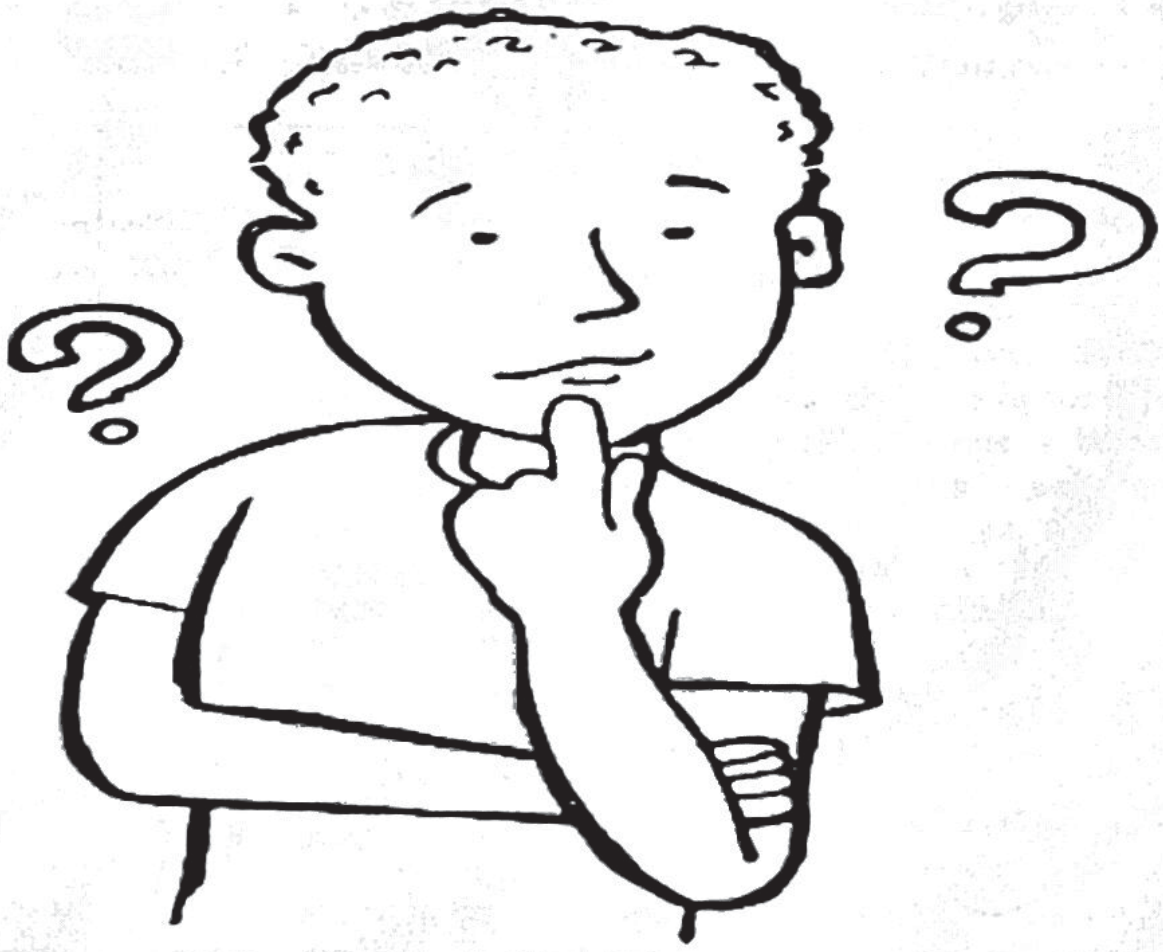
'It is more blessed to give than to receive.

Dr. Mohamed El-Matary

CASES, WRITTEN & OPERATIVE ADDS



How to answer a case

- Write the key points of the case (Pt criteria , Symptoms, signs / General / local)
- Write your diagnosis: anatomical diagnosis (right or left if present), pathological diagnosis, complications and associated diseases.
- Mention the inclusion criteria of your diagnosis according to the key points of the case.
- Write differential diagnosis of the case even if it is not a part of the Q.
- Explain the exclusion criteria of each differential diagnosis.
- In addition to the mentioned symptoms & signs you must mention the rest of related clinical picture of your provisional diagnosis
- Write the mentioned investigation of the case then add other related investigation and don't forget the investigation which exclude your differential diagnosis .
- Regarding treatment you must mention that the patient informed about the different treatment options of the disease and an informed consent was taken.

N.B.

- Take care not to be wrong in the first impression of the diagnosis.
- If there is associated disease in the patient you have to mention how to control it (diabetes mellitus & DVT).
- No prophylactic treatment as the patient is already ill.

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TRAUMATOLOGY CASES

CASE 1

❖ A 24 years old man presented to the ER after a road traffic accident. The patient was conscious but dyspnoeic his blood pressure 90/60, the pulse rate 110/minute. His right chest wall showed bruises, tenderness with crepitus. The breath sounds on the right side were remarkably diminished. His abdomen was free. ⇨ : Rt side Tension Pneumothorax

- What immediate measures should be done to this patient?
- What possible chest injuries have happened in this patient?
- What are the indications of thoracotomy in chest trauma?

CASE 2

❖ A 28 year old man was brought to the ER after his car crashed into a tree when he fell asleep at the wheel. His BP was 100/70, pulse 120/minute, respiratory rate 28/minute and Glasgow Coma Score was 14. The primary survey revealed a patent airway, diminished air entry and breath sounds on the left hemithorax with severe chest wall tenderness and subcutaneous emphysema. There was no tenderness over the abdomen or the pelvis. His extremities were normal.

- What are the diagnostic probabilities? ⇨ : lt side Tension Pneumothorax
- How to confirm the diagnosis?
- How to treat according to priorities?

CASE 3

❖ 32 years old male was walking near a construction site when a piece of concrete fell on his head. Witnesses noted that he went unconscious immediately and did not regain consciousness for 10 minutes. The paramedics placed him in cervical spine precautions and brought him to the hospital. At the E.R., his pulse was 90/minute, B.P. 130/80 and respiratory rate was 18/minute. He did not open his eyes on command but to painful stimulus. He withdraw from painful stimulus with incomprehensible sounds. He had a 4 cm scalp laceration and contusion over right temporal region. Right pupil was dilated (6 mm) sluggish to light and the left was (4 mm) normally reactive to light.

- What is your full expected diagnosis? Rt side extra dural Hge 1GCS 8 / Contusion on Rt
- Classify Glasgow coma score & what score do you give him on arrival to E.R?
- Mention the lines of investigations? Treatment?

CASE 4

❖ A 29 years old female was sleeping in her room on the 2nd floor when she was alarmed by fire inside her room. No one helped her to leave that room for 15 minutes, so she had to jump from the window to the street, where people transferred her in a taxi to

the hospital where she arrived to the E.R. suffering from shock, dyspnea and multiple trauma.

- Enumerate injures do you expect to find?
- How would you proceed in assessment, resuscitation and treatment (according to what priorities)?
- How can you explain and treat her dyspnea?

CASE 5

❖ A 17 year-old male had car accident. On examination we found that he had pain in Lt. loin, dull Lt. Hypochondrium & shifting dullness to Rt. Hypochondrium. (Balance sign)

- What is the diagnosis? Rupture spleen
- How to confirm the diagnosis?
- What is the possible Treatment?

CASE 6

❖ A 17 y boy, fall from height, come to hospital in coma. On examination, we found to have clear watery fluid coming out from his nose. All vital signs are normal.

- What is your diagnosis?
- What are other C/P?
- Treatment?

CASE 7

❖ A 29 years male received a blunt trauma to the Lt. side of head. He presented to E.R with GCS 15 but decline to 7 within 1 hour.

- What urgent measure that has to be done?
- What is the suggested diagnosis?
- Specific investigation to confirm diagnosis?
- Explain clinical picture, based on the diagnosis?
- Discuss the treatment?

CASE 8

❖ Female patient, has car accident, on investigation she found to have surgical emphysematous Lt. lung. Shiftiness of trachea to Rt. side. The heart is shifted to Rt. side & its apex is lying between the 2 lungs & sternum. Also we found open wound at the 5th Lt. intercostal space.

- Discuss the Management?

CASE 9

❖ A 30 year -male patient was admitted to the causality department after a head injury. The patient was drowsy, after few hours level of consciousness started to deteriorate.
Mention investigations & treatment?

CASE 10

❖ A 34 year old female came to the emergency room with history of motor vehicle accident 1 1/2 hour ago. On examination she had a pulse of 120, BP of 125/85, respiratory rate of 33, and a normal temperature. The trachea and apex were shifted to the right side, there was surgical emphysema on the left side of the chest wall, the cardiac apex was felt midway between the midclavicular line and the sternum and there was an open wound in the left side of the chest at the level of the 5th intercostal space, midaxillary line.

- What is your diagnosis?
- How would you manage this case?

CASE 11

❖ A 17 year old male came to the emergency room with history of motor vehicle accident. He complained of abdominal pain, and pain in the left shoulder. On examination, his blood pressure was 85/60, the pulse was 120 bpm. Abdominal examination revealed fixed dullness in the left flank, and shifting dullness in the right.

- Describe the rest of the clinical picture of this condition
- How would you investigate this man?
- How would you treat this case?

CASE 12

❖ A 33 year-old male, presented with a profuse bright red bleeding from a punctured wound below the inguinal ligament. Bleeding was controlled by sustained external pressure. Distal pulsations were weak, limbs was pale & cold.

- What is the possible diagnosis & DD?
- Clinical evaluation & investigations?
- Preparation of the patient & treatment?

CASE 13

❖ A 25-years old man was injured in a motor car accident, the patient was alert but dyspnoeic, the pulse was 140/min, ABP 90/60 mmHg & temp 37° C there were contusions of the Lt. Side of chest wall. Abdominal examination was free.

- How would you proceed for a proper clinical examination?
- What investigations would you order for this patient?
- What is the possible diagnosis and its management?

CASE 14

❖ An 18 years old male came to the causality department, 24 hours after a road traffic accident. After the accident the patient fainted, he recovered his senses after a few minutes and apart from slight pain he was symptoms free for the next 24 hours. The patient was alert. He complained of upper abdominal pain, tachycardia and breathlessness. On examination pulse was 120/min; blood pressure was 90/60 mmHg. Abdominal examination revealed slight guarding and tenderness over the left hypochondrium.

- What is the most likely diagnosis and differential diagnosis
- Describe the clinical picture of such an injury
- Investigations and treatment

Rupture spleen
Rt. kidney injury
chest (Hemothorax Pneumothorax)

CASE 15

❖ A 8 year-old child was admitted to causality department after a car accident. Patient was alert. He complained of upper Lt. abdominal pain. Pulse was 120/min & ABP was 90/60 mmHg. Abdominal ex. revealed slight guarding, tenderness in Lt. Hypochondrium

- Discuss (diagnosis - investigations - treatment)?

CASE 16

❖ 35 year-old-male patient was admitted to the causality department after a car accident. The patient was semi-comatose. The pulse was 110/min & ABP: 120/80 mmHg Examination of Chest, Abdomen & Limbs were free.

- Discuss initial examination, investigations & treatment

CASE 17

❖ In the emergency room, the ambulance brought a 25 years old male after a missile injury. Examination revealed pallor, tachypnea, tachycardia, hypotension and irritability. Exposure of the patient showed the inlet of the missile in the left infraclavicular region.

- How to proceed in the management of this patient?

CASE 18

❖ During the recent events of Tahrer Square, a 22-year-old young man was assault by a gunshot. On arrival to the casualty department, he was shocked with tachypnea rapid thready pulse, confusion, and lost motor reflexes of both lower limbs Examination revealed an inlet of a bullet in the left iliac fossa and exit in the back just to the right of midline.

- Explain the plan of management for such a problem.
- Demonstrating how to deal with different expected injuries.

سطمبة !

MANAGMENT OF POLY-TRAUMATIZED PATIENT

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ATLS

PRIMARY SURVEY

Start at site of accident continues as trauma victim reaches the hospital & repeated at the hospital

ABCDE

- A: Airway patency & Cervical Spine control
- B: Adequate breathing (look, feel, listen)
- C: Circulation→ Control any bleeding
- D: Drugs "Analgesics"
- Cover wound with sterile dressing
- Avoid flexion of spine to avoid dislocations

A — AIRWAY

ASSESSMENT:
- ☑ Is patient able to speak or not?
  →If patient speaks freely→ airway is clear

CLEARANCE:
Remove F.B, Blood→ Chin Lift, Jaw Thrust

PROTECTION:
- ☑ Oropharyngeal or nasopharyngeal airway tube
- ☑ Tracheal Intubation By Orotracheal intubation or Naso-tracheal intubation (IF CERVICAL SPINE APPEARS FRACTURED)
- ☑ Crico-Thyrodotomy

CERVICAL SPINE CONTROL

ASSESSMENT: In 3 cases:
- ☑ Bony fractured evidenced by Clinical examination
- ☑ Multiple traumas
- ☑ Maxillo-facial trauma

MANAGEMENT:
- ☑ Immobilization
- ☑ Radiological evaluation

B — BREATHING

ASSESSMENT:
- ☑ INSPECTION: for air movement, respiratory rate, cyanosis, tracheal shift, jugular venous distension
- ☑ PALPATION: for subcutaneous emphysema & flail segments.
- ☑ AUSCULTATION for upper airway sounds (stridor, wheezing or gurgling).
- ☑ PERCUSSION for hyperresonance or dullness over either lung field.

MANAGEMENT:

Diagnosis	Initial MGMT	Followed by
Tension pneumothorax	Needle decompression	Intercostal tube
Cardiac tamponade	needle pricardiocentrsis	Operative TTT.
Flail chest	Intubation	PEEP
Massive hemothorax	Chest tube insertion	Thoracotomy
Open pneumothorax	occlusive dressing fixed at 3 sites only	chest tube

SECONDARY SURVEY

Head to Toe examination
Urgent investigations after BLS
- LAB : HB%, Glucose, KFT, LFT, ABGs , PO_2,PCO_2
- According to site of injury
- Investigations for complications

C — CIRCULATION

MANAGEMENT:
- ☑ Control bleeding
- ☑ Two canulae, IV Fluids (Ringer Lactate)
- ☑ Blood samples for typing, cross matching, Hb%, HCT
- ☑ When cross matched blood is available it is given immediately.
- ☑ IV fluids & blood are given at a rate that ensures urine output between 0.5 – 1 ml/kg/hr for adults

D — DISABILITY

- ☑ AVPU evaluation: based on patient's best response
- ☑ A:Alert & interactive.
- ☑ V:Vocal stimuli elicit a response.
- ☑ P:Painful stimuli are necessary to elicit a response.
- ☑ U:Unresponsive.

E — EXPOSURE & ENVIROMENT

- Clothes are removed using large scissors
- Warmth is ensured
- Insert foley's catheter & NGT
- Radiological assessment
- AMPLE History is obtained

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HEAD INJURIES

⊖ In case of ecchymosis & bruises in head or history of head injury:
- Patient in poly-traumatized → Follow ATLS protocol in management (Stump) + ADD these points in its places

IN PRIMARY SURVEY:

- **A:** Patients with head injury are more likely to die from airway obstruction than from intracranial lesions
- **C:** Presence of shock in patient with head injury is most likely due to internal hemorrhage in thorax or abdomen

IN SECONDARY SURVEY:

1. Head to toe examination is of great importance as it provides baseline for management plan:
   - **VITAL SIGNS:** pulse, B.P, Respiratory rate (for Cushing's triad of ↑ I.C.T.)
   - **SCALP:** For scalp hematoma or wound
   - **SKULL:** For any fracture
   - **ASSESSMENT OF LEVEL OF CONSCIOUSNESS:**
     - Follow Glasgow coma scale.
     - Mild head injury (13-15)
     - Moderate head injury (9-12)
     - Severe head injury (8 or less)
   - **PUPILS:**
     - Both pupils should be examined for size & reaction to light.
     - Dilated pupil immediately after accident → Most probably due to direct injury of the orbit or oculomotor nerve
     - Initial pupil constriction followed by dilatation → lateralization due to supratentorial hematoma.
   - **LIMBS:**
     - Hemiplegia in acute phase → most probably due to 1ry cerebral damage rather than compressing intracranial hematoma.
2. Investigations:
   a. If on clinical examination patient needs urgent evacuation for intracranial hematoma, no time should be lost in doing investigations.
   b. If there is time we do:
      - **PLAIN SKULL X-RAY:**
        - Site & type of skull fracture
        - Visualization of foreign
      - **CT SCAN:**
        - Highly recommended for:
          - Depressed or compound fractures
          - Impaired level of consciousness or focal neurological signs
          - Basal skull fractures
          - Deteriorating level of consciousness
        - Detects:
          - Brain edema
          - Brain contusions or lacerations
          - Site, size & progress of intracranial hematoma
          - Diagnose extradural & subdural hematomas

DEFINITIVE TREATMENT:

See special surgery book

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CHEST INJURIES

⊙ In case of ecchymosis & bruises in Chest or history of Chest injury:
- Patient in poly-traumatized → Follow ATLS protocol in management (Stump) + ADD these points in its places

IN PRIMARY SURVEY:

- **B:**
  - Simple pneumothorax → Most common thoracic injury in penetrating chest trauma & may result in injury to lung parenchyma
  - Tension pneumothorax → Deflated by inserting 14-G catheter in the 2nd space
  - A sucking chest wound → Sealed by dressing, which is fixed at 3 sites
  - Flail chest → Initially stabilized by external strapping & later endotracheal intubation & positive pressure ventilation
  - In severe pain → strong analgesics should be given as pain impairs respiration
- **C:**
  - Indications for Emergency Department thoracotomy:
    - Penetrating thoracic injury:
      - Arrest with previously witnessed cardiac activity
      - Unresponsive hypotension
    - Blunt thoracic injury:
      - Unresponsive hypotension (BP< 70 mm Hg)
      - Rapid blood loss from chest tube (>1,500 mL)

SECONDARY SURVEY:

1. Head to toe examination:
   - VITAL SIGNS: Signs of shock, engorged neck veins, cyanosis, respiratory distress
   - CHEST:
     - Inspection:
       - Ecchymosis & bruises, ↓ chest movements on affected site
       - In flail chest: flail segment moves paradoxically with respiration
     - Palpation:
       - Shift of trachea to the opposite side, ↓ TVF
       - Rib fracture: Tenderness & crepitus
     - Percussion:
       - Tension pneumothorax: Tympanitic resonance on affected side
       - Hemothorax: Dullness
     - Auscultation: ↓ air entry
   - IN CARDIAC TAMPONADE:
     - Beck's triad: Engorged neck veins, Faint heart sounds & weak pulse
2. Investigations:
   - CHEST X-RAY
   - FAST
   - CT-SCAN
   - ABG

DEFINITIVE TREATMENT:

- Intercostal tube in 2nd space at mid-clavicular line under-water seal
- Recently it is placed in 5th intercostal space between anterior & mid axillary lines
- Intercostal tube is the commonest intervention in thoracic trauma

- Indications of intercostal tube:
  - Absolute indications:
    - Pneumothorax (Tension & Open)
    - Hemothorax
    - Traumatic arrest (Bilateral)
  - Relative indications:
    - Rib fractures
    - Profound hypoxia & penetrating chest injury

⊖ In case of ecchymosis & bruises in Abdomen or history of Abdominal injury:
Patient in poly-traumatized → Follow ATLS protocol in management (Stump) + ADD these points in its places

ABDOMINAL INJURIES

IN PRIMARY SURVEY:

- C: Hypovolemic shock is of great importance & should be checked & excluded

SECONDARY SURVEY:

1. Head to toe examination:
   - VITAL SIGNS: Signs of shock
   - ABDOMEN:
     - Inspection:
       - Rigidity
       - Bruises & fracture in right side in liver or renal injury & in left side in splenic or renal injury
     - Palpation:
       - Tenderness & guarding in the Rt. / Lt. hypochondrium. Later becomes generalized.
       - Rebound tenderness
     - Percussion: Shifting dullness
     - Auscultation: ↓ intestinal sounds
     - DRE: Fullness in the rectovesical pouch & Douglas pouch
2. Investigations:
   - RADIOLOGICAL:
     - U/S AND CT SCAN :
       - Diagnostic → free blood in peritoneum & hematoma on the ruptured liver.
       - Show pathological types and injuries to other organs.
     - PLAIN X- RAY:
       - Fracture ribs.
       - Elevated Rt. copula of the diaphragm.
       - Obliterated psoas shadow.
       - Multiple fluid levels.
       - Giant fluid level due to peritoneal collections.
   - INSTRUMENTAL:
     - Selective hepatic angiography: may be helpful.
     - Diagnostic peritoneal lavage (DPL).
   - LABORATORY INVESTIGATIONS:
     - KFTs, LFTS, FBS, electrolytes, CBC.

