversible or become irreversible based on the wound environment	Decreased perfusion	Vascular damage and vessel leakage
Zone of hyperemia	Reversible (contains clearly viable tissue)	Vasodilation	Healing process begins here

## Burn size estimation

→ Rule of nine is a quick and easy method that divides the body adequate for initial assessment for adult burns.



NB\* palm method → small or patchy burns can be approximated by using the surface area of the patient's palm. The entire (including fingers) is approximately 1% and is used in pediatric burn patients.

## INJURY TO THE AIRWAY AND LUNGS

- **Physical burn injury to the airway above the larynx:**
  - The hot gases can physically burn the nose, mouth, tongue, palate and larynx. Once burned, the linings of these structures will start to swell. After a few hours, they may start to interfere with the larynx and may completely block the airway if action is not taken to secure an airway
- **Physical burn injury to the airway below the larynx (rare):**
  - steam has a large latent heat of evaporation and can cause thermal damage to the lower airway. In such injuries, the respiratory epithelium rapidly swells and detaches from the bronchial tree. This creates casts, which can block the main upper airway
- **Metabolic poisoning:**
  - There are many poisonous gases that can be given off in a fire, the most common being carbon monoxide. This is the usual cause of a person being found with altered consciousness at the scene of a fire. Carbon monoxide binds to haemoglobin with an affinity 240 times greater than that of oxygen and therefore blocks the transport of oxygen. Levels of carboxyhaemoglobin in the bloodstream can be measured.

- Concentrations above 10% are dangerous and need treatment. Other gases such as hydrogen cyanide causes a metabolic acidosis.
- **Inhalational injury**
  - Inhalational injury is caused by the minute particles within thick smoke, which, because of their small size, are not filtered by the upper airway, but are carried down to the lung parenchyma and can cause chemical pneumonitis which causes alveolar edema within 24hrs.

### OTHER LIFE-THREATENING EVENTS WITH MAJOR BURNS

- **The immune system and infection:**
  - Cell-mediated immunity is significantly reduced in large burns leaving them more susceptible to bacterial and fungal infections.
- **Changes to the intestine:**
  - The inflammatory stimulus and shock can cause microvascular damage and ischaemia to the gut mucosa. This reduces gut motility and can prevent the absorption of food.

**NB** → curling ulcer: occurs within 24 hrs after burn due to decreased GI blood flow and mucosal damage, this can be treated with H2 blockers, mucoprotectants and early enteral nutrition.

- **Danger to peripheral circulation:**
  - In full-thickness burns, the collagen fibres are coagulated. The normal elasticity of the skin is lost. A circumferential full-thickness burn to a limb acts as a tourniquet as the limb swells. If untreated, this will progress to limb-threatening ischemia.

### IMMEDIATE CARE OF THE BURN PATIENT

#### Pre-hospital care

- ensure rescuers safety
- **Stop the burning process**
- **Check for other injuries**
- **Cool the burn wound**
- **Give oxygen**
- **Elevate** → Sitting a patient up with a burned airway may prove life-saving in the event of a delay in transfer to hospital care

### Criteria for admission

- Suspected airway or inhalational injury
- Any burn likely to require fluid resuscitation
- Any burn likely to require surgery
- Pts with burns of any significance to the hands, face, feet or perineum
- Pts whose psychiatric or social background makes it inadvisable to send them home
- Any suspicion of non-accidental injury
- Any burn in pts @ extremes of age
- Any burn with associated potentially serious sequelae including high-tension electrical burns & concentrated hydrofluoric acid burns

### Hospital care

- The principles of managing an acute burn injury are the same as in any acute trauma case:
- “ABCD” of life plus E and F (exposure and fluid resuscitation)

### Airway/Breathing

- 3 components
  - Upper airway swelling → Edema occurs within 12-24 hours
    - Early intubation indicated
    - Look for stridor, wheezing, grunting
  - Acute respiratory failure
  - Carbon monoxide intoxication
    - 100% O<sub>2</sub>
    - Decreases CO half life

### Fluid resuscitation

#### Types of fluids

- There are three types of fluid used. The most common is Ringer’s lactate or Hartmann’s solution;
  - Some centers use human albumin solution or fresh-frozen plasma, and some centers use hypertonic saline.
- It...
  - Restores plasma volume
  - Avoids microvascular ischemia
  - Maintains vital organ function

- Use parkland formula to calculate the required fluid...

• **Parkland formula** →  $4 \times \text{Wt}(\text{kg}) \times \% \text{TBSA} = \text{mL to be given in 1 day}$

- Half over 1<sup>st</sup> 8hrs (subtract what was given)
  - Give other Half over next 16 hours
- TBSA → Figure it out by
    - “rule of nines” or
    - entire palmar surface of pt’s hand = 1%
  - Do not give colloid in first 24 hrs

## Monitoring of resuscitation

- The key to monitoring of resuscitation is urine output.
  - Titrate to UOP of 0.5mL/kg/hr in adults and 1mL/kg/hr in children
- If the urine output is below this, the infusion rate should be increased by 50%. If the urine output is inadequate and the patient is showing signs of hypo-perfusion (restlessness with tachycardia, cool peripheries and a high haematocrit) → then a bolus of 10 ml/kg body weight should be given.

## Other managements

- pain management
- Avoid hyperthermia
- Topical antibiotics
  - silver sulfadiazine, silver nitrate solution, and silver-impregnated dressing
- Energy balance and nutrition
- Physiotherapy
- Psychological support
- Escharotomy
  - Circumferential full-thickness burns to the limbs require emergency surgery. The tourniquet effect of this injury is easily treated by incising the whole length of full-thickness burns.

## Electrical burns

- ✓ Coagulation necrosis
- ✓ Frequently only entry (yellow-white) and exit (blow out) wounds are visible masking extensive tissue damage.

### • Types of Electrical Current

- ✓ Direct current
  - Lightning, car batteries, and defibrillators
- ✓ Alternating current
  - Household appliances
  - More dangerous than direct current at low voltage
  - High voltage, high frequency AC is equally damaging as DC
  - Currents >15mA result in tetany preventing voluntary release:
    - NO LET GO PHENOMENON
  - 1000 volts is the minimum value for extensive tissue necrosis and loss of limbs

### NB\*

- AC injuries have 3 times higher mortality/morbidity than DC.
- Electrical burns are more severe at the point of exit.

### Severity of Electrical Shock

- Voltage and amperage of the current
- Alternating or Direct current
- Amount of time the patient is exposed
- Amount of body surface in contact with water
- Area of the body through which the current passes
- Amount of moisture on the patient

### Pathophysiology

- Current Follows path of least resistance towards ground Nerve, blood vessels, muscle, skin, tendon, fat and then bone(in order of increasing resistance). Electrical energy is converted to heat in direct proportion to the resistance of the tissue.

## Specific organs affected

### Neurological system

- Most commonly affected
- May experience
  - Numbness/tingling
  - Loss of consciousness
  - Amnesia
  - Coma
  - Spinal cord involvement

### Cardiac Injuries

- cardiac dysrhythmia's
- Sudden death (Ventricular Fibrillation)

### Vascular Injuries

- Result of vascular spasm
  - Coagulation
  - Vascular occlusion
- Compartment Syndrome
  - Acute ischemic insult
  - Rhabdomyolysis

### Renal Injuries

- Occur due to:
  - Rhabdomyolysis
    - Myoglobinuria
  - Acute Renal Failure (ARF)
    - Myoglobin crystallization

### Musculoskeletal

- Spasms, tetany, contractures, compartment syndromes
- Fractures due to powerful muscular spasm

### Gastrointestinal

- Ileus

### Pulmonary

- Muscular paralysis

## Management

### Peculiarities

- ✓ High voltage burns require large amounts of fluid.
- ✓ Maintain adequate ventilation → risk of Central apnea in Lightning strike
- ✓ TBSA may be difficult to assess

# SHOCK

By -Cheru Lilay(sms)

## Approach to the Patient with Shock

- ❖ Shock is defined as a failure to meet the metabolic demands of cells and tissues and the consequences that ensue.
- ❖ A central component of shock is decreased tissue perfusion. This may be a direct consequence of the etiology of shock, such as in hypovolemic/hemorrhagic, cardiogenic, or neurogenic etiologies, or may be secondary to elaborated or released molecules or cellular products that result in endothelial/cellular activation, such as in septic shock or traumatic shock.

## FORMS OF SHOCK

- ❖ Strict adherence to a classification scheme may be difficult from a clinical standpoint because of the frequent combination of two or more causes of shock in any individual patient can be happened.