DEFINITIVE TREATMENT:

See Spleen, Liver & Urosurgery books

Hemodynamic stable + Blunt trauma → conservative
Penetrating injuries → exploration

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PELVIC FRACTURE

⊖ In case of ecchymosis & bruises in Pelvis or history of Pelvic injury:
Patient in poly-traumatized → Follow ATLS protocol in management (Stump) + ADD these points in its places

IN PRIMARY SURVEY:

- **C:** Hypovolemic shock is of great importance & should be checked & excluded

SECONDARY SURVEY:

Inability to stand up .... Fracture affecting the stability
Inability to pass urine ... urethral or bladder injury

1. Head to toe examination:
   - **VITAL SIGNS:** Signs of shock
   - **PELVIS:**
     - Inspection
     - Palpation
     - Movement
     } as orthopedics scheme
     - Visceral injury:
       - Ask the patient to pass urine:
         - Clear: all is well
         - Not clear: Suspect urethral injury and do gentle retrograde urethrography
     - DRE:
       - For rectal injury / EARLE sign.
     - PV:
       - For vaginal injury
     - Neurovascular examination:
       - For sciatic nerve
2. Investigations:

   X-RAY: Fracture line ± obturator sign

   CT SCAN: For associated injuries (not done to shocked patients)

DEFINITIVE TREATMENT:

- Fracture affecting the stability:
  - External skeletal fixation :: C.clamp
  - ORIF: Using plate & screws (better mechanically and if associated visceral injury)
- Fracture not affecting the stability of the pelvic ring:
  - Bed rest & analgesics for 6 weeks
- Treatment of complications:
  - Bladder injury: Closed by water tight sutures then foley's catheter
  - Urethral injury: Suprapubic cystostomy with later dilatation
  - Rectal injury: Colostomy

STAB WOUND IN THE NECK

Patient is poly-traumatized → follow ATLS protocol in management (Stump) + ADD these points in its places

IN PRIMARY SURVEY:

- **A:** Place the patient on his side and lower the head slightly.

SECONDARY SURVEY:

1. Head to toe examination:
   - **VITAL SIGNS:** Signs of shock
   - **CHEST:** stridor, crepitus(subcutaneous emphysema), tenderness of the trachea
   - **NEUROLOGICAL EXAMINATION:**
     - Spinal cord injury: e.g. quadriplegia, hemiplegia, priapism, urinary retention
     - Brachial plexus injury(C5-C7 roots): sensory & motor loss in the upper arm
     - Nerve injury:
       - phrenic N. injury → paralysis of diaphragm
       - Cranial N. injury (V, IX, X, XI, XII), Horner syndrome
2. Investigations:
   - **X-RAY:** Chest , Spine and Skeletal or Visceral injuries
   - **CT SCAN:** For Chest, abdominal or head injuries (not done to shocked patients)
   - **INSTRUMENTAL:** Endoscopic studies : laryngoscopy, bronchoscopy, esophagoscopy
   - **URGENT SURGICAL EXPLORATION FOLLOWING:**
     1. Control blood loss, expanding hematoma, shock
     2. Airway obstruction
     3. Neurological deficit
     4. Hemoptysis or hematemesis

DEFINITIVE TREATMENT:

- Deal with the patient according to the type of injury & priorities

THE ANTERIOR NECK IS DIVIDED INTO 3 ZONES:

- **Zone I:**
  - Extends from the sternal notch to the cricoids cartilages.
  - Injuries here carry the highest mortality because of the risk of great Vs. (e.g subclavian & common carotid) & intrathoracic injury.
- **Zone II:** Extends from the cricoid cartilage to the angle of the mandible.
- **Zone III:** Is that part of the neck above the angle of the mandible

STAB WOUND IN THE FEMORAL TRIANGLE

SECONDARY SURVEY:

1. Head to toe examination:
   - VITAL SIGNS: Signs of shock
   - LOWER LIMB:
     - Neurological: paresthesia esp. in the anteromedial part of the thigh or along saphenous N. distribution
     - Vascular: bleeding, pulsating swelling, hematoma, acute ischemia (6ps) crush injury or compartmental syndrome
     - Musculoskeletal: Inability to move the limb
     - Signs of :
       - Arterial: hard signs / soft signs
       - Venous: DVT→ Painful swollen limb
       - Neurological: Weak hip flexion, weak knee extension, sensory deficit in the medial side of the leg

DEFINITIVE TREATMENT:

- Deal with the patient according to the type of injury & priorities

GUNSHOTS

USEFUL QUESTIONS TO BE ASKED

- What type of weapon was used? (The victim or witnesses may be able to answer)
- Where is the entry wound and where is the exit wound?
- What structures may have been damaged between the entry & exit?

IN PRIMARY SURVEY:

B:

- Respiratory distress following gunshot injury can be due to pain, flail chest, or diaphragmatic injury
- Insert a chest drain if there is suspected damage to the lung, bronchus, or chest wall.

C:

- Patients are frequently young and fit so compensate well until in extremis - tachycardia may be delayed and hypotension suggests very marked blood loss.
- The use of tourniquets is controversial.
- In a hospital environment, ensure blood is grouped and cross-matched fast.
- Rapid hemorrhage may necessitate operation before adequate resuscitation but anesthesia may induce collapse of a compromised circulation and an experienced anesthetist is essential.

E:

- Clothes should be removed and the entire body surface examined for exit and entry wounds.

N.B.

- It is easy to miss these in hairy parts of the body such as the scalp, axilla and perineum

SECONDARY SURVEY:

ALL PATIENTS WITH NON-TRIVIAL GUNSHOT INJURIES NEED:

- Cross-matching of six units of blood.
- At least one and, preferably, two large-bore IV cannulae: required for vigorous fluid replacement. However, avoid hypertension which may exacerbate blood loss (aim for a systolic BP of 100-110 mm Hg.)
- Investigation: X-ray (AP and lateral) one body region above and one below any wound, as well as the one directly involved, to search for further embedded shot/bullets.
- Monitoring: vital signs, blood gases, CXR, ECG monitoring.
- High-dependency or intensive care

1. Head to toe examination: As usual
2. Investigations: As usual

DEFINITIVE TREATMENT:

- **CHEST INJURIES :**
  - Penetration of the chest may damage pleura, lung, great vessels, heart, mediastinum, diaphragm and abdominal contents
  - The most common injury is a haemopneumothorax from damage to the lung and chest wall
  - Any deterioration or cardiac arrest demands prompt thoracotomy
  - Infection is a major problem. Risk is reduced by early drainage of haemothorax, wide debridement of damaged tissue, delayed closure of wounds, and use of prolonged antibiotics.
- **HEART INJURIES :**
  - 15% of deep chest injuries involve the heart.
  - Diagnosis is difficult and high index of suspicion following penetrating trauma is required
- **ABDOMINAL INJURIES:**
  - Abdominal injuries are associated with a high incidence of internal injury
  - All penetrating wound of the abdomen require full exploratory laparotomy
  - Observation is inadequate as there may be occult bleeding or perforation of bowel
  - Broad-spectrum antibiotics should be administered early with any abdominal injury
- **LIMB INJURIES:**
  - Nerves, tendons and vessels are endangered, so examine the limb in good light
  - Test for pulses but their presence does not exclude arterial injury
  - Note sensation and sweating. Any damage identified will need formal surgical repair.
- **WOUND CLOSURE:**
  - Significant tissue damage can occur with both low- or high-velocity bullets
  - Wide excision or fasciotomy may be required to clear foreign material and dead tissue
  - Primary suture is frequently delayed for high-velocity injuries with grafting and suture at 3-5 days
  - Gunshot wounds are particularly prone to anaerobic infection, especially tetanus and gas gangrene
  - intravenous antibiotic prophylaxis of 24-48 hours' duration is usual following fractures caused by high-velocity weapons or shotguns

13

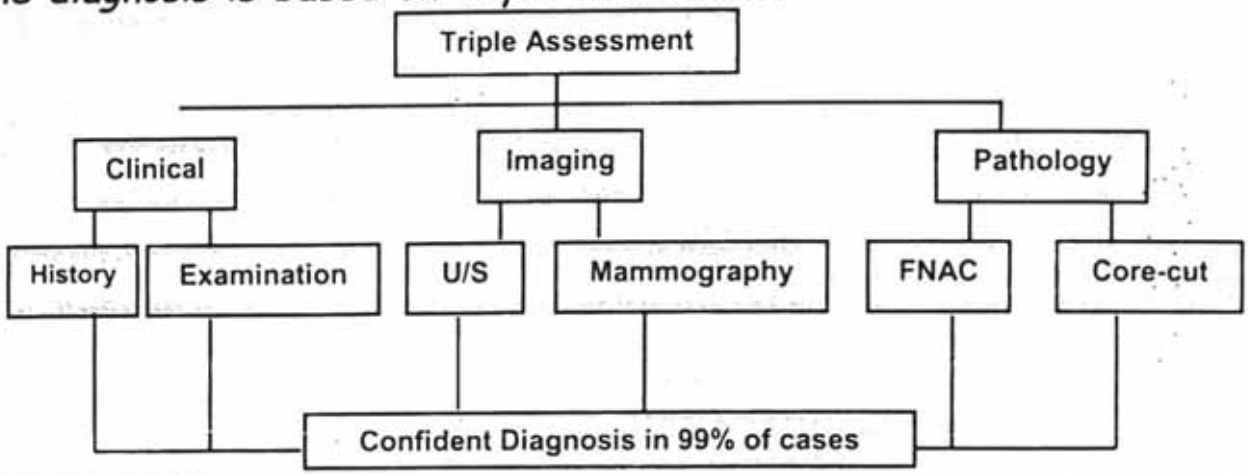
BREAST CASES

CASE 1

55 years-old women presented with a hard lump in the breast.

Discuss the necessary investigations.

The diagnosis is based on triple assessment:



1. **For Diagnosis**

- **Mammography:** *To evaluate the whole breast, 95% accuracy*
  - ⇨ **Indications:**
    1. Screening for high risk group (main value).
    2. It is the only way to detect impalpable cancer breast.
    3. To evaluate the other breast in a patient with cancer breast.
    4. Unexplained breast pain.
       NB: Useful in detection of multifocal lesion in the same or other breast
  - ⇨ **Findings suggestive of malignancy:**
    1) **Clustered Micro-calcification:**
       - Occurs in ductal & not lobular carcinoma.
       - 20% of micro-calcifications are malignant.
    2) **Star shaped mass "dense opacity with irregular edges".**
    3) **Distorted contour of the breast.**
    4) **Increased skin thickness.**

N.B.

- Calcifications that follow a linear and branching pattern or that are associated with speculated density will be considered more suspicious of a malignancy etiology. Calcifications that layer out e.g. tea cup pattern suggest benign cystic hyperplasia.
- A negative mammogram in the face of a clinically suspicious breast exam is not adequate to offer reassurance.

- **Ultra Sonography:**
  values:

I) Differentiate solid lesions from cystic

II) U/S guided biopsy can be done.

⇨ **For cystic swelling we do:**
Aspiration

The criteria of malignant cyst is

- Irregular wall.
- Hemorrhagic fluid.
- Rapid refilling.
- Residual mass after aspiration.
- Malignant cells in the aspirate by cytological examination.

⇨ **For solid swelling we do:FNABC**

NB:

- **Mammography is of less diagnostic value in young women, in whom the density of lesion differs a little from normal tissue, so U/S in young women is useful so nowadays mammography is done with complementary U/S.**
- **For women over 30 years, bilateral mammogram and directed U/S is indicated.**

- **MRI of breast:**
  - Gold standard of woman with synthetic prosthesis.
  - Post-operative scarring: to differentiate between fibrosis & local recurrence of malignancy.
  - After new adjuvant therapy to monitor the response.
  - It is superior to mammography and U/S in determining the size of the tumor, the presence of multifocal or multicentric disease and the presence of contralateral disease.

4. **Biopsy:** it is the solid ground for diagnosis
   - FNABC:
     - simple, inexpensive and very accurate (97%).Accuracy is increased by wide pore needle with suction apparatus of frozen section.
     - FNABC cannot differentiate insitu from invasive breast cancers.
   - Core-cut biopsy (it is the gold standard because it is preserve cell architecture and FNABC should be avoided if core biopsy is possible).The sensitivity of FNABC is 93% compared to 98% to 99% for core needle biopsy(CNB).
   - Open biopsy.

N.B. Surgical excisional biopsies as an initial biopsy tool are strongly discouraged as 80% of suspicious lesions following radiographic evaluation are benign and a surgical procedure can be voided.

2. **For Staging**
   - Sentinel Lymph Node Study:
     - It is done intraoperative.
     - Standard investigation in patients with clinically –ve LN affection.
     - By injection of methylene blue or radioactive isotope → follow-up → till we find the sentinel lymph node.
     - Then it is excised and frozen section is done for it to know whether affected by the cancer or not.

NB: SLN mapping may be performed with technetium-99 only.

- Lung →CXR.
- Liver →abdominal ultra sound and liver function tests.
- Bone →bone scan (Tc 99).
- Brain→ CT scan and MRI.
- PET scan

3. **For Pre-operative Preparation**
   - CBC, FBS, LFTs, KFTs.

4. **For Follow-up**
   1. **Tumor markers:** CA15-3 and CEA.
   2. **Biochemical investigations (hormonal receptors):**
      - Staining for estrogen and progesterone receptors is now considered routine and their presence will indicate the use of adjuvant hormonal therapy with tamoxifen.
      - Recently, tumors are stained for c-erb 52 (a growth factor receptor as patient can be treated with monoclonal antibody against this receptor to decrease relapse).

CASE 2

A female patient 43 years old complained of a lump in her left breast. The lump is painless and it is 4 cm in diameter. There were no skin manifestations and there were palpable lymph nodes in the axilla.

Keys

- 43 years old female
- painless breast lump
- palpable axillary LN

Q1. What is the diagnosis of this case?

- A breast lump with palpable LNs should be considered breast cancer till proved otherwise.
- 1 in 8 women will experience breast cancer in her lifetime and 1 in 33 women will die of the disease.
- However, other D:D should be excluded such as :
  - Fibrocystic disease of the breast usually occurs in young age complaining from cyclic mastalgia
  - Fibroadenoma & cystosarcoma phylloides
  - Breast hematoma: There is no history of trauma. Biopsy may be needed to differentiate it from malignancy.
  - Traumatic fat necrosis. Commonly forms a cyst rather than a mass.
  - Acute mastitis & breast abscess. Usually occurs in a lactating females
  - Retention cyst /Galactocele. There is no history of breast feeding
  - Duct mastitis. There is retracted nipple and creamy white discharge

So, Clinically it is a case of carcinoma of the left breast stageII-A, T2N1M0.

What investigations are needed and why in this case?

- Diagnosis is based on triple assessment (see case 1)

CASE 3

A 36 years old unmarried business woman presented with a small mass in her left breast. Her mother died of breast cancer at the age of 42. On local examination left breast showed a palpable hard 1.5 cm, mass in the upper outer quadrant.

► **What are the diagnostic possibilities?**

The presentation of a breast mass is a common symptom. Although the majority of women who present with a palpable mass will have a benign finding however; as many as 10% will have an underlying malignancy.

► **D.D of breast mass**: (see case 2 Q.1)

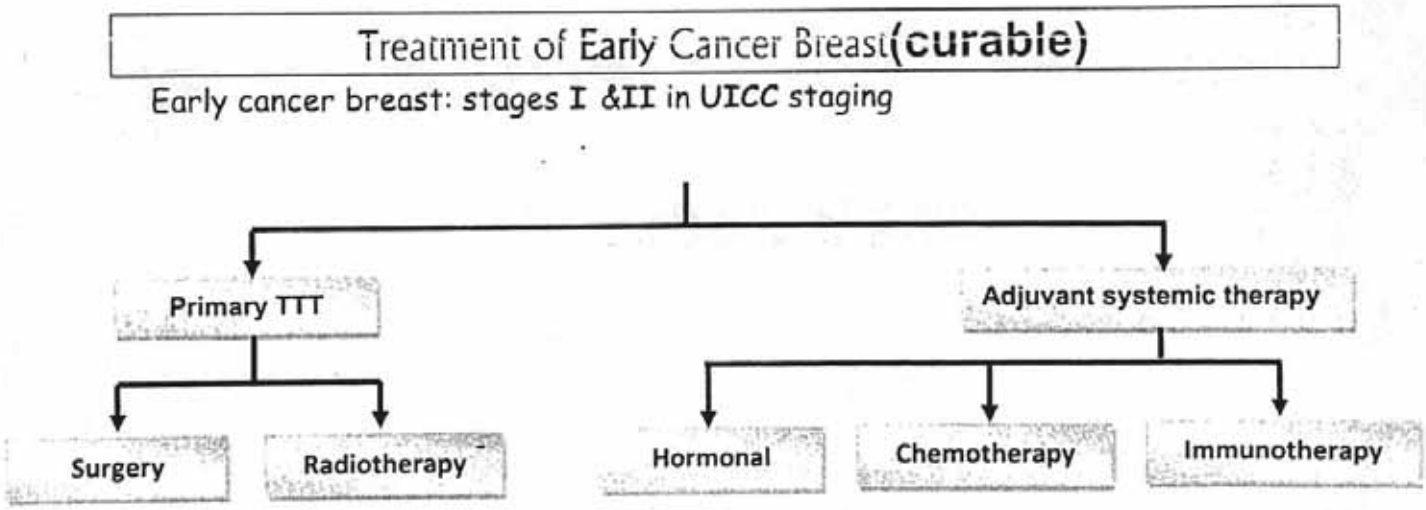
► **Clinically, it is a case of carcinoma of the left breast (upper outer quadrant), stage 1, T1N0M0.**

► **How can you proceed in your investigations?**

Diagnosis is based on triple assessment (see case 1).

► **What are the treatment options?**

- ✓ Breast cancer is now widely accepted to be a systemic disease i:e once it is evident clinically, it metastasize in the form of micrometastasis.
- ✓ So, local and systemic treatments are indicated whatever the stage is.
- ✓ Basic principles for treatment of cancer breast are to:
  - Reduce the chance for local recurrence.
  - Reduce the risk for metastatic spread.
- ✓ Choosing the primary treatment completely depends on staging of the cancer making the primary treatment local in early stages and systemic in locally advanced and advanced cases.



'It is more blessed to give than to receive.

Dr. Mohamed El-Matary

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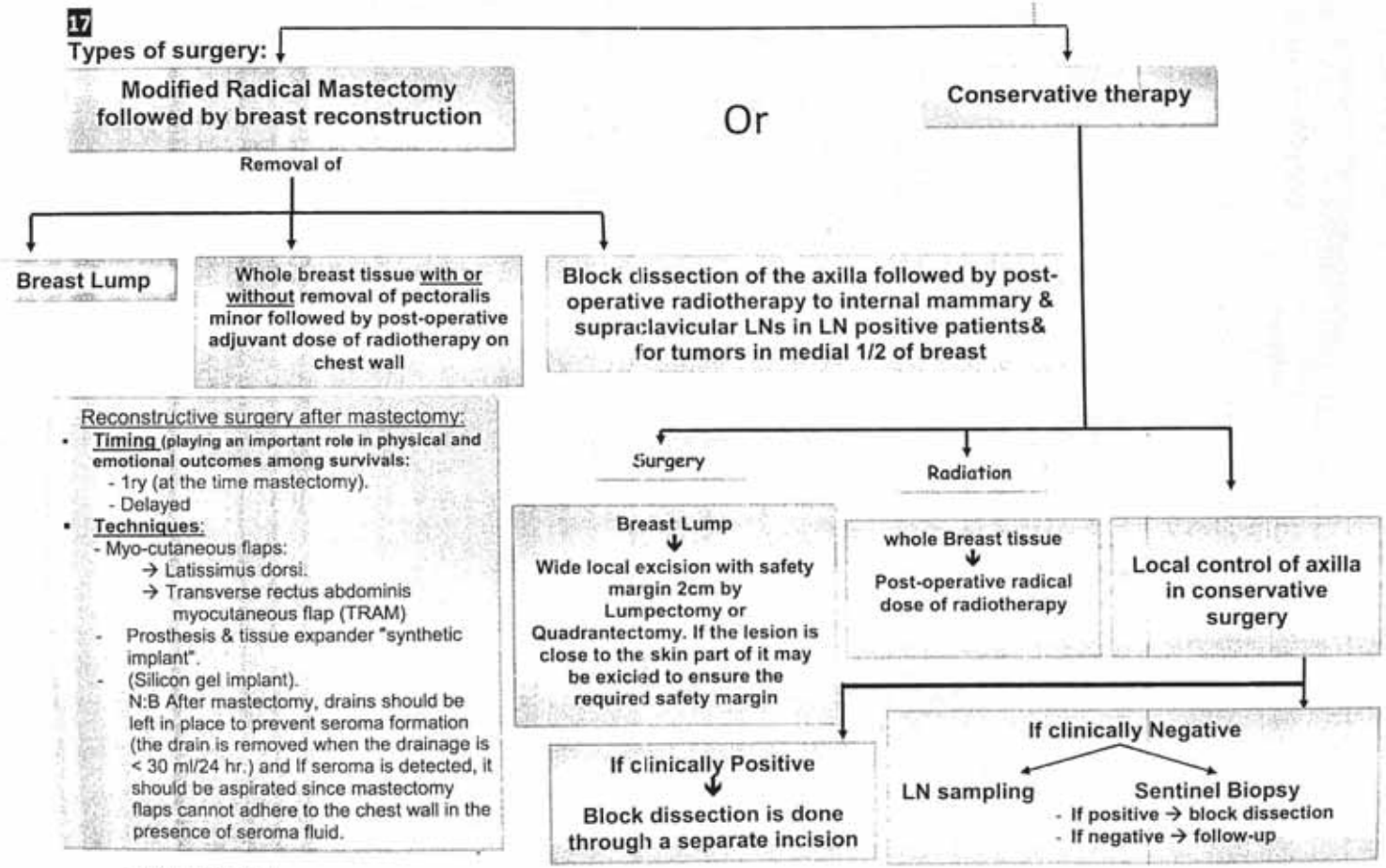

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WhiteKnightLove

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► Indications of conservative surgery:

1. Small lesions≤ 4 cm.
2. Large lesions, but in large breast.
3. Peripheral.

► Advantages of conservative surgery over modified radical mastectomy:

1. Although local recurrence is high but the overall survival rate is the same.
2. Decrease psychological morbidity although recent studies show that 30% of the patients have anxiety or depression for fear of recurrence.

► Contraindications of conservative surgery = indications of modified radical mastectomy: ☑

I- Tumor: B C D E F G H I L

1. Bilateral & multi-focal disease.
2. Central lesions (surgery will cause bad cosmetic appearance).
3. Distant metastasis.
4. Eczema of Paget's disease of the nipple (bad cosmetic appearance, radio-resistant).
5. Fixed to muscle.
6. Tumor > 4 cm (Great tumor).
7. High grade (**gradeIII**).
8. Insitu breast cancer more than 20 % due to the common incidence of multicentricity.
9. Local recurrence after conservative surgery.

II- Patient: (4 P)

1. Pregnancy.
2. Patient preference.
3. Contraindication to irradiation e.g. SLE (lupus).
4. Previous irradiation.

III- Breast: relatively small in size.

(We will need to remove additional 2 cm as a safety margin & therefore the cosmetic advantage of lumpectomy will not be achieved).

N.B:
Patients with micrometastases< 0.2 mm on sentinel LN biopsy are considered node negative (N0mic) and should not be considered for completion dissection or adjuvant chemotherapy based on their nodal status. Patients with metastases longer than 0.2 mm should continue to be treated as node positive and formal axillary LN dissection should be discussed.

Radiotherapy

(Can be started after 14 days from surgery)

2. Radiotherapy

- Type of radiation
- Indication
- Side effects

N.B.:
Post-operative radio-therapy does not improve the survival but it reduces the incidence of local recurrence

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A. Type of Radiation:

1. Deep X- ray (External beam).
2. Ir192 wire implant (Interstitial Beam).

B. Indications:

1. Post-operative after conservative surgery to the remaining breast tissue by radical dose (5000 RAD).
2. Post-operative after radical mastectomy on the chest wall by adjuvant dose (1500 RAD) if:
   - High grade tumor or large tumor.
   - All LN positive patients.
   - Medial tumors for possibility of internal mammary LN affection.

N.B.: Radiotherapy is not routine after mastectomy, but is routine after conservative surgery as literature shows a 50% risk reduction in local recurrence with radiotherapy

C. Side Effects:

1. Local burn.
2. Interstitial pulmonary fibrosis.

Adjuvant systemic treatment

A. Hormonal	B. Chemotherapy	C. Immunotherapy
- Indications - Lines of TTT - Results	- Indications - Preparations - Regimen	

HormonalTherapy

A. Indications:

- For all hormone receptors positive (used alone or with chemotherapy).

B. Lines of treatment:

- Either tamoxifen which blocks estrogen receptors or anastrazole (aromatase inhibitor) which *inhibits conversion of androgen into estrogen.*

C. Side effects of Tamoxifen:

1) Vasomotor symptoms e.g hot flushes and night sweating.
2) Increase risk of endometrial carcinoma which is greater in postmenopausals taking tamoxifen.
3) D.V.T.

D. Results:

1. 60% improvement in estrogen receptor positive patients.
2. 80% improvement in progesterone receptor positive patients.
3. 40% reduction in ipsilateral or contralateral breast recurrence.

N.B.: Premenopausals must be advised to avoid pregnancy while taking tamoxifen

Chemo-therapy

A. Indications:

1. +ve axillary LN biopsy.
2. – ve hormonal receptors & Her 2/neu +ve tumors (denote aggressive tumor).
3. High grade even if –ve LN or postmenopausal.

4. All patients below 70 yrs
5. Tumors more than 1 cm.

B. Preparations (CMF):

- Cyclophosphamide.
- Methotrexate.
- 5-fluorouracil.

C. Regimen:

- Every cycle 8 days repeated every month for 6 months.
- (Six cycles can reduce the risk of relapse 30%)

Target therapy (Immunotherapy)

- For her2/neu receptor +ve cases → give monocolonal Ab (herceptin) against these receptors.

Follow-up of Patients with Breast Cancer

- every 3 months for first 2 yrs ,then every 4 months next 3 yrs , then yearly for life. Its aim is to:

1. **Detect and treat complications of mastectomy**

- Psychiatric morbidity caused by the loss of the breast
- The chest wall is anesthetic in 100% of pts postmastectomy and pt should be educated about this preoperatively.
- Arm edema :results from:
  - excision of lymphatics,
  - Their obstruction by radiotherapy,
  - Malignant axillary recurrence blocking them.
  - Thrombosis of the axillary vein.

  Arm elevation, massage, and elastic or pneumatic arm compression are partially effective.

N.B.: Avoidance of radiotherapy to the axilla which has been surgically evacuated of its nodes reduces the possibility of lymphatic edema.

2. **Detect local recurrence or distant disease:** because of the incidence of cancer in the other breast (1% per year) annual mammography of the contralateral breast is done.
3. **Give the patient instructions.**

- Patients are instructed not to get pregnant for at least three years,
- To use non-hormonal contraception, to avoid the stimulating effect of hormones on possible residual tumor

N.B.: ***Patients should be referred to genetic counseling because it has family history of cancer breast***

Other risk factors that need genetic counseling

- ✓ Ashkenazi Jewish heritage
- ✓ Personal or family history of ovarian cancer
- ✓ Personal or family history of breast cancer in both breasts
- ✓ Any first degree relative diagnosed with breast cancer before age 50
- ✓ Any young woman (<50 years of age) diagnosed with breast cancer.
- ✓ Two or more first or second degree relatives diagnosed with breast cancer
- ✓ History of breast cancer in a male relative.

Prognostic factors of breast cancer :

1. **Type of the tumour**: The best prognosis is provided by the in situ carcinoma, and paget's disease, while the worst is the inflammatory carcinoma
2. **The T stage:**of the primary tumour. The higher the T stage, the worse is the prognosis.
3. **L.Ns:**
   a. Size. b. Mobility. c. Number. d. location of the involved lymph nodes.
   - Large fixed nodes are of bad prognosis
4. **Distant metastasis:**its presence worsens the prognosis

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5. **Hormone receptor status**
6. **The tumour's site:** Medial half tumour have a worse prognosis than those of lateral half due to early involvement of the internal mammary lymph nodes.

CASE 4

A 20 years lady presents with small right breast lump. O/E the lump is well defined, smooth and mobile in lower outer quadrant. No palpable axillary nodes.

Keys

- 20 years lady
- small right breast lump
- Lump is well defined, smooth and mobile in lower outer quadrant.
- No palpable axillary nodes.

- **How to proceed the diagnosis & Treat the most probable diagnosis.**
  - Clinically,it is a case of hard fibroadenoma(breast mouse). Clinical picture is usually enough for diagnosis of fibroadenoma ,However cases in which there is doubt the diagnosis will be based on triple assessment (see case 1)

NB: Breast cancer is an uncommon diagnosis in young age group, with only 0.3% of all breast cancer occurring in women between the ages of 20 to 29

History and clinical examination

➢ C/P

Type of patient

► **20 – 30 years aged female.**

Symptoms

► **Painless lump(s)** that is discovered accidentally

Signs

Breast swelling:

- Usually small, non-tender, firm, well-circumscribed with smooth surface & with high mobility in breast tissue (breast mouse" characterstic feature").with no LN enlargement

➢ D.D of breast mass: (see case 2 Q.1)

➢ Investigations

Clinical picture is usually enough for diagnosis.

- Mammography → reveals well-circumscribed lesion.
- U/S→ may be needed.

➢ Treatment

- Excision by enucleation& histological confirmation of the diagnosis

CASE 5

A 40 years female present 2 cm lump in the upper outer quadrant of Rt. Breast. Core biopsy confirms invasive duct carcinoma.

- **What are lines of treatment available for this case?**
  Mention treatment of early (as in case 2)and intermediate and advanced cancer breast

TTT of intermediate cacner breast

- Neoadjuvant chemotherapy (preoperative chemotherapy) → down staging:
  - **If good response → breast conservative therapy.**
  - **If poor response → modified radical mastectomy**

Treatment of Advanced Breast Cancer (Incurable)

- **Stages III & IV in UICC, T4 patients, fungation, ulceration, inflammatory carcinoma or recurrent cases as well as distant metastasis.**
- **Aim:** palliative treatment& improving the quality of life.
- **Lines of treatment:**

A- Primary Systemic Treatment
- **i- Hormonal therapy.**
- **ii- Chemotherapy.**

B- Adjuvant Local Treatment
- **i- Radiotherapy.**
- **ii- Palliative surgery**

C- Treatment of Complications

A- Primary Treatment

i- Hormonal Therapy:

a. Only given to hormone receptor +ve patient with 60-70 % response
b. More effective in post-menoposal women
c. Not very effective in hormone negative patients (response 10%) , with visceral metastasis or young patient below 35 years old
d. Tamoxifen (anti-estrogen) is given for **notmore than five years** to avoid the risk of endometrial cancer or thrombogenicity. If no response aromatase inhibitors may be used

N.B.:
Raloxifene may be used in selected postmenopausals for longer periods if it is indicated in control of osteoporosis.

ii- Chemo-therapy:

- **Indications:**
  1. It is the basic treatment of metastatic disease (response 60 – 80 %).
  2. Rapidly progressive disease
  3. Visceral metastasis
  4. Hormonal receptor –ve cases.
  5. Failure of hormone therapy.
- **Combination:**
  - Cyclophosphamide, methotrexate & 5-fluorouracil (CMF).
  - Adriamycin is commonly added.

B- Adjuvant Treatment

i- **Radio-therapy:** It has a palliative role in the following situations:

1- Pain (due to bone or soft tissue involvement).
2- SVC obstruction.
3- Used to control tumor fungation& ulceration.
4- Systemically for brain metastasis (to decrease edema & ICT) & spinal metastasis (to decrease local edema & spinal cord compression) & for bone secondaries & patholgical fractures.

ii- **Surgery:**

- To remove an unpleasant fungating tumor.

C- Treatment of Complications

1. **Hypercalcemia:**
   - It is an oncological emergency.
   - Correction of dehydration by IV fluids + furosemide
   - Prednisolone + biphosphonates
2. **Pathological fractures:**
   - Immobilization + internal fixation
   - Radiotherapy to the fracture site.
3. **Cerebral metastasis**
   - Corticosteroids and radiotherapy
4. **Spinal cord compression:**
   - Urgernt surgical cord decompression with stabilization followed by radiotherapy
5. **Superior vena cava obstruction:**
   - Life theratening & requires urgernt treatment.
   - Radiotherapy is the treatment of choice
6. **Pleural effusion:**
   - Systemic therapy and chest tube drainage
7. **Liver metastasis:**
   - Treated by chemotherapy.
8. **Lymphedema:**
   - Can be treated by complete decongestive therapy

CASE 6

A 39 years old female, with history of breast lump since 3 months. On examination you found a breast mass about 6 cm in the outer lateral quadrant. It is intra-ductal carcinoma & fix to chest wall, Peaud' orange skin, L.Ns in the axilla are 1-2 cm & fixed, no supraclavicular L.Ns. General examination was free.

keys

- 39 years old female,
- Breast lump of 3 months duration.
- breast mass about 6 cm in the outer lateral quadrant.
- It is intra-ductal carcinoma
- fix to chest wall, Peaud' orange skin,
- L.Ns in the axilla are 1-2 cm & fixed, no supraclavicular L.Ns.
- General examination was free.
- NB: fixation to the chest wall or skin changes are uncommon findings, but strongly suggestive of a malignant process. However, none of these findings in and of themselves are 100% reliable.

- **What is the T.N.M staging in this case?**

  T4N2M0 (Stage III)

- **How could this patient discover her disease early?**

- There is no method to prevent breast cancer however, prognosis is markedly affected by early detection through the triad of:
  1. Self assessment.
  2. Physical examination.
  3. Mammography every 2 years & in high risk every 1 year
- Benefit of early detection: Makes the treatment more successful.
- Early Signs :
  1) A lump → single, firm, and most often painless.
  2) Unusual appearance of→ the skin on the breast, underarm.
  3) Veins on the skin surface become more prominent on one breast.
  4) Inverted nipple develops a rash or has a discharge other than breast milk.
  5) A depression on the breast surface
- Detection Plan :
  - ⇨ Clinical breast examinations (CBE) every 3 years from ages 20-39, then every year thereafter.
  - ⇨ Monthly Breast-Self Examinations (BSE) beginning at age 20. Look for any changes in the breasts.

- Mammography:
  - Baseline mammogram by the age of 40.
  - Mammogram every one to two years for women 40-49, depending on previous findings.
  - Mammogram every year for women 50 and older.
- Breast U/S
  - Used in addition to mammography not instead of it.

- MRI:
  - Not recommended in early detection of cancer breast as it is expensive and time consuming
- **What are the treatment available for this case?**
  - Neoadjuvant chemotherapy (preoperative chemotherapy) → down staging:
  - If good response → breast conservative therapy (see before).
  - If poor response → modified radical mastectomy (see before).

> ***NB:*** *All pts will locally advanced breast carcinoma should be considered for adjuvant hormonal*

CASE 7

A 45 years old premenopausal lady presented with blood tinged discharge from her left nipple. This started two months ago. Her last lactation was 15 years ago. She is on oral contraceptives. On local examination a small amount of serosanguinous discharge could get expressed from the left nipple.

Keys

- A 45 years old premenopausal lady
- blood tinged discharge from left nipple of Two months duration.
- Her last lactation was 15 years ago.
- She is on oral contraceptives.
- O/E a small amount of serosanguinous discharge could get expressed from the left nipple.

► What are the probabilities in diagnosis ?

- it's a case of bleeding per nipple for D:D
- The commonest cause of bleeding per nipple is Duct papilloma. However, other causes should be excluded such as

Ductectasia

- Middle-aged female/More common in smokers.
- creamy white, serous, yellowish or blood-stained dischargearises from one or more ducts

Fibrocystic disease of the breast:

- ↑ premenstrual& may disappear after menstruation
- Lump.
- cyclic Mastalgia
- Painful nodularity
- Nipple discharge: usually clear or yellow, sometimes brown or green.