## HYPOVOLEMIC SHOCK

- ❖ most commonly encountered in surgical practice
- ❖ results either from the loss of red blood cell mass and plasma from hemorrhage or from the loss of plasma volume alone due to extravascular fluid sequestration or GI, urinary, and insensible losses
- ❖ The signs and symptoms of non hemorrhagic hypovolemic shock are the same as those of hemorrhagic shock, although they may have a more insidious onset.
- ❖ According to ATLS classified into four...
  1. Class I
    - ✓ Mild hemorrhage( up to 750 ml )
    - ✓ Up to 15% Blood Volume Loss of total blood volume
    - ✓ This condition is exemplified by voluntary blood donation
    - ✓ There is no change in vital signs & Capillary refill is normal
    - ✓ no treatment, and blood volume is restored within 24 hours by transcapillary refill and the other compensatory methods.
  2. Class II
    - ✓ 15% to 30% Blood Volume (750 to 1500 mL)
    - ✓ tachycardia and tachypnea
    - ✓ The SBP may be only slightly decreased, especially in the supine position,



- ✓ pulse pressure is narrowed (because increased DBP due to an increase in peripheral vascular tone and resistance by catecholamines ).
- ✓ Urine output is reduced only slightly
- ✓ Mental status changes e.g., anxiety
- ✓ Capillary refill is usually delayed
- ✓ Patients usually can be resuscitated with crystalloid solutions, but some may require blood transfusion

### 3. Class III

- ✓ 30% to 40% ( 1500-2000ml)Blood Volume Loss
- ✓ almost always present with the classic signs of inadequate perfusion
  - ✓ marked tachycardia and tachypnea, significant changes in mental status,
  - ✓ and a measurable fall in systolic pressure
  - ✓ cool, clammy extremities with significantly delayed capillary refill
- ✓ this is the least amount of blood loss that consistently causes a drop in systolic pressure (Class III represents the smallest volume of blood loss that consistently produces a decrease in systolic blood pressure)
- ✓ The resuscitation of these patients frequently requires blood transfusion in addition to administration of crystalloids
  - ✓ The decision to transfuse blood is based on the patient's response to initial fluid resuscitation

### 4. Class IV

- ✓ More than 40% (>2,000 mL)Blood Volume Loss
- ✓ representing life-threatening hemorrhage
  - ✓ marked tachycardia, a significantly depressed SBP,
  - ✓ narrowed pulse pressure or unobtainable diastolic pressure.
  - ✓ The mental status is depressed and the skin is cold and pale.
  - ✓ Urine output is negligible.
  - ✓ These patients require immediate transfusion for resuscitation and frequently require immediate surgical or intervention

- ✓ What is the difference between hypovolemic Shock secondary to plasma or free fluid loss & hemorrhagic shock?
  - ✓ Hemoconcentration, elevated blood urea nitrogen (BUN) and creatinine, and hypernatremia are typical of acute plasma and/or free water losses and are not necessarily present in other forms of shock

## MANAGEMENT OF HEMORRHAGIC SHOCK

- ❖ The basic management principle is to stop the bleeding and replace the volume loss.
- ❖ Mostly this is associated with trauma so first apply ATLS why?
  - ❖ Ensuring a patent airway & breathing are the first priority in the primary survey. This is essential, because efforts to restore cardiovascular integrity will be futile unless the oxygen content of the blood is adequate, means the oxygen status should corrected first, i.e giving blood or fluid before secured oxygen source is meaningless...!
- ❖ How tension pneumothorax shock....?
  - ❖ Air is trapped in intra-thorax this compress the heart causes decreased venous return then finally hypotension....

### INITIAL FLUID THERAPY FOR HEMORRHAGIC SHOCK

*An initial, warmed fluid bolus is given. The usual dose is 2 L RL or NS for adults and 20 mL/kg for pediatric patients.*

*Follow BP, PR, UOP & mental status*

*An initial, warmed fluid bolus is given. The usual dose is 2 L RL or NS for adults and 20 mL/kg for pediatric patients.*

*If not responsive repeat 1x in adult(total 2x) & 2x in pediatrics(total 3x)*

*If not responsive with the above fluid give blood*

*Failure to respond to crystalloid and blood administration in the ED dictates the need for damage control surgery*

*N.B.....And assess other causes of shock E.g septic, Cardiogenic... but in trauma the most cause of nonresponsive shock is unidentified ongoing bleeding*

- ❖ Generally based the response to initial fluid can be divided into 3
  - ✓ rapid response,
  - ✓ transient response, and
  - ✓ minimal or no response.
- ☐ **RAPID RESPONSE**
  - ✓ rapidly to the initial fluid bolus and remain hemodynamically normal after the initial fluid bolus
  - ✓ usually have lost minimal (less than 20%) blood volume
  - ✓ No further fluid bolus or immediate blood administration
  - ✓ Typed and crossmatched blood
    - ✓ should be kept available. Surgical consultation and evaluation are necessary during initial assessment and treatment, as operative intervention may still be necessary
- ☐ **TRANSIENT RESPONSE**
  - ✓ respond to the initial fluid bolus. However, they begin to show deterioration of perfusion indices as the initial fluids are slowed to maintenance levels, indicating either
    - ✓ an ongoing blood loss or inadequate resuscitation.
  - ✓ Most of these patients initially have lost an estimated 20% to 40% of their blood volume
  - ✓ Transfusion of blood and blood products is indicated, but more important is the recognition that this patient requires operative or angiographic control of hemorrhage.
  - ✓ patients who are still bleeding and require rapid surgical intervention.
- ☐ **MINIMAL OR NO RESPONSE**
  - ✓ Failure to respond to crystalloid and blood in the ED dictates the need for immediate, definitive intervention (e.g., operation or Angioembolization) to control exsanguinating hemorrhage.
  - ✓ So the possible DDX are
    - ✓ blunt cardiac injury
    - ✓ cardiac tamponade
    - ✓ tension pneumothorax
    - ✓ Non hemorrhagic shock
      - ☐ Cardiogenic
      - ☐ Septic
  - ✓ CVP monitoring and cardiac ultrasonography help to differentiate between the various causes of shock.

## Summary

	RAPID RESPONSE	TRANSIENT RESPONSE	MINIMAL OR NO RESPONSE
Vital signs	Return to normal	Transient improvement, recurrence of decreased blood pressure and increased heart rate	Remain abnormal
Estimated blood loss	Minimal (10%–20%)	Moderate and ongoing (20%–40%)	Severe (>40%)
Need for more crystalloid	Low	Low to moderate	Moderate as a bridge to transfusion
Need for blood	Low	Moderate to high	Immediate
Blood preparation	Type and crossmatch	Type-specific	Emergency blood release
Need for operative intervention	Possibly	Likely	Highly likely
Early presence of surgeon	Yes	Yes	Yes

## INITIAL ASSESSMENT AND SURGICAL SHOCK MANAGEMENT

CONDITION	ASSESSMENT (PHYSICAL EXAMINATION)	MANAGEMENT
<b>Tension pneumothorax</b>	<ul style="list-style-type: none"> <li>• Tracheal deviation</li> <li>• Distended neck veins</li> <li>• Tympany</li> <li>• Absent breath sounds</li> </ul>	<ul style="list-style-type: none"> <li>• Needle decompression</li> <li>• Tube thoracostomy</li> </ul>
<b>Massive hemothorax</b>	<ul style="list-style-type: none"> <li>• Tracheal deviation</li> <li>• Flat neck veins</li> <li>• Percussion dullness</li> <li>• Absent breath sounds</li> </ul>	<ul style="list-style-type: none"> <li>• Venous access</li> <li>• Volume replacement</li> <li>• Surgical consultation/thoracotomy</li> <li>• Tube thoracostomy</li> </ul>
<b>Cardiac tamponade</b>	<ul style="list-style-type: none"> <li>• Distended neck veins</li> <li>• Muffled heart tones</li> <li>• Ultrasound</li> </ul>	<ul style="list-style-type: none"> <li>• Venous access</li> <li>• Volume replacement</li> <li>• Thoracotomy</li> <li>• Pericardiocentesis</li> </ul>
<b>Intraabdominal hemorrhage</b>	<ul style="list-style-type: none"> <li>• Distended abdomen</li> <li>• Uterine lift, if pregnant</li> <li>• DPL /ultrasonography</li> <li>• Vaginal examination</li> </ul>	<ul style="list-style-type: none"> <li>• Venous access</li> <li>• Volume replacement</li> <li>• Surgical consultation</li> <li>• Displace uterus from vena cava</li> </ul>
<b>Obvious external bleeding</b>	<ul style="list-style-type: none"> <li>• Identify source of obvious external bleeding</li> </ul>	<ul style="list-style-type: none"> <li>• Direct pressure</li> <li>• Splints</li> <li>• Closure of actively bleeding scalp wounds</li> </ul>

Condition	How cause shock
Tension pneumothorax	✓ <b>Compress hearted RV pressure finally decreased venous return</b>
Massive hemothorax	✓ <b>Due to lost</b> ✓ <b>Compression effect, like that of T.pneumothorax</b>
Cardiac tamponade	✓ <b>Decreases the cardiac filling</b> ✓ <b>like that of T.pneumothorax</b>

## CARDIOGENIC SHOCK

- ❖ The clinical definition is decreased cardiac output with tissue hypoperfusion, despite presence of adequate intravascular volume.
- ❖ Hemodynamic criteria include
  - ❖ sustained hypotension (i.e., SBP <90 mmHg for at least 30 minutes),
  - ❖ reduced cardiac index (<2.2 L/min per square meter), and
  - ❖ elevated pulmonary artery wedge pressure (>15 mmHg)
- ❖ Acute, extensive MI is the most common cause of cardiogenic shock
- ❖ CVP is increased
- ❖ urgent echocardiography confirm the diagnosis

### Treatment of Cardiogenic Shock

- ❖ maintenance of adequate oxygenation to ensure adequate myocardial O<sub>2</sub> delivery and
- ❖ judicious fluid administration to avoid fluid overload and development of cardiogenic pulmonary edema
- ❖ Correct Electrolyte abnormalities, commonly hypokalemia and hypomagnesemia
- ❖ Pain is treated with IV morphine sulfate or fentanyl
- ❖ Significant dysrhythmias and heart block must be treated with antiarrhythmic drugs
- ❖ When profound cardiac dysfunction exists, inotropic support
- ❖ consult medical side! For detail

## SEPTIC SHOCK

- ❖ defined as a SIRS response to infection in conjunction with arterial hypotension, despite adequate fluid resuscitation
- ❖ Hemodynamic changes are ...
  - ❖ Early septic shock (warm or hyperdynamic) characterized
    - ✓ peripheral vasodilation,
    - ✓ flushed and warm extremities, and
    - ✓ a compensatory elevation in cardiac output
    - ✓ Although an increase in venous capacitance diminishes venous return to the heart, cardiac output is maintained via tachycardia and the decrease in afterload due to systemic vasodilation
  - ❖ Late septic shock (cold or hypodynamic) characterized by
    - ✓ impaired myocardial contractility due to local and systemic release of cardiac depressants,
    - ✓ worsening peripheral perfusion, vasoconstriction, extremity mottling, oliguria, and hypotension
- ❖ The terms sepsis, severe sepsis, and septic shock are used to quantify the magnitude of the systemic inflammatory reaction.
  - ❖ sepsis
    - ✓ evidence of an infection, as well as systemic signs of inflammation (e.g., fever, leukocytosis, and tachycardia).
  - ❖ Severe sepsis
    - ✓ Hypo perfusion with signs of organ dysfunction
  - ❖ Septic shock
    - ✓ requires the presence of the above, associated with more significant evidence of tissue hypoperfusion and systemic hypotension.