Breast cancer

- More in old ♀
- History of predisposing factors, e.g. F.H. early menarche, late menopause, low parity, obesity ,OCP
- Accidentally discovered painless lump **rather than nipple discharge**
- Mass: hard irregular, ill-defined, immobile with the breast, fixed to the skin.
- +/-Axillary for lymphadenopathy.

Traumatic: there is no history of trauma

► What should you do to diagnose and treat such lady?

History

- 30-40 years female with bleeding nipple.

Symptoms

- Discharge: Bloody or blood stained nipple discharge 50%. (Commonest symptom).May be serosanginous discharge.
- Swelling → retention cyst (if it blocks a duct).
- No pain.

Signs

1. **Bleeding per nipple:**
   (bleeding on zonal pressure).
2. **Swelling:**
   Cystic, small, fusiform swelling, usually lateral to the areola with its long axis pointing to the nipple.
3. **Axillary LNs:** are not enlarged.

A) Investigations

1) If there is discharge do benzidine test→ to make sure is it blood or not.
2) Galactography(Ductography) the papilloma appears as a regular filling defect.
3) Mammography→ to screen the rest of the breast and the other breast.

Treatment →micodochectomy + histopathology

It's pre-cancerous (10%), so the treatment is:
Excision of the affected duct (Micro-dochectomy) through circumareolar incision and wedge of the tissue 2.5 cm around it. The specimen is sent to the histopathology

NB:

► **Bloody nipple discharge (Benzidine test +ve)**

a) If associated with lump:
   - Remove the lump + histopathology

b) If not associated with lump →Zonal Pressure:
   1. From One duct (duct papilloma) → micro-dochectomy &histopathology
   2. from many ducts → according to age
      - if the patient > 40 yrs (duct ectasia or multiple duct papilloma) major duct excision is done.
      - if the patient < 40 yr → observe until:
        1. Disappearance of the discharge
        2. Apperance of lump→ removal of lump + histopathology
        3. Localization to one duct → micro-dochectomy +histopathology.
        4. Patient reach 40 yrs →major duct excision.

CASE 8

A 30 years female present 2 cm lump in the upper outer quadrant of Rt. breast. Core biopsy confirms invasive duct carcinoma.

- **What are the needed investigations?** (see case 1)
- **What are the treatment options?Acc. To the stage**(see case 5)
- **Discus pros and cons of each treatment option?**(advantages and disadvantages of each line)(see case 3)
- **State the postoperative management.** (see case 3)
  -followup
  -complications of surgery
  -prognosis

► Complications of surgery

- The chest wall is anesthetic in 100% of pts postmastectomy and pt should be educated about this preoperatively.
- Infection: Preoperative prophylactic antibiotics especially in high risk patients (obese, elderly, diabetics)
- Hematoma: cessation of anticoagulants 10-14 days before scheduled surgery.
- Seroma: After mastectomy, drains should be left in place to prevent seroma formation (the drain is removed when the drainage is < 30 ml/24 hr.) and If seroma is detected, it should be aspirated since mastectomy flaps cannot adhere to the chest wall in the presence of seroma fluid
- Chronic incisional pain
- Postoperative flap necrosis can occur after mastectomy, seen most often with thin flaps and in smokers.
- Axillary LN Dissection is associated with long term morbidity:
  - Chr. Lymphedma :Avoidance of radiotherapy to the axilla which has been surgically evacuated of its nodes reduces the possibility of lymphatic edema.
  - Shoulder dysmobility.
  - Injury to brachial plexusin the axilla is rare (less than 1%). I
  - Injury to long thoracic n. results in a palsy of serratus anterior ms. and clinically will create winging of scapula.
  - Injury to thoracodorsal n. causes palsy of latismus dorsi ms. which may be evident during athletic activity or when trying to stretch in the midline of the back.

CASE 9

A 45 years old woman presented with a hard lump in the breast

- **Discuss Staging**
- **Necessary investigations(see case 1)**

International TNM classification

Tumor	Lymph Node
Tis = carcinoma in situ (detected by histopathology) or paget's disease with no palpable tumor. T0 = not clinically felt (detected by screening). T1 = Tumor <2 cm. T2 = Tumor 2-5 cm. T3 = Tumor > 5 cm. T4 = any size but fixed to the skin or chest wall or inflammatory carcinoma **NB:** Tx = tumor cannot assessed clinically as previous operation	N0 = No palpable L.N. N1 = Mobile ipsilateral axillary LNs N2 = Fixed ipsilateral axillary LNs N3 = Palpable ipsilateral supra-clavicular LN or edema of the arm. **NB:** Nx = nodes cannot assessed clinically as previous operation

Metastasis

M0 = No evidence of distant metastasis.
M1 = Distant metastasis
Mx = Distant metastasis cannot be assessed

Staging of the UICC (union international contre cancer)

Stage UICC		Description	Category	5 year survival (%)
I		T1, N0, M0	Early breast cancer	93
II	IIA	T2, N1, M0	Early breast cancer	72
	IIB	T3, N0, M0		
III	IIIA	T1-3, N0-2, M0	Locally advanced breast cancer	41
	IIIB	T4, any N, M0		
IV		Any T, any N, M1	Mestastatic	18

- Management & prognosis of breast cancer depends on staging, but it is important to know that only intial management is based on above staging systems, but further management depends on pathologcial staging this is because impalpable L.Ns may be found histologically involved by the disease on doing sentinal L.N. stud

CASE 10

55 years-old women presented with a hard lump in the breast.

- **Discuss the necessary investigations?** (see case 1)

CASE 11

A 39 year old female presented to you in the clinic complaining of a right breast mass of 2 months' duration. She showed you a mammogram and a breast ultrasound that showed a 6 cm solid mass in the right upper outer quadrant with no scattered microcalcifications. She also showed you a needle biopsy that revealed an infiltrating duct carcinoma of grade II. The general examination was normal. Local examination showed peaud' orange, the mass was felt as described above and was fixed to the chest wall. The axillary nodes were palpable, mobile, and each 1-2 cm in size. The supraclavicular nodes were not palpable. The metastatic workup was free.

keys:

- 39 year old female
- Mass of 2 months duration.
- Mammogram and a breast ultrasound showed a 6 cm solid mass in the right upper outer quadrant with no scattered microcalcifications.
- Needle biopsy revealed an infiltrating duct carcinoma of grade II.
- The general examination was normal.
- Local examination showed peaud' orange,
- The mass was felt and was fixed to the chest wall.
- The axillary nodes were palpable, mobile, and each 1-2 cm in size.
- The supraclavicular nodes were not palpable.
- The metastatic workup was free.

► **What is the TNM stage of this tumor?** T4N1M0 stage 3 locally advanced

► **What would she have done to detect this lesion early?** (See case 6)

► **What are the treatment options?** (See case 6)

CASE 12

A 49-year-old woman, P2, age 30 at first birth with no family history of breast cancer, presents with a 1-month history of increasing redness, heaviness, and swelling of her right breast. There was no antecedent history of trauma. Two weeks ago, she saw her primary care physician who made the diagnosis of breast infection and gave her a 10-day course of a cephalosporin. Her symptoms have not improved, and she was referred for surgical evaluation. On physical examination, there is diffuse erythema and edema of the right breast. The breast is diffusely firm compared to the left, but no discrete mass is palpable. There are no palpable supraclavicular or left axillary nodes. A firm, mobile,non tender 1-cm right axillary node is present.

► DIFFERENTIAL DIAGNOSIS

- In a nonlactating woman, erythema and edema over more than one-third of the breast that does not significantly improve with antibiotic treatment is inflammatory breast cancer (IBC) until proven otherwise. IBC *is rare, but is the most lethal form primary breast cancer.*
- Bacterial infection, including mastitis and abscess, is the most common misdiagnosis. These infections, however, are rare in nonlactating women, and treatment with antibiotics tends to be of immediate benefit. Because IBC is not a true inflammatory process, it is not associated with symptoms such as fever, localized pain, or leukocytosis.

NB:
- Considered Stage IIIB in the absence of distant metastases.
- In IBC, mammography reveals only breast thickening and diffusely increase breast density. U/S reveals increased vascularity and minor architectural distortions

Table 1.2	Acute Lactational Mastitis	Mastitis Carcinomatosis
Symptoms:		
1. General	FAHM	Anorexia & loss of weight
2. Local (onset & course)	Acute onset & rapidly progressive course	Gradual onset & slowly progressive course
Signs:		
1. General	High fever	No or low grade fever, cachexia
2. Local		
Tenderness	Marked	Mild
Axillary LNs	Tender	Not tender
Skin	Rosy or fiery red	Dusky red
Involvement	One breast sector is affected	More than 1/3 of the breast
Fate:	The lesion either cured by Ab or forms an abscess	No response to Ab for 1 wk, which is an indication for biopsy

► WORK UP AND MANAGEMENT : as before

CASE 13

A 28-year-old female, with a history of type I diabetes mellitus, presents to her obstetrician for an initial prenatal evaluation. Her last menstrual period was approximately 12 weeks prior to this visit. The patient has had two prior pregnancies requiring cesarean delivery. She states that she has developed a palpable breast mass over the past 7 months. The mass has grown substantially over the past month. She underwent mammography and focused ultrasound a month after first noticing the mass. The imaging at that time was negative for suspicious lesions, and no further evaluation was initiated.

▸ DIFFERENTIAL DIAGNOSIS

- The differential diagnosis of a breast mass in young women includes many benign entities such as fibroadenoma, lipoma, phyllodes tumor, fat necrosis, fibrocystic disease, galactocele, cyst, abscess, or accessory breast tissue.Fat necrosis is usually a posttraumatic or postoperative finding. Galactoceles generally develop months after discontinuation of lactation.
- Breast abscesses are usually associated with skin erythema, induration, and/or fever.
- During pregnancy, accessory breast tissue may swell and present as an enlarging mass in the axillary tail or in the axilla.
- Breast cancer is an uncommon diagnosis in this age group, with only 0.3% of all breast cancers occurring in women between the ages of 20 to 29.

▸ PRESENTATION CONTINUED

- The patient has no prior history of breast masses or breast biopsies. She notes a history of mastitis with a prior pregnancy. She had one maternal grandmother diagnosed with breast cancer but denies any additional family history of cancer, including breast or ovarian cancer.
- On review of systems, she denies trauma to the breast, skin changes, nipple retraction, or nipple discharge. Breast examination reveals a mass in the upper outer quadrant. There is also ipsilateral palpable axillary adenopathy. The contralateral breast is unremarkable

In acase of breast cancer Put in your consideration the following :

if breast cancer develops in pregnancy, it tends to be at a later stage because it is masked by symptoms of pregnancy and lactation. (also may be due to increase vascularity)

▸ TREATMENT:

- For the pregnant pt, the timing and order of ttt is determined in part by gestational age and the stage of cancer at diagnosis.
- Mastectomy is more optional than conservative surgery. Modified radical mastectomy is standard of care ,breast conservation and sentinel LN biopsy are contraindicated.
- Surgery is safer for both fetus and mother during 2nd trimester
- systemic Chemotherapy is not give in the 1st trimester but may be given during 2nd and 3rd trimesters.
- Radiotherapy is contraindicated. May be started postpartum
- Hormonal treatment is usually not given because most of the tumors are with -ve hormonal receptors.
- Termination of pregnancy doesn't improve outcome and should not be recommended to pts in the context of survival from breast cancer.
- Pts may maintain their pregnancy and safely undergo both local and systemic ttt.
- Early delivery may be considered if felt to affect maternal oncologic outcome.
- With appropriate abdominal shielding, mammography is considered safe
- Pregnant pts with an invasive breast cancer, particularly those with biopsy proven axillary disease, should also have staging studies performed e.g. CXR and liver U/S while others e.g. CT ,bone or PET scan should be deferred till the post partum period.

- Any lesions suspicious for distant metastasis warrant a percutaneous biopsy as they are not considered surgical candidates and should be initially treated with systemic chemotherapy

THYROID & ENDOCRINE CASES

CASE 14

A 30 years old mechanic presented with intolerance to heat, nervousness, less of weight inspite of good appetite and lately he was unable to hold small tools accurately. On general examination his pulse was 130/minute and regular, he had warm wet hands and he had exophthalmos. On neck examination a swelling was seen in the front of the neck which moved up & down with deglution.

Keys

- 30 years old man (usually middle aged female)
- intolerance to heat
- nervousness
- less of weight inspite of good appetite
- Unable to hold small tools accurately (tremors).
- pulse was 130/minute and regular,
- warm wet hands
- Exophthalmos.
- swellingin thefront of the neck moves up & down with deglutition (thyroid swelling)

► What are the diagnostic possibilities?

- Clinically, this is a case of thyrotoxicosis mostly primary thyrotoxicosis (Graves' disease):
- it's autoimmune disease,nervous, metaboilc & eye manifestations are more common .
  the gland
- Smooth,diffusely enlarged
- Soft ,Non tender.Freely mobile.
- Thrill may be present.
- Overlying skin is warm.

However,Other causes of thyrotoxicosis and hyperadrenalism should be considered such as

1. **Secondary thyrotoxicosis (Plummer's disease):**
   - Commonly in females > 40 years with past history of thyroid swelling of long period follow by toxic manifestation.
   - Cardiac manifestations are more common due to older age group
   - The gland is large, nodular, Firm.
   - No pulsation and no thrill.
2. **Toxic nodule:**Only one palpable nodule is felt in the gland.
3. **Pheochromcytoma**
4. **Anxiety**
5. Other rare causes of thyrotoxicosis

   Inflammatory:
   - Hashi-toxicosis: in early stage of Hashimoto thyroiditis, about 5% of patients havehyperthyroidism.
   - De Quervain thyroiditis: due to release of hormones from destroyed thyroid tissue

   Drug-induced:
   - Thyrotoxicosis factitia: due to excess intake of L-thyroxine (> 0.3 mg/day)

- Jod-Basedow thyrotoxicosis: due to intake of large doses of iodine in treatment of hyperplastic endemic goitre (it is a temporary condition & very rarely permanent).

Tumors:

- Functioning secondary carcinoma
- TSH secreting adenoma of pituitary

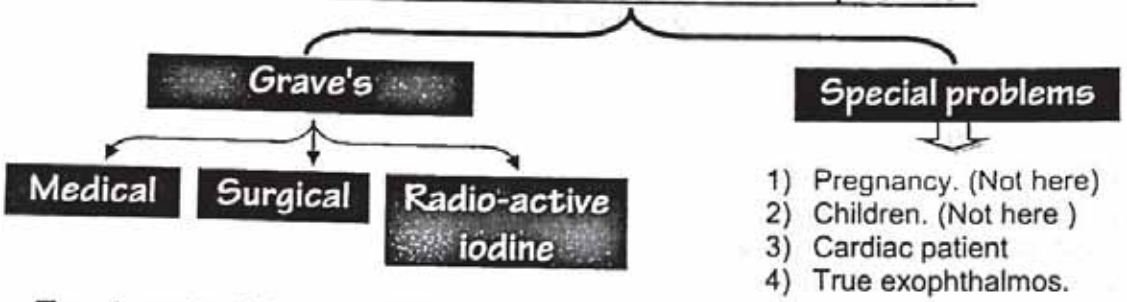
▶ What investigations are that would you suggest.

1. For Diagnosis: (most cases are diagnosed clinically)
   - Thyroid function tests:
     - Free T3 & T4→ high.
     - TSH→ suppressed.
   - U/S of the neck: mild diffuse enlargement.
   - Thyroid scan: diffuse ↑ uptake and exclude retrosternal goitre.
   - Thyroid Antibodies: TSI.

   NB: T3 thyrotoxicosis should be suspected if the clinical picture is suggestive with normal T4 and suppressed TSH
2. Investiagtions for exophthalmos:
   - Exophthalmometer.
   - Ruler: measures distance between lateral orbital margin and apex of the cornea (normally = 15 -17 mm)
3. Preoperative Investigations:
   - CBC, LFTs, KFTs, FBS, CXR and ECG.
   - Indirect laryngoscopy. (for medicolegal purpose)

NB: To exclude thyroiditis:
- Hashimoto → anti-microsomal & anti-thyro-globulin antibodies.
- De Quervain → good response to small dose of prednisolone (therapeutic test).

▶ What are the therapeutic modalities for such patient?



I- Treatment of Graves' Disease

A. Medical Treatment: (main line of treatment):

- The aim is to restore the patient to euthyroid state.
  Start with propranolol to protect the heart + neomercazole 10mgx3/d till the patient become euthyroid then stop propranolol and continue neomercazole 5mgx3/d for 1-1.5 year waiting for spontaneous remession which detected by the decrease in TSI level.

a) **Thiourea Group:**

	Neomercazole (The most commonly used drug in Egypt)	Propylthiouracil
➡ Mechanism of action	Inhibits peroxidase & iodine binding to tyrosine.	
➡ Dose	10 mg (2 tablets) 3 times daily, (maximum dose is 60 mg / day When the patient reaches euthyroid state, the dose is gradually reduced to 5 mg 2 or 3 times daily for 12 – 18 months.	100 mg tds **N.B.** It is used during pregnancy as it crosses placenta to less extent.
➡ Side Effects	• GIT upset, rashes & arthralgia. • The most dangerous complications are **agranulocytosis** due to BM depression (do CBC every 2 weeks) and **hepatotoxicity** → do LFTs.	
➡ Contraindications	1. Toxic nodular goitre. 2. Restrosternal toxic goitre.	
➡ Advantages:	- Avoid surgical risks - Avoid radiation	
➡ Disadvantages:	- We can't predict if the patient is liable to pass into remission or not - High recurrence rate (60% within 2 years from stopping treatment) - Side effects of the drugs.	

B-blockers (propranolol): *(it protects the heart)*

- Used with neomercazole which acts after 2 weeks till the patient becomes euthyroid → stop B-blocker

N.B. In asthmatics, propranolol (non-selective β-blocker) is contraindicated, so (selective β1 blocker) atenolol is used instead.

c- others

- **Diazepam:** if severe CNS manifestations.
- **K^+ perchlorate:** it compatitvely inhibits iodine uptake by the thyroid.
- **Iodides:** (e.g. Lugol's iodine)
  - Reduces the vascularity of the thyroid gland & leads to storage of colloid within the acini.
  - Their effect is only temporary, can not be used for longterm control (main use is preoperative preparation).

B. Surgical Treatment:

- Subtotal thyroidectomy after preparation
- **Indicated in:** failure of medical treatment, RSG or huge-sized goitre.
- **N.B.** Some authors believe that total thyroidectomy is better than subtotal thyroidectomy to avoid progression of exophthalmos.
- **Advantages:**
  The cure is rapid & the cure rate is high if surgery has been adequate
- **Disadvantages**:
  - Thyroid insufficiency (20-45%).
  - 5 % Recurrence
  - Nerve injury
  - Cosmetic scar
  - Parathyroid insufficiency 0.5% (d.t. high incidence of anatomical variation of the site of the parathyroid glands).

C. Radioactive Iodine:

- **Mechanism of action:**
  Destruction of the thyroid cells, thus reducing the mass of functioning thyroid tissue.
- **Dose:** 160 uCi / 1gm of thyroid tissue, the response is slow (within 8 – 12 weeks), 2nd dose may be needed in 20 – 30%.
  Using I^{131} (10 millicuri), I^{132}, I^{128} or I^{123}.
- **Indicated in:** old patient > 45 years with failure of medical treatment.
- **Commonest complication:** myxedema.
- **Advantages:**
  No Surgery & no prolonged medical therapy
- **Disadvantages**:
  - Overdose → thyroid insufficiency (75 – 80 % after 10 years), so long life follow up is mandatory.
  - Low dose →recurrence.
  - Isotope facilities must be available
  - Teratogenicity,
  - Carcinogenicity.

– N.B there is no evidence that therapeutic radio iodine is teratogenic or carcinogenic, thus the minimum age for its usage now is 25 years in many centers.

II- Treatment of Special Problems

True exophthalmos:

1. **Treatment of the primary thyrotoxicosis:**
   It is not preferred to terminate the toxic status abruptly by surgery or radioactive-iodine, **for fear of the theoretical risk of progressing to malignant exophthalmos.**
   Medical:
   - Antithyroid drugs + small doses of L-thyroxine to suppress TSH & EPF.

   Surgical:
   - If subtotal thyroidectomy is indicated, exophthalmos should be stationary for 6 months.
2. **Treatment of the exophthalmos:**
   Medical
   - Head up during sleep to decrease eye congestion.
   - Protection of the eye by day → eye drops & by night → ointment.
   - Dehydrating measures (diuretics).
   - High doses of prednisone (local administration is risky especially in presence of venous congestion).

   Surgical
   - Lateral tarsorraphy (it does not prevent the progression).
   - Orbital deroofing (Naffziger operation).

Thyrocardiac patient:

- The cardiac condition takes priority in management.
- Thyroidectomy is ideal after control of the cardiac status.
- If it is not permissible, radioiodine is used followed by antithyroid drugs until the effect of the former appears (6 weeks).

CASE 15

A 30 years old woman who is pregnant for 5 months complains of palpitation, tremors, excessive sweating & loss of weight.

- **Discuss (Diagnosis, Investigations & Treatment)**

it's a case of 1ry hyperthyroidism with pregnancy

Diagnosis, Investigations (see **case 14**)

TTT like **case 14** +

➢ **Toxic goitre in pregnancy:**

a. Anti- thyroid drugs should be used in **minimum** doses (propylthiouracil not neomercazole) supported by B-blockers. The dose is adjusted according to serum levels of free T4.

NB: In 3rd trimester: antithyroid drugs + small dose of L-thyroxine to suppress maternal TRF to avoid **transmitted thiouracil goitre.**

b. Surgical treatment (after a short course of anti-thyroid drugs & proranolol): it is better to be performed in 2nd or 3rd trimester.
c. During Lactation: propylthiouracil is recommended (as it's excreted in harmless very low concentration in milk).
d. Radio- active iodine is contraindicated, because it is teratogenic and will destroy fetal thyroid.

CASE 16

A 22 years old female medical student discovered a swelling in her neck during self-examination. When she came for consultation, she was apparently healthy with no significant family history or any history' of clinical significance. On examination of her neck a 3 cm single non tender firm mass was found in her left lobe of thyroid. No other masses were felt in the neck.

keys

- A 22 years old female
- Medical student
- 3 cm single non tender firm mass in left lobe of thyroid
- she was apparently healthy
- No significant family history
- No history of clinical significance.
- No other masses in the neck.

What are the clinico- pathological possibilities?

- Clinically, it is a case of solitary thyroid nodule for D:D
- The nodule may be part of simple multinodular goiter, other nodules are not clinically palpable (commonest).
- Colloid nodule
- Adenoma.
- Carcinoma esp (PTC)
- Toxic nodule
- Localized thyroiditis (hashimoto thyroiditis)
- Thyroid cyst

simple multinodular goiter

Type of patient

- Female 30-40 years with nodular swelling on the front of the neck.

Symptoms

1. Cosmetic deformity (main complaint)(painless slowly growing neck swelling).
2. Pressure symptoms: Retrosternal extension or malignancy
3. Pain: It is uncommon but may be felt when hemorrhage occurs in a nodule or late malignancy.

Signs

General: no thyrotoxic manifestations.

Local:

- Asymmetrical thyroid swelling
- Nodular (solitary, or multinodular)
- Firm.

Colloid nodule

- Etiology: is a late stage of diffuse hyperplasia when TSH stimulation has fallen of and when many follicles are inactive and full of colloid as patient may receive large doses of iodine → it will inhibit TSH and protease → hyper-involution of the gland.
- C\P: The gland is diffusely enlarged (Soft, Smooth, Symmetrical).

Hashimoto thyroiditis

Type of patient

- Middle age female, with goitrous myxedema & other autoimmune disease.

Symptoms

- Fluctuating course.
- Manifestations of thyrotoxicosis in 5% of cases.
- Manifestations of myxedema.
- Other autoimmune disease.

Signs

- **General:**
  - Manifestations of myxedema : usually associated with splenomegaly.
  - Autoimmune manifestations e.g. erythema nodosum .
- **Local:**
  - Asymmetrical large nodular firm asymmetrical swelling in the front of the neck Moves up with deglutition.

Toxic nodule.

Type of Patient Commonly in females at any age

Clinical Picture

- Toxic Manifestations
- Only one palpable nodule is felt in the gland.

Carcinoma esp (PTC)

- Female 20-40 years old, thyroid swelling in neck, LN (papillary carcinoma).

Symptoms:

- Swelling in lower part of front of the neck
- Early painless & late painful
- Infiltrative or compressive manifestations: dyspnea, dysphagia, hoarseness of voice & Horner's $.
- Metastatic manifestations: neck masses, skull swelling, hemoptysis & jaundice.

Signs:

❖ General examination:

- Cachexia.

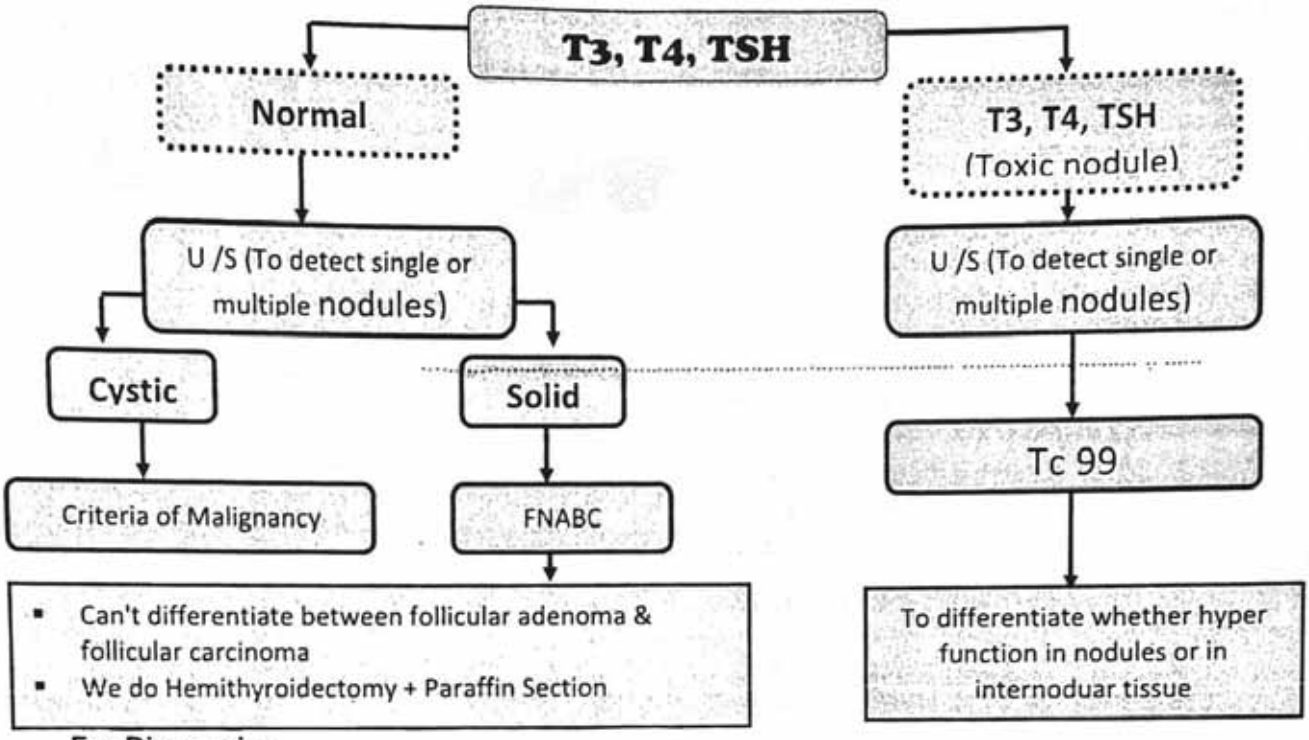
❖ Local examination:

A- Thyroid swelling " LUMP":

- Early → mobile thyroid lump in a part or the whole thyroid, firm to hard.
- Late → Hard fixed infiltrate the surrounding structures with restriction of thyroid mobility.

B- Neck LNs: May be enlarged & hard (mobile or fixed to skin & m.)

- **What investigations should be ordered?**



For Diagnosis:

1. Thyroid function tests:

- To differentiate simple from toxic nodular goitre.
- In SNG → Normal T3 & T4 levels
- In secondary thyrotoxicosis / In toxic nodule: ↑ T3, T4 and ↓ TSH
- The presence of thyroid antibodies to differentiated from autoimmune thyroiditis.
  - Antithyroglobulin&Antimicrosomal antibody
  - High ESR , leucocytosis

2. U/S of the neck:

- To detect cystic or solid
- solitary or multinodular.

Ultrasonic features suspicious for malignancy;

1) Hypoechoic
2) Micro calcification
3) Irregular margins
4) Chaotic vascular pattern
5) Extra capsular invasion
6) LN involvemen

NB: Although the prevalence of thyroid nodule on U/S may exceed 50%, palpable thyroid nodule can be detected in 10% of women and 2% of men. Fortunately, most nodules are of benign nature and only 5% harbour malignancy.

3. FNABC:

- to exclude malignancy.
- hashimoto thyroidities :Askanazy cells + lymphocytic infiltrations

2. To exclude complications:

1. Thyroid scan:

- in SNG to exclude secondary thyrotoxicosis and retrosternal extension
- In hashimoto:: low uptake
- in toxic nodule :hot nodule with suppression of the uptake of surrounding thyroid tissue

2. Plain X-ray:

- to exclude scabbard trachea, calcification and retrosternal extension.

3. Preoperative investigations:

- CBC, KFTS, LFTs, FBS.
- Indirect laryngoscopy for medicolegal importance.

4. Staging: CT, U/S, Bone scan, CXR if proved to be malignancy .

NB: The value of thyroid scan in cases of solitary thyroid nodule is:
- May reveal the presence of multinodular goiter.
- If the nodule is hot, it is toxic and the possibility of malignancy is nearly excluded.
- If the nodule is warm, it is a functioning adenoma and the possibility of malignancy is nearly 3.5%.
- If the nodule is cold, the possibility of malignancy is 10-16%

- **Propose the treatment for each possibility.**
  - **simple multinodular goiter**

Most patients with multinodular goiter are asymptomatic and do not need operation

Treatment

Non – complicated SNG

Aim of TTT:
1. To relieve the pressure symptoms if present.
2. For cosmetic purposes.
3. To prevent complications.

Treatment

Surgical

a- Partial thyroidectomy.
b- Subtotal thyroidectomy.
c- Total thyroidectomy.

Non- surgical

Complicated SNG

1. 2ry toxic goiter.
2. Malignant changes
3. Retrosternal extension
4. Hemorrhage

A- Non- complicated SNG

1. **Surgical:**
   - I. **Operations:**
     - a- **Partial thyroidectomy:**
       - Removal of the nodular parts leaving an equivalent of 8 gm of relatively normal thyroid tissue (size of normal lobe) on each side if feasible to reduce the risk of hypoparathyroidism that accompanies total thyroidectomy.
       - We preserve the posteromedial part to avoid injury of RLN and parathyroid glands & to preserve part of the gland for secretion of thyroxine.
     - b- **Subtotal thyroidectomy:** Removal of thyroid tissue leaving about 4-5 gm of thyroid tissue on each side, so, total remnant on both sides equal one normal lobe
     - C-**Total thyroidectomy:**
       - (Total thyroidectomy + replacement therapy) to prevent recurrence and to avoid accidental malignancy. for this reason surgeons favor total thyroidectomy in younger patient as reoperation is hazardous.
       - NB: However, total thyroidectomy & thyroxine for life is better than re exploration of the neck, to avoid recurrence & histopathological surprise.
   - II. **Post-operative:**
     - Suppressive dose of L-thyroxin (0.1 - 0.2 mg/day) to avoid recurrence (prevent TSH fluctuation) in the left thyroid tissue
2. **Non-surgical:**
   - In patients less than 25 years old, surgery not advised as it may be followed by recurrence (conservative treatment: suppressive dose of L-thyroxin)
   - Recently: alcohol injection in the nodules, as it causes necrosis of the nodules and reduction of the size of the gland.

B- Complicated SNG

1. **2ry toxic goitre:**
   - If < 45 years → Subtotal thyroidectomy after preparation.
   - If > 45 years → Radio-active iodine.
2. **Malignant changes**(Follicular carcinoma):
   - Total or near total thyroidectomy.
   - Supplementary L-thyroxin.
   - Radioactive iodine for metastasis.
3. **Retrosternal extension:** surgical excision.
4. **Hemorrhage:** urgent aspiration or even emergency subtotal thyroidectomy.

Toxic nodule

1) Surgical Treatment:
- Ipsilateral total lobectomy.
- Indicated in patients < 45 years.

2) Radioactive iodine.
- Very effective (as the autonomous nodule is the only part that will take the iodine). But used in patient > 45 years for fear of malignancy

3) Medical Treatment: as secondary thyrotoxicosis.

Hashimoto thyroiditis

Medical Treatment:
1. Cortisone.
2. L- Thyroxin. (Main treatment)
3. Inderal to control toxic symptoms during Hashi-toxicosis.

⇨ **Indications for surgery**
1. Large goitre with pressure manifestations
2. Suspicion of malignancy. i.e. :
   - Rapid increase in size.
   - Pain.
   - Ulceration.
   - LN enlargement.

Colloid nodule:

Conservative unless causing pressure manifestations → Subtotal Thyroidectomy

CASE 17

A 23 years female with a diffuse swelling on the front of the neck that moves up & down with swallowing & proptosis. Pulse 130/min.

- **What is provisional diagnosis**?(See case 14)
- **How to confirm the diagnosis?(** See case 14)
- **Discuss treatment details?(**See case 14)

CASE 18

A 30 years old women who is pregnant in her 14 weeks developed tremor, insomnia, intolerance to hot weather & loss of weight. On examination she had tachycardia & wide pulse pressure.

- **Discuss (Diagnosis, Investigations & Treatment)**(see case 15)

CASE 19

A 42 year old woman in a good health, whose only medications are oral contraceptives, presents for evaluation of a central neck mass. Her neck examination shows a firm mass to the right of the larynx that moves up and down with deglutition. She has no palpable lymphadenopathy. She has no family history of thyroid disease and no personal history of radiation exposure.

KEYS

- 42 year old woman in a good health,
- Firm neck mass to the right of the larynx that moves up and down with deglutition.
- No palpable lymphadenopathy.
- No family history of thyroid disease
- No personal history of radiation exposure.

- **What's your diagnosis and D.D ?**
  - Clinically, it is a case of solitary thyroid nodule for D:D
  - Most probably simple multinodular goiter (The nodule may be part of simple multinodular goiter, other nodules are not clinically palpable)
  - D:D (see case 16)

- **What is the work up you will perform??** (see case 16)

- **What is the treatment of such case?** Treatment of SNG (see case 16)

- **What is the prognosis?**
  There is high recurrence rate after partial thyroidectomy so some surgeons prefer to do total thyroidectomy and replacement because re-exploration of the neck is hazardous however there higher risk of injury of recurrent laryngeal nerve and parathyroid gland

- **How can you treat hypocalcemia associated with parathyroid gland injury during the operation?**
  a. For mild hypocalcemia, oral calcium carbonate 500- 1500 mg two to four times daily.
  b. For severe hypocalcemia, we add vitamin D (calcitriol 0.25- 1 microgram daily)
  c. Hypocalcemia not controlled by oral supplementation or accompanied by severe symptoms like muscle cramps is best managed by IV calcium gluconate (ca gluconate is the only option for IV supplementation "ca chloride never be used").

N.B: Unintentionally removed or devascularized parathyroid glands should be auto transplanted and implanted in the muscle.

- **What is the post operative management?**

- The pt should be monitored for several hours after surgery to evaluate the occurrence of neck **hematoma** that may require emergent evacuation (Postoperative expanding neck hematoma should prompt bedside wound exploration followed by return to the operating room).
- Symptomatic transient postoperative **hypocalcemia** occurs in 10-20% of pts that undergo total thyroidectomy and may be minimized with the use of oral calcium.
- Measuring postoperative calcium and PTH levels is used to identify patients that may require higher doses of calcium and calcitriol supplements.
- All pts that underwent total thyroidectomy require thyroid hormone **replacement** therapy.

CASE 20

A 53 years old female presented to outpatient clinic with a Lt. sided thyroid swelling. There are no other symptoms or signs. Sonography reveals a solitary solid nodule

- **Discuss (Diagnosis, Investigations & Treatment)** (see case 16)

CASE 21

A 27 year old female presented to obesity clinic. She gave a history of amenorrhoea. On examination, the blood pressure was 175/100, her face showed enlarged cheeks with some hirsutism, the back showed deposition of fat between both scapulae, abdominal examination revealed obesity with stria rubra, and the lower limbs were slim as compared to her trunk. Her routine labs showed a fasting blood sugar of 220 mg/dl.

Keys:

- A 27 year old female
- amenorrhoea.
- Blood pressure 175/100,
- Enlarged cheeks
- Hirsutism
- The back showed deposition of fat between both scapulae,
- Obesity with stria rubra
- Lower limbs were slim as compared to her trunk.
- Fasting blood sugar of 220 mg/dl.

- **What is your diagnosis?**
  - **Clinically, it is a case of Cushing's syndrome complicated with hypertension and DM. however exclusion of the Other causes of obesity, hypertension & DM especially when combined is important**
- **How would you reach the diagnosis in this case? (C/P +investigation)**
  - **C/P**

I. **Fat redistribution:**
- Patients may have increased adipose tissue:
  - in the face **(moon facies)**
  - Upper back at the base of the neck **(buffalo hump)**
  - Above the clavicles **(supraclavicular fat pads).**
- Trunkal obesity with pendulous abdomen
- Increased waist to hip ratio greater than 1 in men and 0.8 in women

II. **Skin**
- Facial plethora (red cheeks).
- Red striation, common over the abdomen, buttocks, back, upper thighs, upper arms, and breasts.
- Ecchymosis.
- Cutaneous atrophy and thinning of skin may be evident.
- Hirsutism and male pattern hair may be present in women.
- Poor wound healing.