### Treatment of septic shock

- ❖ Start with secure of airway and ventilation
- ❖ Severely obtunded & those with work of breathing is require intubation and ventilation
- ❖ Empiric antibiotics must be started
- ❖ vasopressors may be necessary to treat patients with septic shock
- ❖ For detail refer medical side

## Assessment of Endpoints in Resuscitation

- ❖ What are the best indicators of resuscitation?
- ❖ Generally those are classified as the following
  - ✓ Systemic/global
    - ✓ Lactate
    - ✓ Base deficit
    - ✓ Cardiac output
    - ✓ Oxygen delivery and consumption
    - ✓ VS(BP, PR)
  - ✓ Tissue specific
    - ✓ Gastric tonometry
    - ✓ Tissue pH, oxygen, carbon dioxide levels
    - ✓ Near infrared spectroscopy
  - ✓ Cellular
    - ✓ Membrane potential
    - ✓ Adenosine triphosphate
- ❖ BP & PR are not definite indicators of resuscitation b.c those are normal in Compensated shock
- ❖ What is compensated shock?
  - ✓ When inadequate tissue perfusion persists despite normalization of blood pressure and heart rate.
  - ✓ Even with normalization of blood pressure, heart rate, and urine output, 80% to 85% of trauma patients have inadequate tissue perfusion, as evidenced by increased lactate or decreased mixed venous O<sub>2</sub> saturation
  - ✓ Patients failing to reverse their lactic acidosis within 12 hours of admission (acidosis that was persistent despite normal heart rate, blood pressure, and urine output) developed an infection three times as often as those who normalized their lactate levels within 12 hours of admission
  - ✓ In addition, mortality was fourfold higher in patients who developed infections
- ❖ Both injury severity score and occult hypotension (lactic acidosis) longer than 12 hours were independent predictors of infection.
- ❖ Thus, recognition of subclinical hypo perfusion requires information beyond vital signs and urinary output.
- ❖ Therefore, surrogate parameters have been sought to estimate the O<sub>2</sub> debt( adequacy of resuscitation); serum lactate and base deficit have been shown to correlate with O<sub>2</sub> debt.

❖ **Serum Lactate**

- ✓ Lactate is generated by conversion of pyruvate to lactate by lactate dehydrogenase in the setting of insufficient oxygen
- ✓ Normally removed 50% by liver & 30% by kidney
- ✓ Elevated serum lactate is an indirect measure of the O<sub>2</sub> debt,
- ✓ When it is corrected is determine the prognosis...e.g
  - ✓ If it corrected with 24hr 100% survival
  - ✓ “ “ “ 24-48hr 78% “
  - ✓ “ “ “ >48hr only 15% “
- ✓ But the individual variability of lactate may be affect its accuracy
- ✓ So, Base deficit and volume of blood transfusion required in the first 24 hours of resuscitation may be better predictors of mortality than the plasma lactate alone

❖ **Base Deficit**

- ✓ Base deficit is the amount of base or acid in millimoles that is required to titrate 1 L of whole blood to a pH of 7.40 with the sample fully saturated with O<sub>2</sub> at 37°C (98.6°F) and a partial pressure of CO<sub>2</sub> of 40 mmHg.
- ✓ Measured by arterial blood gas analysis in clinical practice as it is readily and quickly available
- ✓ Base deficit can
  - ✓ be stratified into mild (3–5 mmol/L), moderate (6–14 mmol/L), and severe (15 mmol/L)
  - ✓ Both the magnitude of the perfusion deficit as indicated by the base deficit and the time required to correct it are major factors determining outcome in shock.
- ❖ Indeed, when elevated base deficit persists (or lactic acidosis) in the trauma patient, ongoing bleeding is often the etiology.
- ❖ Trauma patients admitted with a base deficit greater than 15 mmol/L required twice the volume of fluid infusion and six times more blood transfusion in the first 24 hours compared to patients with mild acidosis.
- ❖ Generally as the base deficit increased @ admission
  - ✓ The resuscitation should intensive
  - ✓ Higher rate morbidity and mortality



# BLOOD TRANSFUSION

By -Dawit Birhanu(sms)

## Blood components

### Banked Whole Blood-

- Now rarely indicated and rarely available. With the new preservatives, the shelf life has been extended to  $40 \pm 5$  days. At least 70% of the transfused erythrocytes remain in the circulation for 24 hours after transfusion and are viable. The hemolysis that occurs during storage is insignificant.

### Fresh Whole Blood –

- Refers to blood that is administered within 24 hours of its donation and is rarely indicated. Because of the time required for testing for infectious disease, it must be administered untested. One unit of platelet concentrate has more viable platelets than 1 unit of fresh blood. Fresh whole blood is a poor source of platelets and factor VIII.

### Packed red cells-

- Cells are spun down and concentrated.
- Each unit = 330 ml(hct=50–70%)
- PRCs are stored in a SAG-M solution (saline–adenine–glucose–mannitol) to increase shelf-life to 5 weeks at  $2-6^{\circ}\text{C}$ .

### Fresh-frozen plasma-

- is rich in coagulation factors & removed from fresh blood and stored at  $-40$  to  $-50^{\circ}\text{C}$  with a 2 years shelf-life. It is the first-line therapy in the treatment of coagulopathic haemorrhage .

### Platelet -

- pooled platelet concentrate containing about  $250 \times 10^9$  cells per litre. Platelets are stored on a special agitator at  $20-24^{\circ}\text{C}$  and have a shelf-life of only 5 days.

### Cryoprecipitate-

- is precipitate of FFP
- rich in factor VIII and fibrinogen
- stored at  $-30^{\circ}\text{C}$  with a 2-year shelf-life
- given in low-fibrinogen states or in factor VIII deficiency

## Prothrombin complex concentrate –

- contain factors II, IX and X(factor VII may be included)
- indicated for the emergency reversal of anti-coagulant (warfarin) therapy in uncontrolled haemorrhage

## Indications for blood transfusion

- acute blood loss, to replace circulating volume and maintain oxygen delivery;
  - in case of hemorrhagic shock, major surgery, extensive burns.
- Perioperative anaemia, to ensure adequate oxygen delivery during the perioperative phase( here GUH cut off for major surgery is HCT 30%)
- symptomatic chronic anaemia without haemorrhage or impending surgery.

## Complications from a single transfusion

### ABO incompatibility

- CPs=hematuria, bilateral loin pain, fever, chills, rigor, oliguria(ATN)
- RX=stop blood .send it to blood bank & recheck.
  - Repeat coagulation profile
  - Iv fluids, monitor UOP, U/A for Hgb
  - Diuretic- furosemide

### Minor incompatibility reaction

- Due to extra vascular hemolysis(mild ,occurs 2-21days)
- CPs-fever, malaise & jaundice
- RX-supportive

### Febrile reaction

- Due to sensitization to WBCs or platelets
- ↑ temperature but no hemolysis
- Use of 20-40mm filter or leukocyte depleted blood avoids it.

### Allergic reaction

- Due to allergy to plasma products CF-chills, rigor & rashes
- RX- antihistamins

## Embolism

- Although air embolism has been reported as a complication, healthy individuals can tolerate large amounts of air injected intravenously at a rapid rate. The normal adult can tolerate an embolism of 200 mL of air. Smaller amounts, however, can cause alarming signs. Manifestations of venous air embolism include a rise in venous pressure, cyanosis, a "mill wheel murmur" over the precordium, tachycardia, hypotension, and syncope.
- Treatment - consist of placing the patient on the left side in a head down position with the feet up. Arterial air embolism may be visible in the retinal vessels or as blood flows from transected vessels. Plastic tubes used for transfusion can break off within a vein and embolize into the right atrium or pulmonary artery. Embolized catheters have been successfully removed.

## Thrombophlebitis

- Prolonged infusions into a peripheral vein are associated with venous thrombosis. Intravenous infusions that last more than 8 hours are more likely to be followed by thrombophlebitis, with an increased incidence in the lower limbs.
- Treatment consists of discontinuation of the infusion and the application locally of warm moist compresses. Embolization from superficial thrombophlebitis or venous thrombosis is extremely rare.

## Overtransfusion and Pulmonary Edema

- Overloading the circulation is an avoidable complication. It can occur with rapid infusion of blood, plasma expanders, and other fluids, particularly in patients with heart disease. To prevent the complication, the central venous pressure should be measured whenever large amounts of fluid are administered. Circulatory overload is manifest by a rise in venous pressure, dyspnea, and cough. Rales can generally be heard at the lung bases.
- Treatment consists of diuresis, placing the patient in a sitting position, and, occasionally, venesection.