III. **Cardiovascular and renal**
- Hypertension.
- Volume expansion with edema.

IV. **GIT :** PU

V. **Endocrine:**
- Diabetes mellitus.(steroid induced)
- Hypothyroidism may occur from anterior pituitary tumors.
- Galactorrhea.

- Polyuria and nocturia from diabetes insipidus.
- Menstrual irregularities, amenorrhea, and infertility.

VI. **Skeletal/muscular**
- Proximal muscle weakness.
- Osteoporosis→fractures and kyphosis
- Bone pain.

➢ Investigations

A. Investigations for diagnosis of Cushing's syndrome:

- **↑Urinary free cortisol or 17-hydroxycorticosteroids:**
- **Plasma cortisol level:**
  - Normal 5-20 mg/dl & there is a normal circadian rhythm
  - In early stages of Cushing's syndrome there is loss of circadian rhythm.
  - In later stages there is persistent elevation of cortisol level.
- **Low-dose dexamethasone suppression test:**
  - Dexamethasone 0.5 mg/6 hours is given for 2 days.
  - In normal individuals this causes inhibition of ACTH secretion by negative feed back mechanism so cortisol level in blood will decrease.
  - In Cushing's syndrome there will be no change in cortisol level.

⇨ **Less important investigations:**

- **Insulin tolerance test:**
  - Hypoglycemia stimulates an increase in plasma cortisol in normal individuals but not in patients with Cushing's syndrome.
- **Blood picture:**
  - Increased red cells & neutrophils.
  - Decreased lymphocytes & eosinophils.
- **Blood chemistry:**
  - Increased Na & glucose.
  - Decreased K.

B. Investigations for diagnosis of the cause:

- **Plasma ACTH:**
  - Normal level: 10-80 ng/liter.
  - Low level in adrenal tumors.
  - High level in ACTH-dependent cases and ectopic ACTH secretion.
  - If not available shift to high dexamethasone suppression test.
- **High-dose dexamethasone suppression test:**
  - Dexamethasone 2 mg/6 hours is given for 2 days.
  - Decrease in plasma cortisol occurs only in pituitary tumours but not in adrenal tumours or ectopic ACTH syndrome.
- **Diagnosis of pituitary tumours;**
  - MRI & CT scan.
  - Inferior petrosal sinus sampling.
- **Diagnosis & localization of adrenal tumours :**
  - U/S, CT scan, MRI or selective adrenal vein sampling.

▪ How would you treat her?

1- For pituitary tumors:

1- Trans-sphenoidal removal of the tumor (treatment of choice)
2- Hypophysectomy or pituitary irradiation followed by replacement therapy)

2- For adrenal tumors:

1- Surgical removal of the tumour.
2- This should be followed by suboptimal replacement therapy with low-dose steroids till the other atrophic adrenal gland recovers from suppression.

3- For paramalignant syndrome: treatment of the primary tumor if possible.

4- Medical therapy:

- Used to prepare patients before surgery or if surgery is contraindicated.
- Includes drugs that inhibit cortisol production e.g. metyrapon

CASE 22

Dr. Mohamed El-Matary

A 55-year-old woman complaining from anorexia, nausea and polyuria her past medical history is notable for nephrolithiasis, Peptic ulcer resistant for treatment, gastroesophageal reflux disease and not diabetic, and her blood pressure 160/100 , serum calcium 14.7 mg/dL.
serum creatinine 0.5 mg/dl

what is the most probable diagnosis and D:D ?

keys:

- 75-year-old woman
- anorexia, nausea
- peptic ulcer resistant for treatment.
- gastroesophageal reflux disease.
- Polyuria, nephrolithiasis.
- blood pressure 160/100 .
- serum calcium 14.7 mg/dL.
  Normal creatinine level .

➢ Clinically it's case of hypercalcemia and The most common reason for hypercalcemia in the out-patient setting is primary hyperparathyroidism (HPT), while hypercalcemia in the inpatient population often is secondary to malignancy.

► **Parathyroid-mediated hypercalcemia** (↑ serum PTH levels are elevated inappropriately).

- **Primary HPT** The peak incidence is in the fifth and sixth decades of life, with a female to male ratio of 3:1. sometimes a part of **MEN type I or MEN type II**
  - benign, solitary parathyroid adenoma in 80% to 85% of patients.
    Adenoma
  - 5% to 20% have parathyroid hyperplasia,
  - fewer than 1% of patients have parathyroid carcinoma
- **secondary / tertiary HPT normocalcemic hyperparathyroidism** as in CRF & malabsorption
- Benign familial hypocalciuric hypercalcemia (BFHH)
- Lithium therapy.

► **Non-parathyroid-mediated hypercalcemia** ((↓serum PTH levels)
Malignancy (3 groups) characterized by recent onset of hypercalcemia, ↑ESR, ↑ALP and ↑ S. Ca+2 (>14 mg/dl) & anemia.

- Group I (30%): Hematologic malignancies, e.g. multiple myeloma & lymphomas.
- Group II (50%): Solid tumours with lytic bone metastasis e.g. cancers of breast, lung, kidney and pancreas.
- Group III (20%): Solid tumors without bone metastasis. Hypercalcaemia is due to their secretion of a hormonal factor that binds to PTH receptor in bone (PTH-like substance).

- granulomatous diseases as sarcoidosis
- endocrinopathies as hyperthyroidism, adrenal insufficiency
- medication as (thiazides, vit.D, Ca)
- immobilization

• Symptoms of hypercalcemia include

Hypercalcemia is the disease of bone, stones, mood & abdominal organs

- ▶ The commonest presentation is asymptomatic hypercalcemia.
- ▶ In general, 80% of patients have renal involvement & 35% of patients have skeletal involvement.

1) **The earliest symptoms:**
   - Muscle weakness, anorexia, nausea, constipation, polyuria and polydipsia.
2) **Renal:**
   a- Nephrolithiasis = recurrent renal stones (30-80%).
   b- Nephrocalcinosis (5-10%), which is irreversible and may lead to renal failure.
   - ⇨ The patient complains of backache, haematuria, passage of renal calculi of calcium phosphate or oxalate.
   - ⇨ Notice that 75% of patients with 1ry hyperparathyroidism have calcium stones
   - ⇨ Hypertension due to irreversible renal impairment

   NB: hypertension is responsible for 30% of deaths in patients with persistent hypertension after parathyroidectomy.
3) **Bone:**
   - ⇨ subperiosteal resorption, especially of the phalanges and in severe cases cysts and tufting of terminal phalanges.
   - ⇨ The skull is the 2nd common site with diffuse granularity and cystic changes.
   - ⇨ multiple pathological fractures may occur. There is severe demineralization of the whole skeleton (The patient is losing his skeleton in his urine).
4) **GIT:**
   - ⇨ Peptic ulcer disease (**common**).
   - ⇨ Pancreatitis (rare, < 1 % of cases).
5) **Emotional disturbances:**
   - ⇨ Neurologic and psychiatric problems may occur.
   - ⇨ The severe forms are not correctable by parathyroidectomy.
6) **Hyperparathyroid crisis**
   - ⇨ Occurs with high serum calcium 16-20 mg/dl.
   - ⇨ It presents by rapidly developing muscular weakness, nausea, vomiting, weight loss, fatigue and drowsiness.

   NB :MEN-I is characterize d by 3Ps:
   ❶ Pituitary tumor.
   ❷ Parathyroid adenoma.
   ❸ Pancreatic tumor.

   MEN-II
   ❶Medullary carcinoma
   ❷Pheochromocytoma
   ❸Parathyroid Adenoma.

• What are the investigations would you want to do ?

▶ Investigations

A. Lab.:

1) **Serum Ca^{+2} level:** (esp.ionized Ca^{+2}),
   - Levels above 13 mg/dl are highly suspicious (except, in 2ry hyperparathyroidism i.e. normocalcemic hyperparathyroidism).
   - Ca^{+2} and P^{+3} are evaluated together with plasma proteins.
   - Dent test:

- Only in 1ry hyperparathyroidism giving 150 mg cortisone for 10 days lowers serum Ca^{+2}.

NB:

- Hyperparathyroidism with normal S. calcium level (Correction of these disorders may declare hypercalcaemia):
- Because of the effect of PTH on bicarbonate excretion in the kidneys, pts with primary HPT often have hyperchloremic metabolic acidosis
  a) Hypoalbuminemia
  b) Pancreatitis.
  c) Vitamin D and Mg ↓.
  d) Excess phosphorus intake.

2) PTH immunoassayElevated plasma level of PTH
3) Plain X-ray showed multiple bone cysts with loss of bone density
4) Serum chloride to phosphate ratio > 33 suggests hyperparathyroidism.
5) ↑↑ excretion of calcium in urine.
6) Serum ALP is raised with skeletal lesions.

B. Localization:

The most accurate localization of hyperactive parathyroid glands is by surgical exploration of the neck. In the hands of experienced surgeons, nearly 95% of patients with primary hyperparathyroidism are cured at the initial neck exploration.

► **Helpful preoperative methods of localization are:**

1) High resolution U/S (accuracy 76%).
2) CT scan: 50% accuracy & is helpful in mediastinal sites.
3) Technetium labeled sestamibi scan:
   - 80% accuracy in localization of parathyroid adenoma with a greater sensitivity
   - Initially both the thyroid and parathyroid glands are visualized, but after a short time the isotope is washed out from the thyroid and the parathyroid is clearly visualized.

➡ Combining ultrasound & sestamibi scan has a sensitivity of 95%.
➡ Sestamibi scan has replaced thallium technetium scan.

4) In patients with previous neck exploration, selective venous sampling from certain points along the big veins, e.g. innominate v. and IJV may be helpful.

▪ What is the treatment of such case ?

► Treatment

A. Parathyroid adenoma:

- The adenoma is excised.
- Operative localization of the adenoma is helped by giving radioactive technetium and tracing the highest radiation density in the neck by a hand-held probe.
- The other glands are exposed to ensure that they are of normal size.
- One of them is biopsied.

B. Parathyroid hyperplasia:

- Subtotal parathyroidectomy (i.e., excision of three & half glands).
  OR Total parathyroidectomy + Heterotopic auto transplantation of very thin slices in the forearm muscles.
- Postoperatively S. PTH can be measured from the ipsilateral antecubital vein sample.
- If patients develop hypercalcaemia, few parathyroid slices can be removed from this easily accessible site.

NB:
Parathyroidectomy is the only effective long term ttt for HPT The rationale for Parathyroidectomy is supported by evidence that in about 80% of pts the clinical manifestations of primary HPT improve after successful Parathyroidectomy.

➡ **Postoperative care.**
- ✓ Following removal of the parathyroid glands, the serum Ca^{+2} falls to normal in 24-48 hours. Patients with severe skeletal depletion, long standing hyperparathyroidism develop paraesthesia, carpopedal spasm or even seizures. (bone hunger syndrome) often necessitate postoperative ttt with Ca supplements and calcitriol
- ✓ Mild symptoms respond to oral calcium supplementation, but severe symptoms need IV calcium possibly with addition of Mg^{+2}.

➡ Adenoma & hyperplasia are either chief cell, water clear cell or rarely oxyphil cell types.

➡ Parathyroid carcinoma:
- Patients are usually symptomatic with skeletal & renal involvements.
- The glands are palpable in 1/3 to 1/2 of cases.
- ↑ ALP, PTH & Ca^{+2}.

➡ **Treatment of 2ry & 3ry hyperparathyroidism:**
- Essentially medical by Vit. D + Calcium & Phosphate binders.
- Surgery is indicated for failure to respond to medical treatment by removal of all but about 50 mg of parathyroid or 15 slices 1 mm each. Surgery should be postponed 6 months after renal transplantation in cases of 3ry hyperparathyroidism as the s. Ca^{+2} may return to normal after transplantation.

CASE 23

A 38 years old female was referred from the orthopedic clinic after having a pathological fracture of the humerus. Plain X-ray showed multiple bone cysts with loss of bone density. There was a history of polyurea, thirst and muscle weakness. The patient has been on regular medical treatment of peptic ulcer 3 years before presentation.

keys
- A 38 years old female
- pathological fracture of the humerus.
- Plain X-ray showed multiple bone cysts with loss of bone density.
- polyurea, thirst and muscle weakness.
- peptic ulcer 3 years resistant for TTT

a) What is the differential diagnosis of such a condition?

b) How to proceed in management?

CASE 24

A 45 year-old female patient has been receiving antihypertensive drugs since 3 years. She always complained of recurrent attacks of Palpitation, Headache, and Episodic Sweating. In addition, she used to complain of muscle weakness, backache, anorexia, nausea, and repeated passage of calculi in urine. Recently, she has undergone an ipsilateral thyroid lobectomy and isthmus resection, for what appeared on frozen section to be a benign nodular lesion 2.0 cm in diameter Seventy-two hours later the final pathology returns and the diagnosis is Medullary carcinoma of the thyroid.

Keys

- A 45 year-old female
- receiving antihypertensive drugs since 3 years. recurrent attacks of Palpitation, Headache, and Episodic Sweating. (suggestive for pheochromocytoma)
- she used to complain of muscle weakness, backache, anorexia, nausea, and repeated passage of calculi in urine. (suggestive for hyper para thyroidism)
- Recently, she has undergone an ipsilateral thyroid lobectomy and isthmus resection, for what appeared on frozen section to be a benign nodular lesion 2.0 cm in diameter Seventy-two hours later the final pathology returns and the diagnosis is Medullary carcinoma of the thyroid.

a) What is the possible diagnosis of this lady? It is a case of MEN type II

hyper parathyroidism

pheochromocytoma

medullary carcinoma

b) How to proceed in subsequent management? (C/p ,investigations, TTT)

1. Hyperparathyroidism (as before)

2. Pheochromocytoma

Early Hypertension or DM in young age

- Hypertension which is usually paroxysmal.
- Attacks of sympathetic over activity (hypercatecholaminaemia):
  - Tachycardia & palpitation.
  - Sweating & pallor.
  - Anxiety & tremors.
  - Arrhythmia & precipitation of angina.
- Hyperglycemia.
- May be associated features of multiple endocrine neoplasia (MEN) e.g.
  - Medullary thyroid carcinoma.
  - Hyperparathyroidism.
  - Neurofibromatosis.

▶ **Investigations**

1. Laboratory:
   1- Increased urinary vanillylmandelic acid (VMA) (N: 2-7 mg/24 hrs).
   2- Increased urinary catecholamines.
   3- Increased plasma catecholamines.

2. Radiological
   1- Abdominal ultrasonography
   2- CT scan or MRI
   3- Selective adrenal vein sampling.

▶ **Treatment**
- **Adrenalectomy** of the diseased side after preoperative preparation
- **Preoperative preparation:** alpha blockers 7-10 days followed by beta blockers 3-4 days or combined alpha and beta.
- **Operative:** anesthesia by nitrous oxide

NB. Avoid halothane to avoid arrhythmia

- **Approaches of adrenalectomy:**
  1. Posterior approach (lumbar approach).
  2. Thoracoabdominal approach (bed of 10th rib).
  3. Anterior approach (for bilateral exposure).
  4. Laparoscopic adrenalectomy.

3. Medullary carcinoma

- **Type of patient:**
  - Old age, however familial type is more common in children & young adult.
- **Symptoms:**
  1- **Swelling** in lower part of front of the neck → Rapidly growing
  2- Early painless & late **painful** & pain may referred to ear (along auricular branch of vagus "Arnold nerve")
  3- **Infiltrative** manifestations:
  4- **Metastatic** manifestations:
  5- **Others** → diarrhea in 30 % of cases due to production of 5-HT (serotonin) or prostaglandin.
- **Signs:**
  - **General examination:** Cachexia.
  - **Local examination:**
    a- **Thyroid swelling :**
    Early → mobile Late → Hard fixed infiltrating the surrounding structures
    b- **Neck LNs:** May be enlarged & hard
    c- **Surroundings:**
    1-Trachea → is fixed to the gland
    2- Carotid artery → Absent carotid pulse (Berry's sign). (Infiltration of carotid sheath)

▶ **Investigations**
- For screening: In medullary carcinoma (familial type) →calcitonin, calcium →if high →total thyroidectomy even if thyroid is normal by other investigations
- For diagnosis: US, FNABC, ↑ serum calcitonin > 0.08 ng /ml [tumor marker] (the level falls after resection of the tumor)
- For staging:
  - CT scan.
  - CXR →lung metastasis.
  - Bone scan → bone metastasis
  - Abdominal U/S → liver metastasis.
  - Direct laryngoscopy, bronchoscopy & esophagoscopy.
- For pre-operative preparation:
  - CBC, FBS, KFTs, LFTs, CXR ,ECG
- To rule out pheochromocytoma →urinary catecholamines

Treatment

- Total thyroidectomy + resection of metastatic L.N.s.
- **Thyroid gland management:**
  - Removal of both lobes and ismuth of thyroid gland.
- **Lymph nodes management** →
  - Medullary carcinoma is associated with high incidence of nodal involvement.
  - Central neck node dissection **Should** be done in **All** patients regardless the age.
  - Modified radical neck dissection for primary tumor > 1.5 cm in diameter and when nodes are involvement
- **Parathyroid** →Sporadic type (preserve all parathyroid gland)
  →Familial type, we preserve only 1/2 parathyroid gland (for fear of hyperparathyroidism).

N.B *If familial type → treatment of pheochromocytoma is done at first by (combined alpha & beta blockers) then adrenalectomy.*

No rule of radioactive iodine as C-cells can not pick up iodine & not under control of TSH

الذين يزرعون بالدموع يحصدون بالابتهاج
انظروا إلى الأجيال القديمة وتأملوا. هل توكل أحد على الرب فخزي؟
الذي بدأ معك اول الطريق لن يتركك في منتصفه
هو شايف هو عارف معك ينتهي ☺

SALIVARY GLANDS CASES

CASE 19

47 male with unilateral painless swelling affecting right parotid gland. The swelling is slowly increasing in size over years. Facial nerve is intact.

► What is the probable diagnosis?

Keys :

- 47 male
- unilateral painless swelling affecting right parotid gland.
- The swelling is slowly increasing in size over years.
- Facial nerve is intact.

Clinically, it is a case parotid gland swelling most probably pleomorphic adenoma (mixed salivary tumor).

► What are the pathological types of lesion?

☑ **Inflammation:**
- Acute (viral, bacterial).
- Chronic (TB, sarcoidosis).

☑ **Autoimmune:**
- Sjogren's syndrome.
- Benign lymphoepithelial lesion.

☑ **Tumors:**
- **Benign:**
  - Pleomorphic adenoma
  - Adenolymphoma
  - Oncocytoma.
  - Monomorphic adenoma.
- **Malignant:**
  - Mucoepidermoid carcinoma
  - Adenoid cystic carcinomao Acinic cell carcinoma
  - Carcinoma ex pleomorphic adenoma

► What are the principles of treatment?