## Syndrome of transfusion-related acute lung injury (TRALI)

- is sometimes seen after transfusion and is characterized as mild to life-threatening. Noncardiogenic pulmonary edema is often accompanied by fever, rigors, and a "white out" chest x-ray.

- Treatment is discontinuation of any transfusion, notification of the transfusion service, and intensive pulmonary support, sometimes including intubation. This type of pulmonary edema does not respond to diuretics and is thought to be caused by infused donor antigrenulocyte or anticlass I or II MHC antibodies.

### Infection:

- Bacterial infection - contamination of infused blood is rare and can be acquired from contaminated collection bags or poor cleaning of the donor's skin. Gram-negative organisms, especially coliform and *Pseudomonas* species, which are capable of growth at 4°C (39.2°F), are the most common cause. Clinical manifestations include fever, chills, abdominal cramps, vomiting, and diarrhea. There may be hemorrhagic manifestations and increased bleeding. If the diagnosis is suspected, the transfusion should be discontinued and the blood cultured. Emergency treatment includes oxygen, adrenergic blocking agents, and antibiotics.
- Hepatitis, HIV, malaria, syphilis.
  - it is mandatory to screen the blood for these diseases before transfusion.

### Complications from massive transfusion

- The term massive transfusion implies a single transfusion greater than 2500 mL or 5000 mL transfused over a period of 24 hours
  - Coagulopathy
  - Hypocalcaemia
  - Hyperkalaemia
  - Hypokalaemia
  - Hypothermia
  - iron overload due to repeated transfusions over long periods of time (eg. Thalassaemia )
    - (Each transfused unit of RBCs contains 250 mg of elemental iron.)

# Fluid & electrolyte imbalance

By -Cheru Lilay(sms)

## BODY FLUIDS

- ❖ Total Body Water(TBW)
  - ✓ *Is relatively constant for an individual and is primarily a reflection of body fat.*
  - ✓ *Lean tissues such as muscle and solid organs have higher water content than fat and bone. In an average young adult male 60% vs. young adult female it is 50%*
  - ✓ *The highest percentage of TBW is found in newborns, with approximately 80% of their total body weight comprised of water.*

## Classification of Body Fluid Changes

- ❖ *Disorders in fluid balance may be classified into three general categories:*
  - *disturbances in*
    - a) *volume,*
    - b) *concentration, and*
    - c) *Composition.*
- ❖ *Although each of these may occur simultaneously, each is a separate entity with unique mechanisms demanding individual correction*

## Disturbances in Fluid Balance

- ❖ *Extracellular volume deficit is the most common fluid disorder in surgical patients and can be either acute or chronic.*
  - *Acute volume deficit is associated with cardiovascular and central nervous system signs(shock), whereas chronic deficits display tissue signs, such as a decrease in skin turgor and sunken eyes( dehydration) , in addition to cardiovascular and central nervous system signs.*
  - *Shock vs. DHN???*

## FLUID AND ELECTROLYTE THERAPY

- ❖ Parenteral Solutions
  - ❖ *The type of fluid administered depends on the patient's volume status and the type of concentration or compositional abnormality present.*
  - ❖ *Both lactated Ringer's solution and normal saline are considered isotonic and are useful in replacing GI losses and correcting extracellular volume deficits.*
    - ❖ *Causes of correcting extracellular volume deficits are any GI loss, burn, dehydration....*

## ❖ **Crystalloids**

- ❖ *Solutions of electrolytes and water are collectively referred to as crystalloids*
- ❖ *the most widely used fluids for parenteral administration*
- ❖ *Inexpensive , highly effective for fluid maintenance and replacement, and have outstanding safety profiles*

### **Types of crystalloids**

#### ➤ **Lactated Ringer's**

- *slightly hypotonic in that it contains 130 mEq of lactate.*
- *It is ideal for the replacement of existing fluid deficits when serum electrolyte concentrations are normal why?*
  - *Because Lactate is used rather than bicarbonate because it is more stable in IV fluids during storage. It is converted into bicarbonate( used to buffer acid base imbalance) by the liver after infusion, even in the face of hemorrhagic shock.*

#### ➤ **Sodium chloride(0.9%) (NS)**

- *is mildly hypertonic, containing 154 mEq of sodium that is balanced by 154 mEq of chloride.*
- *The high chloride concentration imposes a significant chloride load on the kidneys and may lead to a hyperchloremic metabolic acidosis.*
  - *So, it is an ideal solution, for correcting volume deficits associated with hyponatremia, hypochloremia, and metabolic alkaloids*

#### ➤ **D5( 5% dextrose) mean ..**

- *50 g of dextrose per liter*
- *supplies 200 kcal/L*
  - *dextrose is always added to solutions containing <0.45% sodium chloride(hypotonic) to maintain osmolality and thus prevent the lysis of red blood cells that may occur with rapid infusion of hypotonic fluids. The addition of potassium is useful once adequate renal function and urine output are established.*

#### ➤ **0.45% sodium chloride**

- *useful for replacement of ongoing GI losses as well as for maintenance fluid therapy in the postoperative period.*
- *This solution provides sufficient free water for insensible losses and enough sodium to aid the kidneys in adjustment of serum sodium levels.*
- *Because this is hypotonic causes RBC lysis to prevent this ...*
  - *add 5% dextrose (50 g of dextrose per liter)*

**Table 3-12 Electrolyte Solutions for Parenteral Administration**

Solution	Electrolyte Composition (mEq/L)						
	Na	CL	K	HCO <sub>3</sub> <sup>-</sup>	Ca	Mg	mOsm
Extracellular fluid	142	103	4	27	5	3	280-310
Lactated Ringer's	130	109	4	28	3		273
0.9% Sodium chloride	154	154					308
D <sub>5</sub> 0.45% Sodium chloride	77	77					407
D5W							253
3% Sodium chloride	513	513					1026

## Alternative Resuscitative Fluids

- ❖ *Hypertonic saline*

- ❖ *Hypertonic saline solutions (3.5% and 5%)*

- ❖ used for correction of severe sodium deficits

- ❖ *Hypertonic saline (7.5%)*

- ❖ has been used as a treatment modality in patients with closed head injuries.
    - ❖ It has been shown to increase cerebral perfusion and decrease intracranial pressure, thus decreasing brain edema.
    - ❖ appears to increase intravascular volume in patients more quickly than isotonic solutions, and the total resuscitation volume requirement may be decreased
    - ❖ reduces the systemic inflammatory response syndrome (SIRS) and may attenuate multiple organ dysfunction syndrome
    - ❖ *These cardiovascular and hemodynamic effects are short-lived, in general lasting from 60 to 120 minutes. The addition of colloids such as dextran or hetastarch can prolong the effect.*
    - ❖ Adverse effect
      - ❖ increased bleeding, because hypertonic saline is an arteriolar vasodilator
      - ❖ electrolyte abnormalities such as hypernatremia

- ❖ **Colloids**
  - ❖ also are used in surgical patients
  - ❖ Due to their molecular weight, they are confined to the intravascular space, and their infusion results in more efficient transient plasma volume expansion.
  - ❖ However, under conditions of severe hemorrhagic shock, capillary membrane permeability increases; this permits colloids to enter the interstitial space, which can worsen edema and impair tissue oxygenation
  - ❖ *Colloid solutions with smaller particles and lower molecular weights exert a greater oncotic effect but are retained within the circulation for a shorter period of time than larger and higher molecular weight colloids.*
  - ❖ *Are limited in use because of their doubtful effectiveness, cost, and potential complication.*
- ❖ Four major types of colloids are available
  - ❖ *Albumin*
  - ❖ *Dextrans*
  - ❖ *hetastarch, and*
  - ❖ *Gelatin*
- ❖ **Albumin (molecular weight 70,000)**
  - ❖ is prepared from heat-sterilized pooled human plasma.
  - ❖ It is typically available as either a 5% solution (osmolality of 300 mOsm/L) or 25% solution (osmolality of 1500 mOsm/L).
  - ❖ Because it is a derivative of blood, it can be associated with allergic reactions.
  - ❖ Albumin has been shown to induce renal failure and impair pulmonary function when used for resuscitation in hemorrhagic shock.
- ❖ **Dextrans**
  - ❖ are glucose polymers produced by bacteria grown on sucrose media and are available as either 40,000 or 70,000 molecular weight solutions.
  - ❖ They lead to initial volume expansion due to their osmotic effect but are associated with alterations in blood viscosity.
  - ❖ Thus dextrans are used primarily to lower blood viscosity rather than as volume expanders.
  - ❖ Dextrans have been used, in association with hypertonic saline, to help maintain intravascular volume.
- ❖ **Hetastarches**
  - ❖ Administration of hetastarch can cause hemostatic derangements related to decreases in von Willebrand's factor and factor VIII
  - ❖ and its use has been associated with postoperative bleeding in cardiac and neurosurgery patients.
  - ❖ Hetastarch also can induce renal dysfunction in patients with septic shock and in recipients of kidneys procured from brain-dead donors.
  - ❖ Currently, hetastarch has a limited role in massive resuscitation because of the associated coagulopathy and hyperchloremic acidosis (due to its high chloride content).



## General classification of IV fluids

Crystalloids	colloids
<ul style="list-style-type: none"> <li>✓ Are balanced salt solutions</li> <li>✓ use to restore extracellular volume by exerting significant hydrostatic effect on capillaries due to this pulmonary &amp; GI wall edema is common</li> <li>✓ Causes hemodilution due larger volume required</li> <li>✓ Although it expands the intravascular volume, it also expands the interstitial space by approximately three times as much as the plasma.</li> <li>✓ Cheap</li> </ul>	<ul style="list-style-type: none"> <li>✓ Contain larger molecules &amp; remain in the intravascular compartment</li> <li>✓ expand the plasma by increasing the colloid oncotic pressure</li> <li>✓ requiring smaller volumes for resuscitation than crystalloids</li> <li>✓ Allergic reaction is common</li> <li>✓ Pulmonary edema possible if given in injured lung b.c it can extravasates</li> <li>✓ Expensive</li> </ul>

### Correction of Volume Abnormalities

- Maintenance Fluid Therapy
  - ✓ It is the usual daily requirement
  - ✓ Calculation of maintenance fluid replacement does not include replacement of either preexisting deficits or ongoing additional losses
  - ✓ It to replace basal fluid requirement i.e the sensible and insensible losses
  - ✓ how it is calculated

For 0-10 kg	Give 100 mL/kg/d
For the next 10-20 kg	Give an additional 50 mL/kg/d
For weight >20 kg <sup>b</sup>	Give 20 mL/kg/d

- ✓ In patients who may be intolerant of hypervolemia (i.e., cardiac disease, elderly patients), the requirement per kilogram over 20 kg is decreased to 15 mL/kg per day.
- ✓ E.g for 70kg the MF is 2500ml per day

- ✓ *For maintenance therapy, 1 to 2 mEq/kg per day of sodium is required, & Potassium requirements are approximately 0.5 to 1 mEq/kg per day .*
- ✓ *e.g. If sodium is replaced at 2 mEq/kg per day and potassium is replaced at 1 mEq/kg per day, a 70-kg patient requires 2,500 mL of water containing 140 mEq of sodium and 70 mEq of potassium. Each liter of parenteral solution would contain 56 mEq of sodium and 28 mEq of potassium*
- ✓ *Short-term maintenance therapy generally does not require addition of calcium, phosphate, or magnesium*
- ✓ **Replacement of Ongoing Fluid Losses**
  - ✓ *Once volume deficits have been replaced and maintenance fluids have been calculated and given, the overall fluid balance of the patient can be maintained by replacement of fluid losses beyond those considered to be maintenance*
  - ✓ *Ongoing losses from nasogastric tubes, stomas, fistulas, and other measurable sources are recorded during the course of care and can be replaced in fairly straightforward fashion*
- ✓ **Intraoperative Fluid**
  - ✓ *Intraoperative replacement with isotonic solutions is usually accomplished at rates of 500 to 1,000 mL/h.*
- ✓ **Postoperative Fluid Therapy and Monitoring**
  - ✓ *is adjusted to the patient's volume status at the completion of the operative procedure, as well as to anticipated ongoing fluid losses*
  - ✓ *Isotonic solutions should be used for volume resuscitation during the early postoperative period.*
  - ✓ *It is best not to give potassium supplements during this period without indication why.... Surgery by itself causes Hyperkalemia due cell damage & stress*
  - ✓ **Routine monitoring of postoperative fluid status consists**
    - ✓ *serial vital signs and urine output measurements*
    - ✓ *intake and output data are recorded*
    - ✓ *Weight should also be recorded daily b.c*
      - ✓ *postsurgical , rapid fluctuations in weight are generally related to changes in TBW*
    - ✓ **Urine specific gravity**
      - ✓ *greater than 1.010 to 1.012 indicates that the urine is being concentrated (relative to plasma)*
      - ✓ *less than 1.010 indicates that dilute urine is being produced*
      - ✓ *Both volume depletion and cardiac failure are accompanied by increased urine concentration and low urine outputs.*
      - ✓ *Urine specific gravity in the range of plasma (1.010 to 1.012) may indicate either adequate hydration or the inability of the kidneys either to dilute or concentrate the urine*

## Correction of Life-Threatening Electrolyte Abnormalities

### Hypernatremia

- *Hypernatremia is a less common problem in surgical patients than hyponatremia*
- *Mainly this is due to a Concentration Changes in Body Fluids i.e ...*
  - *sodium abnormality are mainly affected by body fluid status (Volume excess or deficits) than intakes....*
- *It can happen in low , normal or high volume status...*

Low	Free water loss Insensible—skin, respiratory Gastrointestinal loss Excessive hyperosmotic peritoneal dialysis Renal Diuretics, diabetes insipidus, nonliguric renal failure
Normal	Same as “Low” volume status but with improper correction
High	Free water loss Increased mineralocorticoids—hyperaldosteronism, hypercortisolism Iatrogenic Excessive sodium administration

#### ❖ Clinical Features

- ✓ *Symptomatic hypernatremia usually occurs only in patients with impaired thirst or restricted access to fluid, because thirst will result in increased water intake.*
- ✓ *Symptoms are rare until the serum sodium concentration exceeds 160 mEq/L but, once present, are associated with significant morbidity and mortality.*
- ✓ *symptoms are related to hyperosmolarity , central nervous system effects predominate*
- ✓ *Water shifts from the intracellular to the extracellular space which results in cellular dehydration*
- ✓ *range from restlessness and irritability to seizures, coma, ataxia, spasm and death*

#### ❖ Treatment

- ✓ *Treatment of hypernatremia usually consists of treatment of the associated water deficit.*
- ✓ *In hypovolemic patients, volume should be restored with normal saline before the concentration abnormality is addressed.*

- ✓ *The formula used to estimate the amount of water required to correct hypernatremia is as follows:*

$$\text{Water deficit (L)} = \frac{\text{serum sodium} - 140}{140} \times \text{TBW}$$

Estimate TBW as 50% of lean body mass in men and 40% in women

$$\text{water requirement} = \frac{\text{desired change in } [\text{Na}^+]_i \times \text{TBW}}{\text{desired } [\text{Na}^+]_i}$$

- ❖ *In other way*

- ❖ *E.g a 70-kg patient with a TBW of 42 L (TBW 60% of body weight) has a serum sodium of 170 mEq/L. so what is required water*
    - ✓ *Giving is ,current serum sodium =170,TBW=43, tents take normal sodium is 154*
    - ✓ *= ((170-154)x43)/154=4.3L*
  - ❖ *How much the rate ? slow for chronic hyponatremia why?*
    - ✓ *In chronic hypernatremia, the cells in the brain gradually adapt by increasing intracellular osmotic solute content, thereby regaining cellular volume. These cellular changes are not readily reversed. A sudden decrease in extracellular sodium concentration, and therefore osmolality, results in cell , brain edema*
- ❖ *The rate of fluid administration should be titrated to achieve a decrease in serum sodium concentration of no more than 1 mEq/h and 12 mEq/day for the treatment of acute symptomatic hypernatremia.*
- ❖ *Even slower correction should be undertaken for chronic hypernatremia (0.7 mEq/h),*
- ❖ *Oral or enteral replacement is acceptable in most cases, or IV replacement with half- or quarter-normal saline can be used*
- ❖ *Frequent neurologic evaluation as well as frequent evaluation of serum sodium levels also should be performed.*

## **HYPONATREMIA**

- ❖ *frequently seen in the postoperative or postinjury period when ADH is elevated as a component of the normal stress response to injury*
- ❖ *as a consequence of either sodium depletion or dilution*
- ❖ *Because volume expansion and hyponatremia diminish the effects of ADH on the collecting tubules, hyponatremia is usually self-limited under these circumstances, with serum sodium concentration rarely falling below 130 mEq/L unless exacerbated by exogenous free water administration.*

### **❖ Clinical Features...when is symptomatic ?**

- ❖ *Chronic hyponatremia is often asymptomatic until serum [Na<sup>+</sup>] falls below 110 to 120 mEq/L*
- ❖ *in acute drop serum [Na<sup>+</sup>] to the 120 to 130 mEq/L range may symptomatic*
- ❖ *Symptoms related to the CNS result largely from cellular water intoxication, and permanent CNS injury can occur if it is left untreated.*
- ❖ *Central nervous system*
  - ✓ *Headaches*
  - ✓ *Confusion*
  - ✓ *Delirium*
  - ✓ *Coma*
  - ✓ *Seizures*
- ❖ *Gastrointestinal Anorexia*
  - ✓ *Nausea*
  - ✓ *Vomiting*
- ❖ *Musculoskeletal Weakness*
  - ✓ *Fatigue*
  - ✓ *Muscle cramps*

### **❖ Treatment**

- ❖ *Most cases of hyponatremia can be treated by free water restriction and, if severe, the administration of sodium.*
  - ❖ *If neurologic symptoms are present, 3% normal saline should be used to increase the sodium by no more than 1 mEq/L per hour until the serum sodium level reaches 130 mEq/L or neurologic symptoms are improved.*
  - ❖ *Correction of asymptomatic hyponatremia should increase the sodium level by no more than 0.5 mEq/L per hour to a maximum increase of 12 mEq/L per day, and even more slowly in chronic hyponatremia.*
  - ❖ *The rapid correction of hypomania not recommended*
- *Is a compositional changes in body fluids , mainly due to intake & exertion related other than body fluid imbalance*

## Hyperkalemia

- ✓ *defined as a serum potassium concentration above the normal range of 3.5 to 5.0 mEq/L.*
- ✓ *It is caused by*
  - ✓ *excessive potassium intake*
    - ✓ *can be either from oral or IV supplementation, or from red cell lysis after transfusion*
  - ✓ *increased release of potassium from cells*
    - ✓ *Acidosis and a rapid rise in extracellular osmolality from hyperglycemia or IV mannitol can raise serum potassium levels by causing a shift of potassium ions to the extracellular compartment.*
  - ✓ *impaired potassium excretion by the kidneys*
    - ✓ *Potassium-sparing diuretics*
    - ✓ *Renal insufficiency/failure*
- ✓ *Because 98% of total body potassium is in the intracellular fluid compartment, even small shifts of intracellular potassium out of the intracellular fluid compartment can lead to a significant rise in extracellular potassium.*