The tumor should be excised with safety margin (less recurrence rate than enucleation)

a- Conservative superficial parotidectomy
- All parotid tissue that is superficial to the nerve and its braches is excised

b- Total conservative parotidectomy:
- Removal of both superficial and deep lobes with preservation of facial nerve (indicated for tumors of the deep lobe and for recurrent tumors)

VASCULAR CASES

CASE 20

A 55 years old male presented to the outpatient clinic complaining of attacks of cramping pain in his left calf. The pain was present since one year but has progressed recently to the extent that it develops after 50 meters walking. The patient has weak left femoral pulse and absent distal pulsation. Examination of the abdomen revealed a pulsating swelling above the level of the umbilicus.

key:
- 55 years old male.
- attacks of cramping pain in his left calf.
- progressive coarse of the pain (to the extent that develop at 50 meters)
- weak left femoral pulse and absent distal pulsation
- Examination of the abdomen revealed a pulsating swelling above the level of the umbilicus.

1- What is the diagnosis of this case?

- It is a case of chronic ischemia of the left lower limb ,at the level of left SFA, mostly of atherosclerotic type, associated with abdominal aortic aneurysm, but other causes of chronic pain in the lower limb should be excluded:

1- Sciatica.(burning pain along the coarse of the nerve, increases by leaning forwards and sitting)
2- Varicose veins.(history of DVT)
3- Flat foot (pain on prolonged standing, inspection of the arch of the foot)
4- Peripheral neuritis (neuropathic pain is constant and unreleived by dependency)
5- spinal stenosis = compression of the spinal cord or its nerve roots. (symptoms usually are not consistently associated with activity and not rapidly relieved with rest)

2- What investigations are required?

A) Investigations of chronic ischemia:

1- Doppler flow study:
- ✓ Detection of stenosed or occluded segments.
- ✓ Detection of collateral refilling of the post-occluded or post-stenosed arteries.
- ✓ Measurement of the ankle/brachial(A/B) index:
  - Normally A/B index is 1-1.2
  - Less than 0.9 denotes ischemia
  - Less than 0.7 indicates severe ischemia
  - Less than 0.3 indicates impending gangrene.
- ✓ Measurement of segmental pressure.

2- Duplex scanning: Visualizes the arteries and detects the areas of stenosis and block.

3- Arteriography:
- ✓ This invasive method is done only if revascularization surgery is intended.
- ✓ Direct femoral arteriography: this technique is losing popularity nowadays in favour of more informative aortography.
- ✓ Arteriography provides the following information:
  - Exact site of arterial block
  - State of the proximal arteries.
  - Distal run-off.

- ✓ Complications:
  - Neurological deficit
  - Hemorrhage
  - Diminished pulse
  - Pulsatile mass (hematoma - false aneurysm)
  - Infection (at puncture site)
  - Allergic reaction to the contrast media
  - Thrombosis of the punctured vessel
  - Death < 0.05 %.

4- Digital subtraction arteriography (DSA) :The contrast material is injected I.V

5- MRA (Magnetic Resonance angiography):
- ✓ Advantages: Non-invasive and same accuracy as arteriography.
- ✓ Disadvantages: Expensive, new technique& still not experienced enough and diagnostic not therapeutic.

6- Computerized tomography (CT angiography).

N.B.
- *MRA and CT are gradually replacing DSA.*
- *In claudicant patient, we start the investigations with non-invasive vascular laboratory test and then proceed to one of the imaging tests only if non-invasive test results are insignificants .*
- *In CLI, do the non-invasive vascular lab test together with one of the imaging tests according to the clinical situation*

7- Other system evaluation (very important):
- ➢ Blood picture to detect anemia or polycythemia.
- ➢ Blood sugar
- ➢ Serum lipids
- ➢ Serum creatinine
- ➢ ECG and fundus examination.

B) INVESTIGATION OF AAA:

1- U/S:
- ☞ If an AAA is Clinically suspected,U/S is the screening test of choice to document or to rule out the presence of an aneurysm.
- ☞ It is rapid, inexpensive, non-invasive and accurate.

2- C.T scan:
- ☞ If repair of an AAA is decided, CT scan provides data that are important for surgery especially if endovascular repair is considered.
- ☞ In this respect spiral CT is superior to the conventional axial CT as the former can display the information in multiple planes and allow three- dimensional reconstruction of the aneurysm sac.

3- MRA: It is a good alternative to CT scan but is more costly.

4- Arteriography:
- ☞ An arteriogram may appear normal despite the presence of a large AAA if the aneurysm is occupied by a thrombus, so angiography is neither used to diagnose AAA nor to assess its dimensions.

- Angiography is of value if the patient has been suspected to have associated occlusive disease in the iliac, renal, or mesenteric arteries to plan the simultaneous repair of the occlusive disease.

5- For other system affection: ECG, CBC, lipid profile

3- What are the possible lines of treatment of this condition?

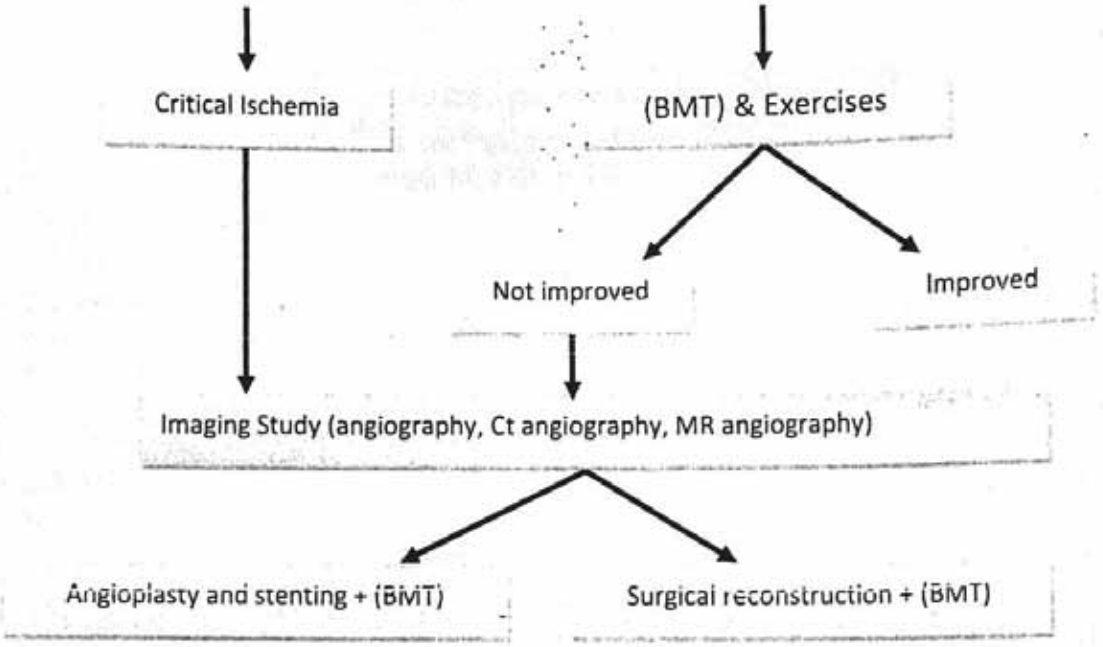
A) TTT OF CHRONIC ISCHEMIA

Conservative ttt

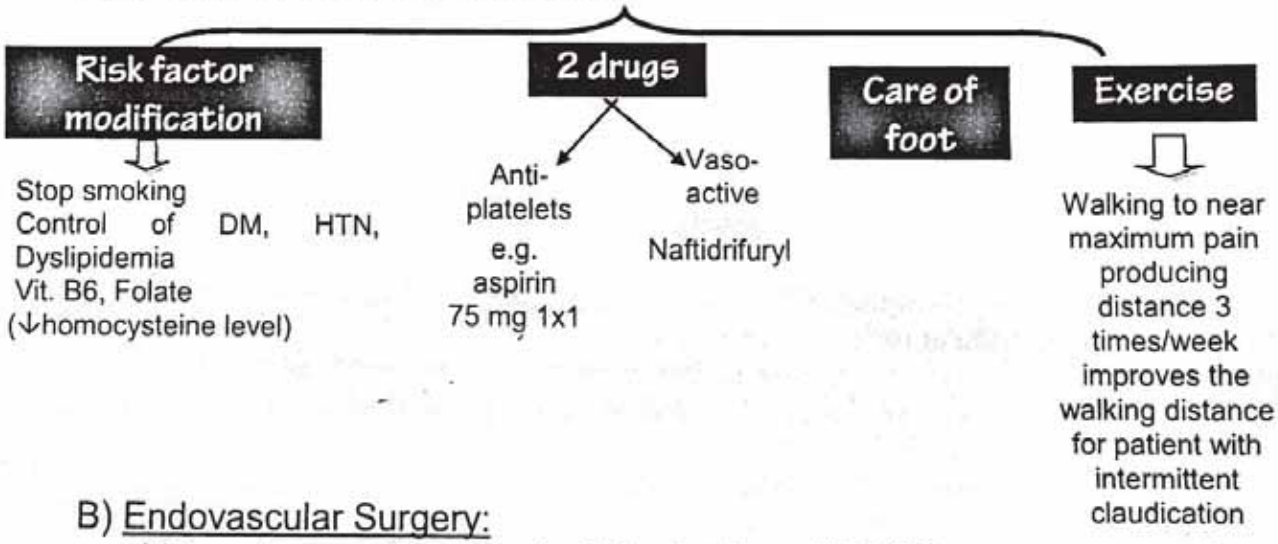
(Treatment is mainly conservative)

Spontaneous improvement occurs in many patients over the 1st 6 months after an occlusive episode as collateral vessels develop.

Symptoms of PAD → Clinical and Duplex assessment → Claudication



A) Best Medical Treatment (BMT):



B) Endovascular Surgery:

1) Percutaneous Transluminal Angioplasty "PTA" (success rate 95%)

Indications (as endarterectomy)

- Short segment affection in a big vessel (2cm or less).
- Non-calcified

- Not done in occlusion below knee level
- Good outflow

Complications: Recurrence, A-V fistula, Hematoma.

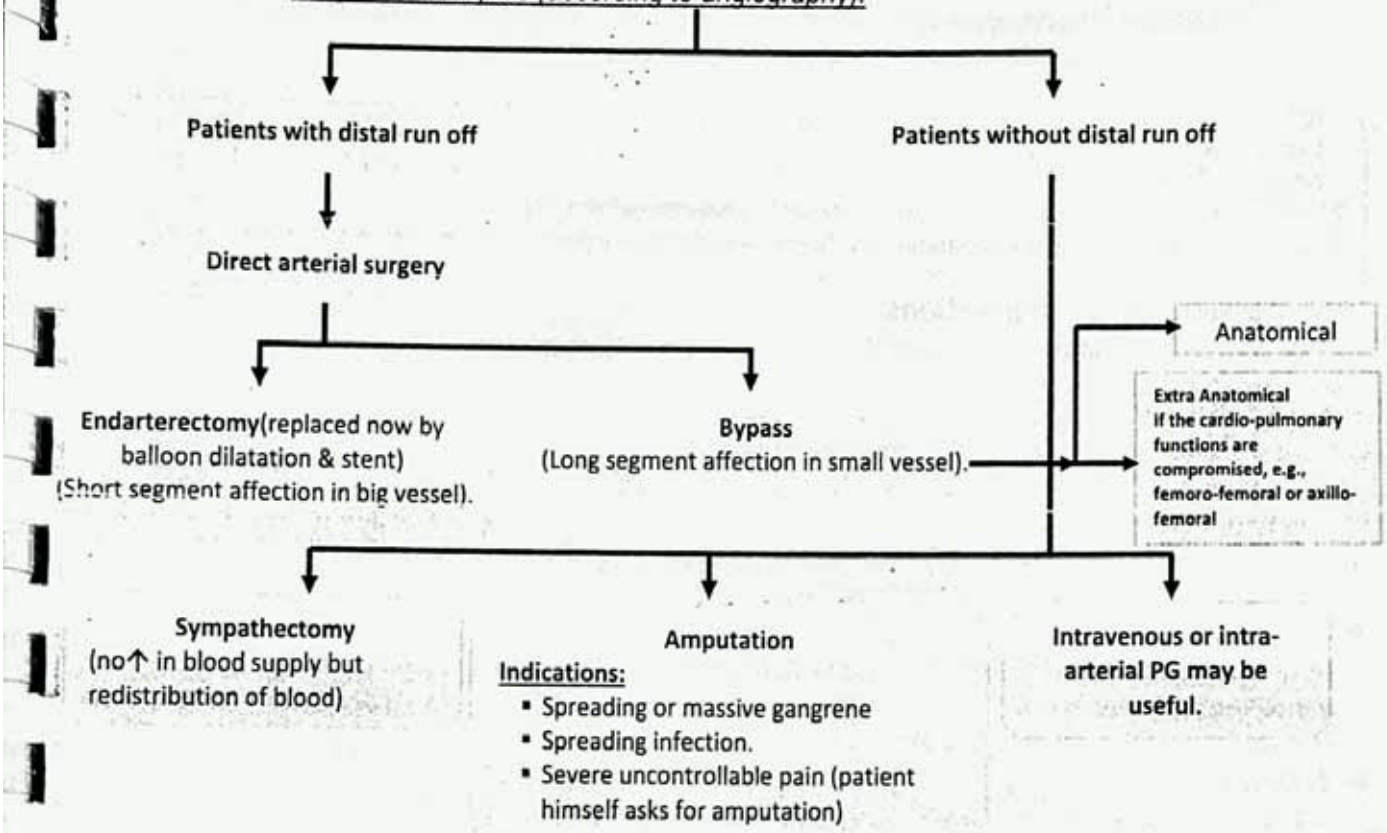
2) Intraluminal Stent: (after balloon angioplasty, stent can be inserted to prevent the elastic recoil of the arterial wall and keep the lumen patent)

C) Surgical Treatment : (*It aims at saving the limb and thus called limb salvage surgery*)

⇒ *Indications of surgery (=late ischemia)*

1. Starting gangrene (to avoid spread of gangrene).
2. Pregangrene.
3. Severe claudication pain interfering with patient's work (differs according to each patient).
4. Ulcers resistant for healing.
5. Long segment occlusion > 12 cm

⇒ *Surgical techniques (according to angiography):*

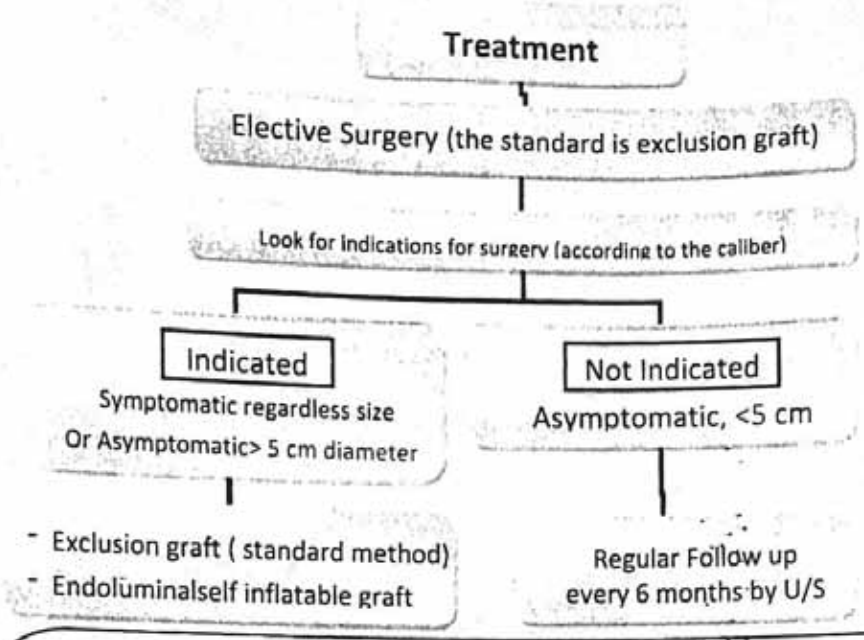


- postoperative :

- Leg elevation in the early postoperative period minimizes leg swelling and healing complications. - Aggressive mobilization and rehabilitation maximizes return to function.
-All patients are maintained indefinitely on aspirin or clopidogrel following surgical bypass

TTT OF AAA

1- Immediate surgery for patient with diagnosis of rupture.
2- Urgent surgery for patient with symptoms of acute expansion.
3- Elective surgery



N.B. 1- Endovascular repair of AAA via insertion of endoluminal stented graft through bilateral femoral arteriotomies is expensive and recurrence of aneurysm can occur so, only indicated for:

1- High risk patient who can not tolerate anaesthesia or open surgery
2- High risk local abdominal factors (intra-abdominal infection)

➢ **postoperative complications:**

1- additionally approximately 20%of patients who undergo open AAA repair will develop a ventral hernia
2- a common complication following EVAR is development of an endoleak .current recommendations are for an abdominal and pelvic CT scan with intravenous contrast at 1,6, and 12 months following EVAR and then annually thereafter assuming no endoleaks are noted.
3- Incisional hernia , colon ischemia, and aortoenteric fistula are some of the more serious complications that occur after aneurysm repair

► **prognosis:**

- studies suggest that 40% to 60% of untreated patients with CLI will progress to amputation within 12 to 24 months.
-The incidence of graft failure is threefold higher in smokers than in nonsmokers

► **follow up :**

- The ABIs can be an effective measure post-intervention result
- also, recently, trans-cutaneous partial pressure of oxygen or $TcPO_2$
- Duplex ultrasonography is generally done at 1, 6, and 12 months with yearly scans thereafter.

CASE 21

A 55 years old male presented to the outpatient clinic with black discoloration of his left toe since 10 days .He has history of cramping pain in his left calf on walking. The patient smokes 20 cigarettes per day for the last 20 years.

key: - black discolorationof the toe.
- history of cramping pain on walking.
- heavy smoker (20 cigarettes /day for 20 years)

- **Describe the possible causes of his complaint**

Clinically, it is a case of chronic lower limb ischemia most probably burger disease complicated with dry gangrene of the left toe, other causes of gangrene and chronic leg pain should be excluded .

- causes of gangrene:

1- neuropathic:(history of neurological diseases such as syringomyelia or diabetes mellitus with peripheral neuropathy)
2- venous: (history of DVT or varicose veins)
3- traumatic: (prolonged bed rest with inability of movement = bed sore / recent intervention with risk of arterial injury)
4- infective: (contaminated deep lacerated wounds occurring in fields or streets involving bulky area such as gluteal are & thigh)
5- frost bite: (history of exposure to cold weather)

- causes of chronic leg pain:

1- Sciatica.(burning pain along the coarse of the nerve, increases by leaning forwards and sitting)
2- Varicose veins.(history of DVT)
3- Flat foot (pain on prolonged standing, inspection of the arch of the foot)
4- Peripheral neuritis (neuropathic pain is constant and unreleived by dependency)
5- spinal stenosis = compression of the spinal cord or its nerve roots. (symptoms usually are not consistently associated with activity and not rapidly relieved with rest)

- **What investigations are required?** (See case 20)

- **What are the treatments in this case?**
  - See case 20 +
  - In gangrenous toe, revascularization before amputationof the gangrenous toe.