### ❖ *Clinical feature*

- ✓ *clinical manifestations of hyperkalemia are primarily related to membrane depolarization related to intra & extracellular imbalance*
- ✓ *The most life-threatening manifestations are related to the cardiac effects*
  - ✓ *Arrhythmia, arrest*
  - ✓ *peaked T waves (early), widened QRS complex, flattened P wave, prolonged PR interval, sine wave formation, and ventricular fibrillation.*
- ✓ *Neuromuscular manifestations of severe hyperkalemia include weakness progressing to flaccid paralysis*
- ✓ *GI... Nausea/vomiting, colic, diarrhea*

### ❖ *Treatment.... The goals of therapy include*

- ✓ *protecting the cells from the effects of increased potassium( neutralization)*
- ✓ *reducing the total body potassium*
- ✓ *shifting potassium from the extracellular to the intracellular space*
- ✓ *For all patients, exogenous sources of potassium should be removed, including potassium supplementation in IV fluids and enteral and parenteral solution.*
- ✓ *Potassium removal*
  - ✓ *Is a definitive therapy*
  - ✓ *removed from the body using a cation-exchange resin such as Kayexalate that binds potassium in exchange for sodium*
  - ✓ *Kayexalate it can given*
    - ✓ *usual oral dose is 40 g dissolved in 20 to 100 mL of sorbitol*
    - ✓ *Each gram removes approximately 1 mEq of potassium*

- ❖ **Shift potassium**
  - ✓ *regular insulin 5–10 units IV & Glucose 1 ampule of D50*
    - ✓ *Why D50 added...?...To avoid insulin-induced hypoglycemia*
  - ✓ *Bicarbonate 1 ampule IV ...MOA*
    - ✓ *the increase in extracellular pH shifts potassium into the cells*
- ❖ **Counteract cardiac**
  - ✓ *urgent & first Rx in severe cases*
  - ✓ *Calcium gluconate 5–10 mL of 10% solution*
  - ✓ *to counteract the myocardial effects of hyperkalemia*
  - ✓ *The effects are transient and usually last approximately 30 minutes*

## Hypokalemia

- ✓ *Hypokalemia is much more common than hyperkalemia in the surgical patient.*
  - ✓ *caused by*
    - ✓ *inadequate potassium intake*
    - ✓ *excessive renal potassium excretion*
    - ✓ *potassium loss in pathologic GI secretions, such as with diarrhea, fistulas, vomiting, or high nasogastric output*
    - ✓ *intracellular shifts from metabolic alkalosis or insulin therapy*
- ...increment in PH vs Hypokalemia is expressed by...*

Potassium decreases by 0.3 mEq/L for every 0.1 increase in pH above normal.

### Symptom

- ✓ *Ileus, constipation*
- ✓ *Decreased reflexes, fatigue, weakness, paralysis*
- ✓ *Cardiovascular Arrest*

### Treatment

- ✓ *consists of potassium repletion, the rate of which is determined by the symptoms*
  - ✓ *Oral repletion is adequate for mild, asymptomatic*
  - ✓ *If IV repletion is required, usually no more than 10 mEq/h is advisable in an unmonitored setting but in monitored setting can be increased to 40 mEq/h*
  - ✓ *Caution should be exercised when oliguria or impaired renal function is coexistent*

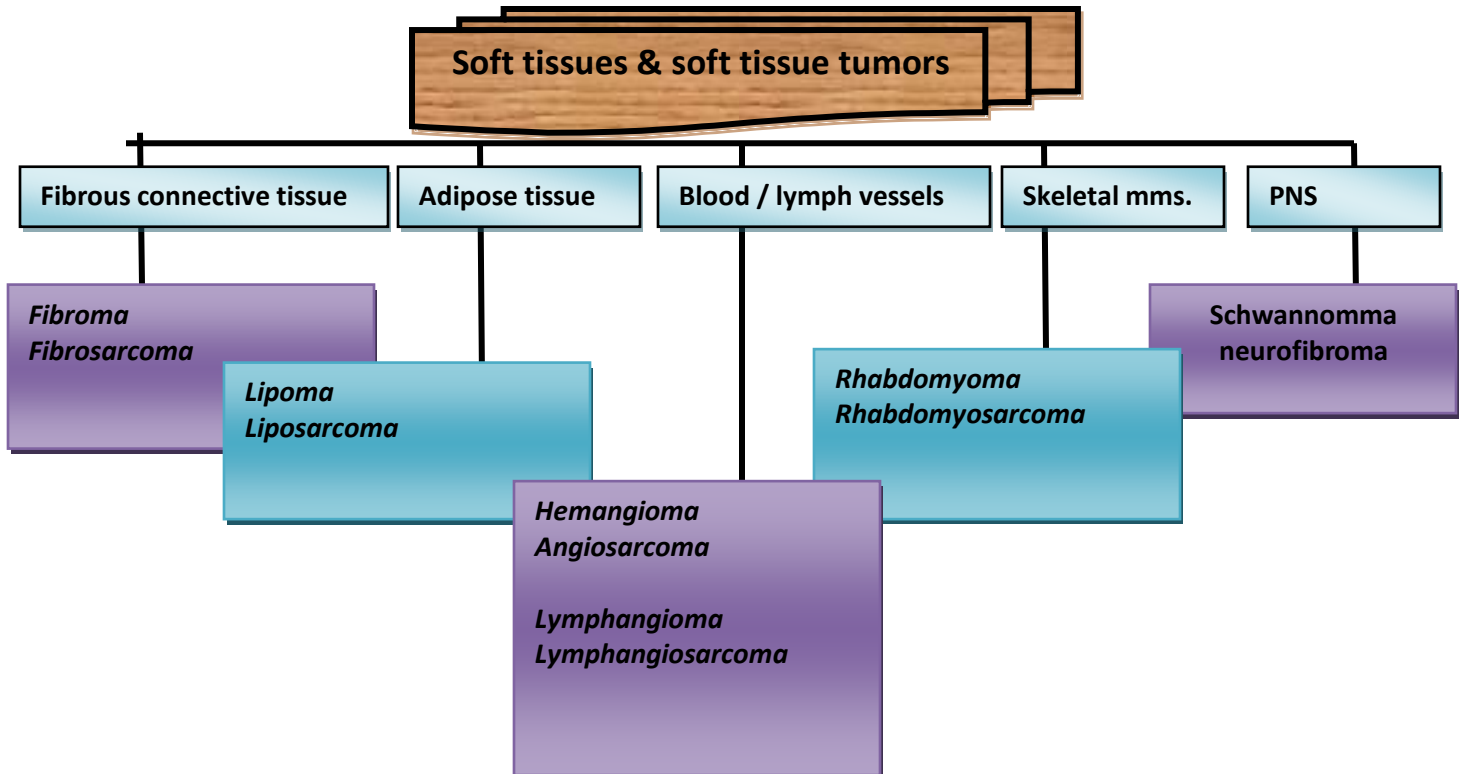
**Pls read the rest.....!**

# SOFT TISSUE TUMORS

- Soft tissue = supportive tissue of various organs & the non-epithelial, extra-skeletal structures exclusive of lymphohematopoietic tissues

NB\*\*\*

- When you are asked to list DDx for a swelling...think of the structures that are found under/overlying the swelling like fibrous connective tissue, adipose tissue, vessels, skeletal muscles, nerves & bones...then list the benign & malignant disease forms of each structure. E.g. fibroma, fibrosarcoma (for fibrous CT)



## Risk factors

- Genetic factors
- Radiation
- Chronic lymphedema
- Environmental carcinogens
- Infections

## Clinical Presentation

- Mass –cmn sign of soft tissue tumor
  - Usually → painless
  - If it has hx of rapid growth...suspect malignancy
- See mass examination (P/E)...page 239



# SKIN GRAFT AND FLAP

BY EYASU FELEKE (SMS)

## Graft

- A tissue of epidermis and varying amounts of dermis that is detached from its own blood supply and placed in a new area with a new blood supply.

## Flap

- Any tissue used for reconstruction or wound closure that retains all or part of its original blood supply after the tissue has been moved to the recipient location.

## Classification of graft

1. Auto-graft → a tissue transferred from one part of the body to the other body part.
2. Homograft(allograft) → a tissue transferred from a genetically different individual of the same species
3. Xeno-graft → a tissue transferred from an individual of one species to other species.

## Indications

- Generally to achieve temporary cover(open wound & to prevent infection) or permanent cover for
  - Skin loss 2<sup>o</sup> to
    - post traumatic (avulsion and degloving injuries)
    - post-surgical (excision of burn wound)
    - infection
  - Mucosal loss (excision lesion of oral cavity or tongue)
  - Cosmetic reasons

## Contraindication

- Beta hemolytic streptococcal infection
- Infected wound with copious discharge
- Avascular wound

## Types of skin grafts

	Definition
<b>Split-thickness grafts</b>	<ul style="list-style-type: none"> <li>• superficial and some deep layers of skin(contain 100% of the epidermis &amp; some part of dermis)</li> <li>• Split-thickness grafts are used for non-weight-bearing parts of the body</li> <li>• Donor sites: - thigh, buttock &amp; abdomen</li> <li>• Can be of two type:- thin split thickness and thick split thickness</li> </ul>
<b>Full-thickness grafts</b>	<ul style="list-style-type: none"> <li>• Contains all of the layers of the skin including blood vessels</li> <li>• For weight-bearing portions of the body and friction prone areas such as, feet and joints.</li> <li>• Resistant to trauma with minimal secondary contractions</li> <li>• Donor sites: - groin and medial aspect of the arm</li> </ul>
<b>Pinch grafts</b>	<ul style="list-style-type: none"> <li>• quarter inch pieces of skin</li> <li>• will then grow to cover injured sites (grow even in areas of poor blood supply and resist infection)</li> </ul>
<b>Pedicle grafts</b>	<ul style="list-style-type: none"> <li>• skin used from the donor site will remain attached to the donor area (remainder is attached to the recipient site)</li> <li>• Blood supply remains intact at the donor location until the new blood supply has completely developed.</li> <li>• Mostly used for hands, face or neck areas of the body</li> </ul>

## Comparison between grafts

Type of Graft	Advantages	Disadvantages
<b>Thin Split Thickness</b>	<ul style="list-style-type: none"> <li>- Best Survival</li> <li>- Heals Rapidly</li> </ul>	<ul style="list-style-type: none"> <li>- Least resembles original skin.</li> <li>- Least resistance to trauma.</li> <li>- Poor Sensation</li> <li>- Maximal Secondary Contraction</li> </ul>
<b>Thick Split Thickness</b>	<ul style="list-style-type: none"> <li>- More qualities of normal skin.</li> <li>- Less Contraction</li> <li>- Looks better</li> <li>- Fair Sensation</li> </ul>	<ul style="list-style-type: none"> <li>- Lower graft survival</li> <li>- Slower healing</li> </ul>
<b>Full Thickness</b>	<ul style="list-style-type: none"> <li>- Most resembles normal skin.</li> <li>- Minimal Secondary contraction</li> <li>- Resistant to trauma</li> <li>- Good Sensation</li> <li>- Aesthetically pleasing</li> </ul>	<ul style="list-style-type: none"> <li>- Poorest survival.</li> <li>- Donor site must be closed surgically.</li> <li>- Donor sites are limited.</li> </ul>

## Requirement for graft survival

- Bed must be well vascularized
- Contact between graft and recipient should be immobile
- Low bacterial count at the site

## Factors that contribute for graft failure

- Malnutrition
- Sepsis
- DM, HIV, immune status, malignancy, CRF, liver failure
- Drugs: - steroids, chemotherapy, vasoconstrictors
- Recipient site of the graft like bone, tendon, infected wound & highly irradiated areas

### Donor site

#### Ideal donor site would provide: -

- Skin that is identical to the skin surrounding the recipient area in terms of
  - Color, thickness, hair & texture.

# ANESTHESIA

By Endalkachew Belayneh (sms)

Anesthesia → temporary induced loss of sensation or awareness.

- It may include
  - analgesia (relief from or prevention of pain)
  - paralysis (muscle relaxation),
  - amnesia (loss of memory), or
  - Unconsciousness.

## TYPES OF ANESTHESIA

### 1) General anesthesia

- To do most complex surgical procedures.
- It can be divided into three distinct phases: induction, maintenance, and emergence.
- Induction — for adults is usually achieved with the injection of intravenous medications.
  - propofol is commonly used because of its favorable recovery profile and short elimination half-life. but bradycardia, hypotension...
    - Other less commonly used :-etomidate & ketamine
      - Etomidate : used when vasodilation and cardiac depression are undesirable
      - Ketamine: analgesia, preserve respiratory drive, bronchodilator and CVS stimulant.
- Maintenance — achieved with volatile or intravenous (IV) anesthetics.
  - Volatile agents are popular because of their ease of delivery, reliable recovery, excellent safety profile, and mode of onset.
    - But causes → fulminant hepatic necrosis
- Emergence ("waking up")- patient backs to a restored state of consciousness.
  - Autonomic hyper-responsiveness → short period of time in which patient's body is aware of emergence without full return to consciousness.
    - Manifest as hypertension, tachycardia, bronchospasm, or laryngospasm.
    - Short acting narcotics, beta blockers, or lidocaine can blunt these responses

## 2) Peripheral nerve block

- For procedures involving the extremities.
- Common blocked nerve groups
  - brachial plexus(interscalene block, infraclavicular block)
  - the sciatic nerve (posterior or lateral approach), and
  - The femoral nerve group (3 in 1 block).
- Also used for operative anesthesia or post-operative pain control.
- major relaxation and analgesia of the selected area without the hemodynamic instability

## 3) Intravenous regional block(Bier block)

- is alternative to peripheral nerve block for extremity surgery, usually the hand or forearm.
- can be applied in pain therapy (eg, chronic regional pain syndrome)

## 4) Neuraxial anesthesia

- for patients undergoing surgery of the lower extremities or abdomen

A) Spinal anesthesia

B) Epidural Anesthesia

### A) Spinal anaesthesia

- also called spinal b ,subarachnoid b ,intradural b and intrathecal block
- Involves the injection of a local anaesthetic into the subarachnoid space.

#### Indications

- Orthopedic surgery on the pelvis, hip, femur, knee, tibia, and ankle,
- Vascular surgery on the legs
- Endovascular aortic aneurysm repair
- Hernia (inguinal or epigastric)
- Hemorrhoidectomy
- Nephrectomy and cystectomy in combination with general anaesthesia
- Transurethral resection of the prostate and transurethral resection of bladder tumors
- Hysterectomy in different techniques used
- Caesarean sections

- severe respiratory disease such as COPD as it avoids intubation and ventilation

### Contraindications

- Non-availability of patient's consent
- Local infection or sepsis at the site
- Bleeding disorders, thrombocytopaenia, or systemic anticoagulation
- Space occupying lesions of the brain
- Anatomical disorders of the spine
- Hypovolemia
- stenosis valvular diseases
- allergy to anesthetics
- multiple sclerosis-controversial...

### Complications

- Hypotension (Neurogenic shock) - Due to sympathetic nervous system blockade.
  - treated with iv fluid and sympathomimetic drugs
- post spinal head ache -associated with size and type of spinal needle used
- Cauda equina injury--very rare, due to the insertion site being too high
- Cardiac arrest--very rare, usually related to the underlying medical condition of the patient
- Spinal canal hematoma--Urgent CT/MRI to confirm the dx followed by
  - urgent surgical decompression to avoid permanent neurological damage
- Epidural abscess--May present as meningitis or abscess.
  - Urgent CT/MRI confirms the dx followed by antibiotics and urgent surgical drainage

### Limitations

- limited to procedures involving most structures below the upper abdomen.
- To administer a spinal anaesthetic to higher levels may affect the ability to breathe by paralysing the intercostal respiratory muscles, or even the diaphragm in extreme cases (called a "high spinal", or a "total spinal", with which consciousness is lost), as well as the body's ability to control the heart rate via the cardiac accelerator fibres.
- Also, injection of spinal anaesthesia higher than the level of L1 can cause damage to the spinal cord, and is therefore usually not.

# *Surgical instruments in picture*



Artery forceps

•



Artery forceps



Abdominal wall retractor



**Abdominal spatula**



**Alli's forceps**



**Alli's forceps**



**Ambu bag**





Angel



Angled forceps



Artery forceps



Artery forceps



Babcock



**Bladder retractor**



**Blade holder**



**Cervical thongs traction**



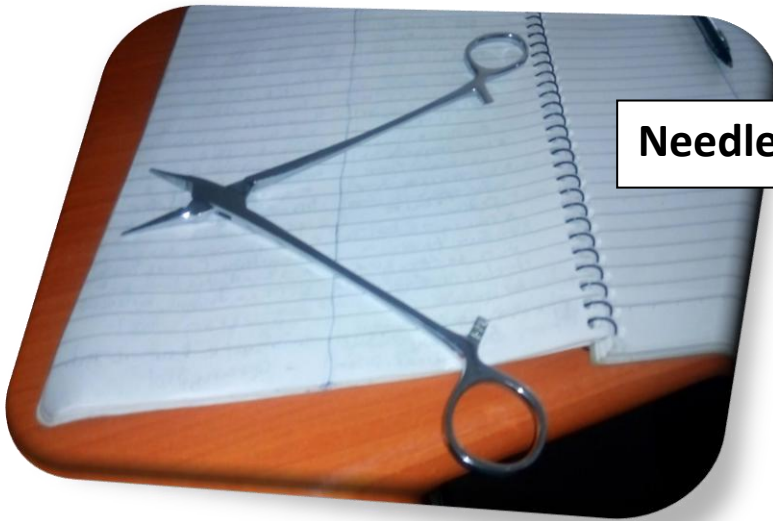
curette



Deaver retractor



Needle holder



**Needle holder**



**Dissector**



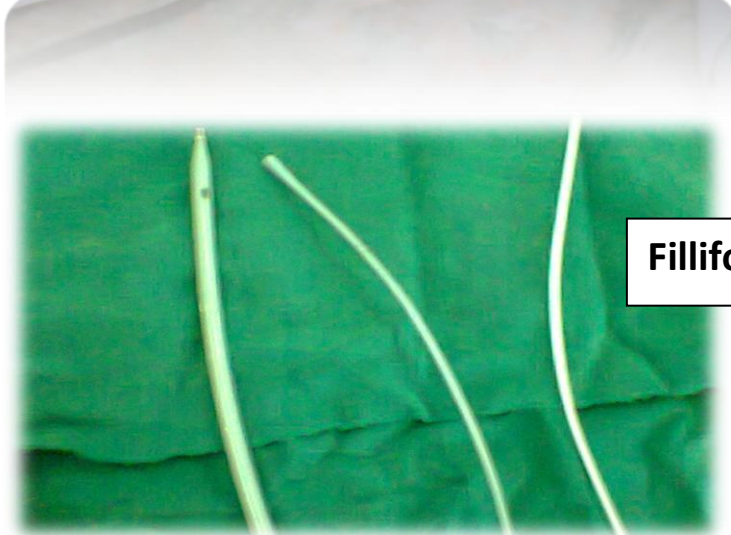
**Dissector**



**Doines retractor**



**Doines retractor**



**Filliform & followers**



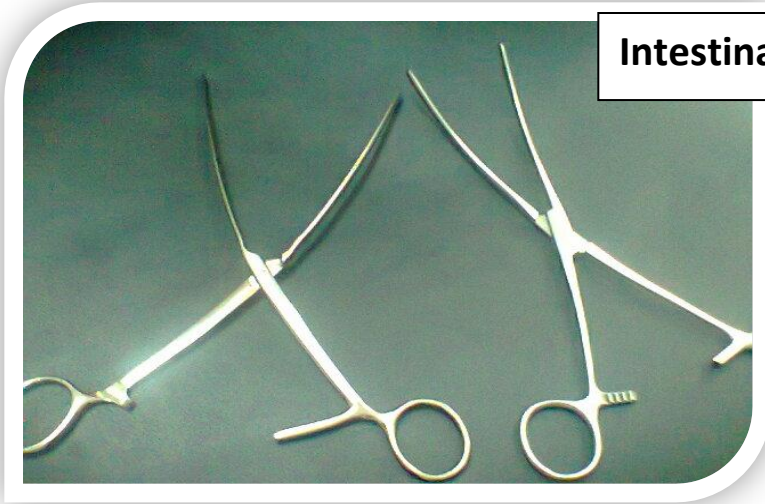
Tissue forceps



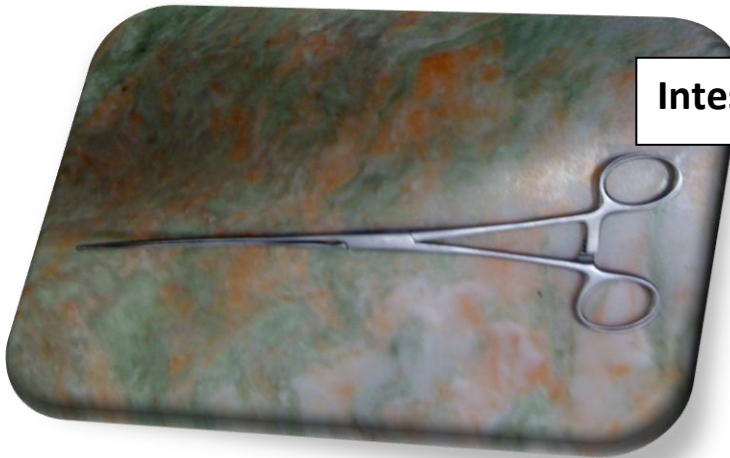
Gally pot



GB forceps



Intestinal clamp



Intestinal clamp



Intestinal clamp





Jiggle saw holder



Knife/scalpal



kocher



kocher



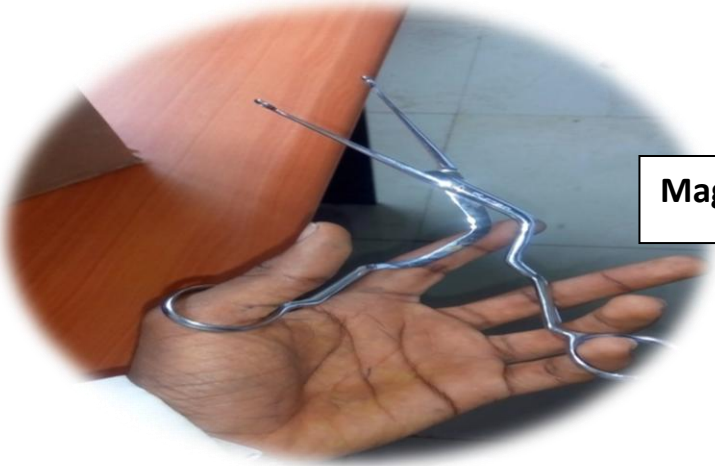
Laryngeal mask



Langenbeck retractor



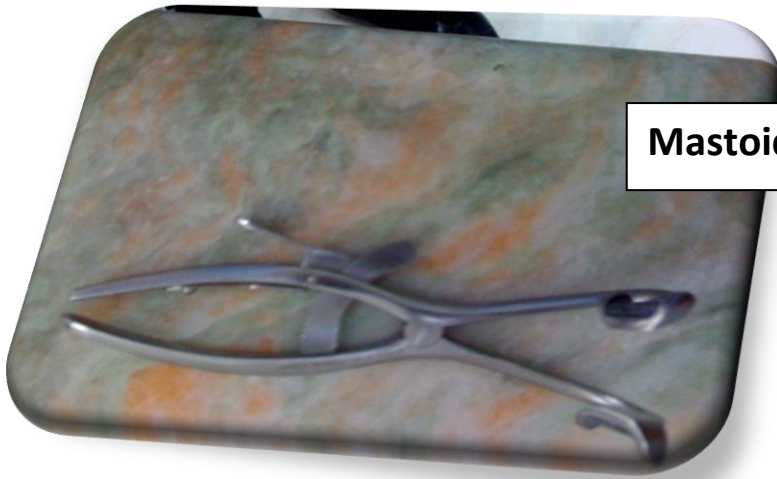
Lungenbek retractor



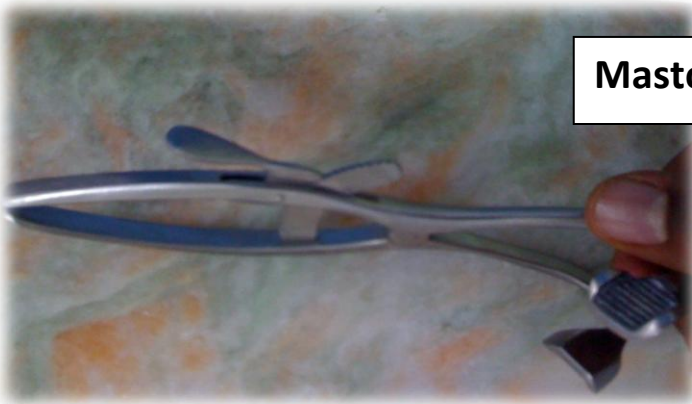
Maggille's forceps



Maggille's forceps



**Mastoid retractor**



**Mastoid retractor**



**Mosquito forceps**



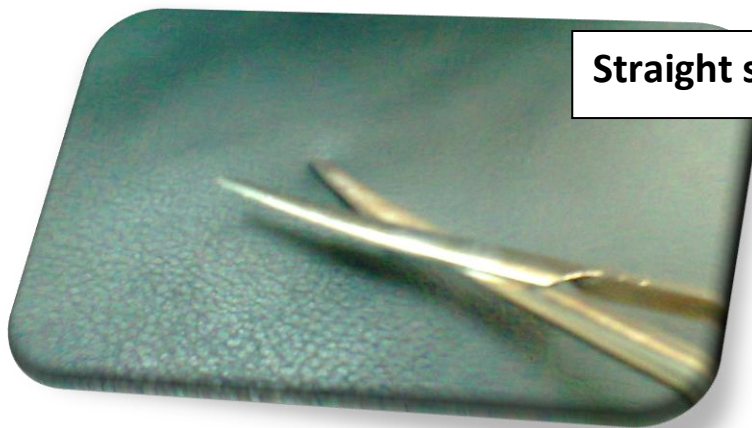
**Speculum**



**Speculum**



**Sponge forceps**



Straight scissor



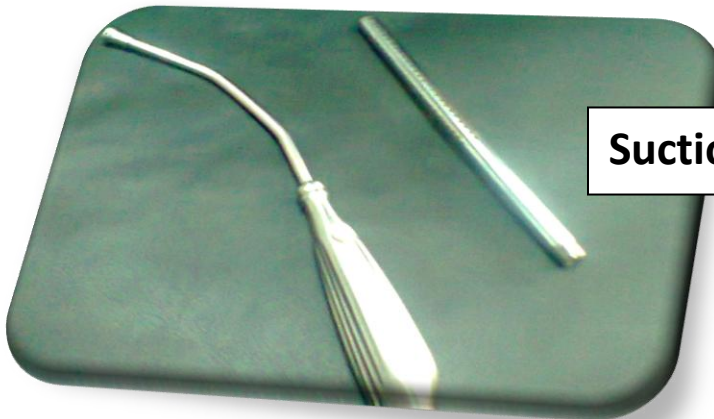
Straight scissor



Stitch scissor



Suction nozzle-metalic suction tip



Suction



Suspensor



Tissue forceps, non toothed



Towel clip



Trocar





Towel clip



Vascular clamps



Vascular clamps

Kkkkkkk.....ha ha ha.....



DEBOL

<https://www.youtube.com/watch?v=RiqQleLPIBg>

Med students **ለመጀመሪያ ጊዜ** tablet ሲቀበሉ.....

Miscellaneous—watch examination of Varicose Vein

አነሳስቶ ላሰጀመረን፣ አሰጀምሮ ላሰጨረሰን ለአምላካችን ኃይል፣ ክብር፣ ምስጋና ይሁን።

<https://www.youtube.com/channel/UCZ0IBTvCctutXxL462pe-RQ>

**DEBOL DFP Channel** - በያለንበት አካባቢያችንን እናስተዋወቅ !!!  
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