CASE 22

A 70 year-old female, presented with painful Rt. leg of 4 hours duration. She has atrial fibrillation, on the Rt. limb only the femoral pulsation is felt; on the Lt. Limb all pulsations are felt.

key: - painful Rt. leg.
- 4 hours duration (acute onset)
- She has atrial fibrillation,
- on the Rt. limb only the femoral pulsation is felt; on the Lt. Limb all pulsations are felt.

➡ What is your provisional diagnosis?

Clinically, it is a case of acute embolic ischemia in right lower limb in femoral artery (statistically the commonest site is superficial femoral artery) associated with atrial fibrillation, other causes of acute limb pain should be excluded:

1- Traumatic: fracture – dislocation – crush injury (history of trauma, deformity)
2- Vascular : acute ischemia (empolism , thromposis)..... (6Ps)
DVT (swollen limb)
chronic ischemia (intermittent claudication)
3- Infective: cellulitis – osteomylitis – myositis – septic arthritis (FAHM)
4- Inflammatory : Rh.arthritis – ankylosing spondylitis (other systemic manifestations)
5- Degenerative : osteoarthritis - baker's cyst (the lesion is limited to the joint)
6- Neurological : sciatica (burning pain along the coarse of sciatic nerve) – P.neuropathy
7- Metabolic : Gout (high uric acid, history of renal stones)
8- Miscellaneous : cramp

➡ Justify your diagnosis?

1) A 70 year-old female,
2) Acut onset (4 hours) painful Rt. leg.
3) She has atrial fibrillation(cardiogenic cause is the commonest (80%) especially AF (77%)) , so there is source of emboli.
4) On the Rt. limb only the femoral pulsation is felt: on the Lt. Limb all pulsations are felt.

➡ How to confirm diagnosis?

➢ **Investigations(Should be urgent)**

A. Site of impaction:

1- **Doppler& Duplex scan:** localizes and identifies the presence of embolism and thrombus.
2- **Arteriography:** (Mainly preoperative,it is **not done in threatened limb**☑, as it may cause a delay of 2 – 3 hrs).
Its value is in cases diagnosed as acute thrombosis because it provides information that is essential before doing an arterial reconstruction. This information includes:
a- Site of occlusion.
b- Proximal inflow, i.e., if there is another proximal arterial narrowing.
c- Distal run-off, i.e., flow distal to the obstruction.

B. For the cause:

- Echo: transesophageal Echo is 4 times more informative than transthoracic echo.
- ECG → to detect AF.
- X-ray →injuries for fracture

C. For complications:

1- High hemoglobin, BUN and creatinine indicate intravascular hypovolemia due to fluid sequestration in the limb.
2- Acidosis and raised creatinine phosphokinase and WBCs → if muscle necrosis.

What is the treatment?

- It is common for patients with ALI to have multiple acute medical problems that must be treated appropriately, and saving life before limb is paramount. First and foremost is evaluation and stabilization of cardiac issues, and ensuring adequate renal clearance

⇨ Pre-operative Preparations:

- Hospitalization
- Heparin : Start with a loading dose of 80 IU/kg followed by a maintenance dose of 18 IU/kg/hour. The dose is monitored by checking APTT every 12 hours, which should be maintained at 2.5-3 times the baseline level.
- Morphine: for pain.
- Oxygen; Care of the **cardiac** condition (O_2, digitalis)
- Prophylactic **antibiotics.**
- I.V fluids to correct dehydration if present

⇨ Operation:

Urgent embolectomy (within 6 hours) by Fogarty catheter ±
Fasciotomy (*done in late cases as a prophylaxis to prevent compartmental syndrome).*
Followed by anticoagulant.

⇨ Post-operative:

- ✓ **Treatment of the cause:** Embolism→ antiarrhythmic drugs for AF.
- ✓ **Treatment of complications:**
  - Gangrene →amputation.
  - Volkmann's ischemic contracture →muscle or tendon transfer.
  - Crush syndrome →IV fluids + alkalinization of urine.

Prognosis:

- the most important prognostic sign is muscle turgor.
- early recurrent ALI suggests an incomplete thrombectomy, or a persistent nidus of thromboembolism.

CASE 23

Male patient has history of pain in leg extend from knee to foot, the calf muscle is firm & tender. No history of trauma.

- **Discuss Management**

  Clinically, it is a case of deep **venous** thrombosis(DVT) of the femoral vein, however other causes of leg pain should be excluded.

DD:

A-Causes of acute limb pain:

1. **Trauma:**
   - Fracture.
   - Crush injury.
   - Dislocation.
2. **Inflammation:**
   - Rheumatoid arthritis.
   - Ankylosing spondylitis.
3. **Infective:**
   - Cellulitis.
   - Myositis.
   - Osteomyelitis.
   - Septic arthritis.
4. **Degenerative:**
   - Osteoarthritis.
   - Backer's cyst.
5. **Vascular:**
   - Deep venous thrombosis.
   - Acute arterial occlusion.
   - Intermittent claudication.
6. **Neurological:**
   - Sciatica.
   - Peripheral neuropathy.
7. **Metabolic:** Gout.
8. **Others:** cramp.

Management of DVT is diagnosis (C/P + Investigations) + TTT

Clinical Picture

(Usually manifested clinically on 3-7th day postoperatively)

➢ **General:**

- Mild unexplained fever.
- Tachycardia out of proportion to fever (lysis of thrombus → release of pyrogens & toxins).

➢ **Local:**

- Classical triad of pain, swelling, tenderness.
- Depends upon the site of the thrombosis.

1) Pain: there is usually aching discomfort and tightness in the involved calf or thigh, which are aggravated by muscular exercise.
2) Swelling (it is the most reliable physical sign)
   - ✓ In calf thrombosis → swelling is limited to foot and ankle.
   - ✓ In femoral thrombosis → swelling involves calf and lower part of thigh.
   - ✓ In iliofemoral thrombosis → swelling affects the whole lower limb.
3) Tenderness: present on grasping the affected calf or thigh.

- **Homan sign**; Pain is felt in calf on dorsiflexion of the foot; it is not a reliable sign as it may be falsely positive in cases of calf muscle contusion or cellulitis.
- The most dangerous DVT which requires the longest period of treatment is iliofemoral DVT

Investigations

DVT is a potentially fatal disease and its clinical picture overlaps with many other conditions. So once clinically suspected, the diagnosis of DVT must be confirmed / excluded by accurate investigations, as clinical examination is not reliable in 50% of cases.

To Detect DVT:

1. Doppler. (accurate in 80-85%)
2. Duplex. →(accurate in 90 -100) most errors are in below knee veins.
   →It is the standard test for diagnosis of DVT
3. Recently →spiral CT (most accurate).
4. Radioactive fibrinogen →detect active uptake by thrombus.
5. Venography (not done now).

Not done now & replaced by Duplex US

*NB: The most widely utilized test to diagnose DVT is duplex ultrasound imaging with a sensitivity and specificity >95%.

Doppler and duplex scan findings in cases of DVT

	Normal veins	DVT
Vein diameter	Normal	Dilated veins
Blood flow	Spontaneous	Poor
Echogenic material in lumen	None	Present
Distal compression	Augments blood flow	Poor augmentation
Blood flow with respiration	Phasic flow with respiration	Loss of phasic flow with respiration

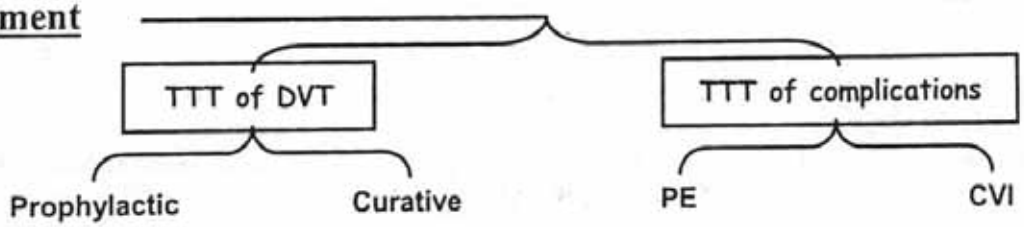
If Pulmonary Embolism is suspected:

1. Spiral CT or V/Q lung scan or pulmonary arteriography
2. Ventilation /perfusion scan.
3. Pulmonary angiography.
4. Chest x ray.

If Recurrent DVT in Young Patient:

- Measurement of protein C, S. Antithrombin 3, lupus anticoagulant.

Treatment



I- Treatment of DVT:

A. Prophylactic

For all patients

1- Early ambulation after operation.
2- Active leg exercises while in bed.
3- Adequate postoperative hydration.

For high risk patients e.g. major surgery, elderly patients, history of DVT or PE

(as for all patients) +

1- Elastic stocking support.
2- Intra-operative intermittent pneumatic compression.
3- Prophylactic anticoagulants e.g., low dose heparin (miniheparin 5000 IU S.C 2 hrs before the operation then every 12 hrs till the pt. is ambulant "5-7 days" this lowers DVT incidence by 50%) or LMWH (at night of operation and 12 hours post operative.

➡ **Prophylactic heparinization should be avoided if a large raw area is left after surgery**

B. Curative

► **Aim of treatment:**

- Prevents formation of new thrombus
- Prevents propagation of thrombus.
- Prevent PE.
- Minimize post-phlebitic limb.

A. General:

- Complete bed rest for 7-10 days till the thrombus is adherent to the vessel wall.
- 1st day elastic stockings.
- Foot elevation in bed 15-20° to decrease edema and pain &↑ venous return.
- Thrombi usually takes 7-10 days to become adherent to the vein wall. During this period the patient should be kept in bed then gradual ambulation with elastic stocking support is allowed but standing and sitting with legs dependent are forbidden.
- These measures are continued for 3-6 months until recanalization and collaterization develops.

B. Drug treatment:

- Anticoagulants.
- Fibrinolytics.

1. Heparin

Low molecular weight heparin (fractionated heparin)

- Tinzaparin 175 IU/kg/24 hours S.C.
- Enoxaparin 1 mg/kg/12 hours S.C.

N.B.:
Heparin is given until all signs of active thrombosis disappear which is clinically known by disappearance of pain and tenderness ongrasping. This usuallytake 7-10 days

Unfractionated heparin

Administrated either by

Continuous I.V. infusion.

ading dose of 80 IU/kg then maintenance dose of 18 IU/kg/hour.
This is the ideal method, but it requires hospitalization and a pump that controls the doseper hour.

Bolus therapy

A loading dose of 80 IU/kg then maintenance dose of 70 IU/kg/4 hours

2. Oral anticoagulants(Coumarin derivatives)

- The most commonly used is warfarin.
- **Administration:**
  1- The basal prothrombin time (PT) & concentration (PC) are estimated before the start of warfarin.
  2- An initial dose of 10 mg warfarin is followed by 5 mg daily dose.
  3- Discontinue heparin after 3 days of overlap treatment.
  5 days after the start of warfarin, PT & PC are measured & the dose is adjusted to reach the therapeutic goal of PC 30-40%.
  4- PC and PT are repeated every 2 weeks and the INR should be between 2-3 times the control value.
  5- Oral anticoagulants are given for 3-6 months which is the time needed for recanalization (as evidenced by duplex scanning). In some patients who are liable for rethrombosis warfarin is given for life.

$$INR = \frac{\text{Patient PT}}{\text{Normal PT}}$$

3. Fibrinolytic Therapy

(The effect of these drugs is at its best ifgiven in the first 3 days of thrombosis, as after that they have no advantages over heparin)

- ***Types:***
  - Urokinase.
  - Streptokinase.
  - Recombinant tissue plasminogen activator (advantages: less allergic and more effective).
- ***Action:***
  - Conversion of plasminogen into plasmin, which has a proteolytic effect on fibrin & fibrinogen.
- ***Indications:***
  1) Isolated ilio-femoral DVT
  2) Impending venous gangrene as phlegmasia cerulea dolens
- ***Advantages:***
  - ↓ valve damage
  - ↓ CVI to 40-50 %
- ***Complications:***
  - Allergic reactions to streptokinase (give corticosteroids before thrombolytics).
  - Bleeding tendency.
  - Intra cranial hemorrhage.

- ***Contraindications:***
  1) Old age.
  2) Hypertension.
  3) Peptic ulcer.
  4) Bleeding tendency.

C. Operative:

1. Intraluminal device (filter)(Greenfield filter or Miles or Spencer)

- ***Under local anesthesia*** → it is placed in infrarenal position (opposite L2).
- ***Indications:***
  - ✓ If there is contraindication for anticoagulants, heparin & fibrinolytics.
  - ✓ Recurrent pulmonary embolism in spite of full heparinization.
  - ✓ First PE in high risk patients.
  - ✓ Following pulmonary embolectomy.

2. Venous thrombectomy (rarely done):

By Fogerty catheter if:

- Massive illiofemoral thrombosis.
- Phlegmasia cerulea dolens.
- Pulmonary embolism.

II- Treatment of Complications:

1) Pulmonary embolism: morphia, O_2, thrombolytics, anticoagulants, embolectomy.
2) Post phlebitic limb (CVI): compression bandage.

➢ Prognosis:

- The use of elevation, compression, and ambulation can reduce the incidence of chronic venous insufficiency (postthrombotic syndrome) by 50%
- Risk factors for chronic venous insufficiency include multiple DVTs, advanced age, cancer, recent surgery, immobilization or trauma, pregnancy, hormone replacement therapy, obesity, and gender.

NB:

the May-Thurner syndrome, defined as compression of the left iliac vein by the overlying right iliac artery, which forms an area of narrowing predisposing to thrombosis. Treatment of the May-Thurner syndrome includes venoplasty and stenting and, if thrombosis, thrombolysis, venoplasty, and stenting

CASE 24

A 42 year old male presented to you in the emergency room with a 2 day history of left leg pain and swelling. On examination, the leg was swollen from the knee downwards, the calf muscles were tense and tender, the pedal pulses were intact, and there was no history of trauma.

➡ **What is the diagnosis, and the differential diagnosis?**(See case 23)

DD of acute leg pain (see case 23)

DD of swollen limb : (DD of lower limb edema)

A- Unilateral:

I)Acute:

1. DVT
2. Rupture of plantaris m tendon
3. Contusion of calf muscles

both previous conditions (No2 & 3) occur during exercise and can produce swollen painful calf which is usually difficult to distinguish from DVT. Duplex scan is needed to establish the diagnosisl.

4. Acute filaria

II) Chronic:

1. Varicose vein 2. Cellulites 3. chronic filarial 4. lymphedema

B- Bilateral: . Cardiac . Renal . nutritional .angioneurotic.

➡ **How would you investigate and treat this case?**(See case 23)

CASE 25

A 22 years old female farmer suffered from severe sudden pain in her right lower limb. Four hours later her husband brought her to the E.R. where her Rt foot, leg and thigh were cold and no pulses were felt on her Rt lower limb. Her radial pulse was 90/minute and regular. She gave a history of receiving a monthly intramuscular injection for years.

➡ **What are the diagnostic possibilities?**

Clinically, it is a case of acute embolic ischemia of the right lower limb since complicating rheumatic heart disease (mitral stenosis and AF)

Themonthly intramuscular injection for years = penicillin.

Causes of acute ischemia; The most common causes are embolism and vascular injury

- Embolism [It is the classical example of acute ischemia].
- Thrombosis.
- Trauma e.g. catheter, arteriography. Intra-arterial drug injection
- Others (pressure from outside e.g. tourniquet, plaster cast, aortic dissection, phlegmasia Alba dolens).

- other causes of acute limb pain should be excluded (DD of acute limb pain in case 22)

➡ **What immediate and delayed investigations do you suggest?**

(See case 22)

immediate = detect the site of impaction.

delayed = detection of the causes and complications.

➡ **How would you treat her?**(See case 22)

CASE 26

A 65 years Male presents with rest pain in the right foot. He had mild stroke 2 years ago but recovered completely.

➡ Discuss (Diagnosis, Investigations & Treatment)

Clinically, it is a case of chronic ischemia of the rightlower limb ,at the level of right SFA, mostly of atherscleroticc type. It is critical limb ischemia stage III Fontain classification, however other causes of chronic limb pain should be excluded = DD of chronic limb pain (case 20)

- *C/P of rest pain*
  - **Site:** never comes above the ankle
  - **Cause:**ischemic neuritis (cry of ischemic nerve).
  - **Character:** severe pain awakes the patient from sleep
  - **Comes on:** rest and characteristically it worse at night
  - **Relieved by:** hanging the foot out of bed and by sleeping on a chair
  - **Exacerbated by:** lying down and elevation of the foot

- *Investigations and TTT* (see case 20)

CASE 27

- A 55 years old male diabetic type II presented to the E.R. with systemic manifestations of sepsis. He lost control of diabetes in the last 10 days. On examination his right foot showed boggy painless non tender swelling filling the planter aspect of the same foot.

- A 65-year-old man with a history of hypertension, hyperlipidemia, and non–insulin-dependent diabetes mellitus presents with a 3-day history of pain in his left foot. He reports that his blood sugars, while normally very well controlled, have been very difficult to manage over the past day. His vital signs are normal. On physical examination, he has palpable femoral and popliteal pulses bilaterally but only dopplerable signals in the dorsalis pedis and the posterior tibial arteries. He has redness around the second toe, with a small 5-mm ulcer on the dorsal surface of the toe. The ulcer does not appear to probe deeply.

➡ What are the etio-pathological factors?

Clinically, it is a case of Diabetic Foot infection, however other causes of leg ulcers should be excluded :

1- Traumatic: (history of trauma, Skin over medial side of tibia or bony prominence.)
2- Inflammatory:- chronic osteomyelitis: history of acute osteomyelitis, X-ray findings of chronicity.
   - syphlitic: rare, punched out, floor covered by yellowish slough.
   - tuberculous: undermined edge, bluish margin.
3- Neoplastic: raised everted edge, fixed base.
4- Venous ulcer: gaitre area, history of DVT, edge may be punched out or sloping, indurated base.
5- Ischemic: between the toes, in the dorsum of the foot or around the maleoli , abscent pulse, other skin manifestation of ischemia, punched out edge.
6- Neurotrophic: in pressure areas, painless due to skin anesthesia.
7- Blood disease:as in sickle cell anemia
8- Autoimmune: as in SLE and rheumatoid arthritis.

Also causes of chronic leg pain should be excluded.(case 20)

- **Diabetic patients are susceptible to serious foot infections due to:**
  1- Peripheral neuropathy: diminished sensations makes the patients unaware of foot injuries.
  2- Vascular affection: due to premature atherosclerosis and microangiopathy.
  3- Compromise of the immune system: both the humoral and cellular immunity are disturbed.

NB: The lifetime risk of acquiring foot lesions (ulcers/gangrene) in diabetic patients has been estimated at 15% to 25%.

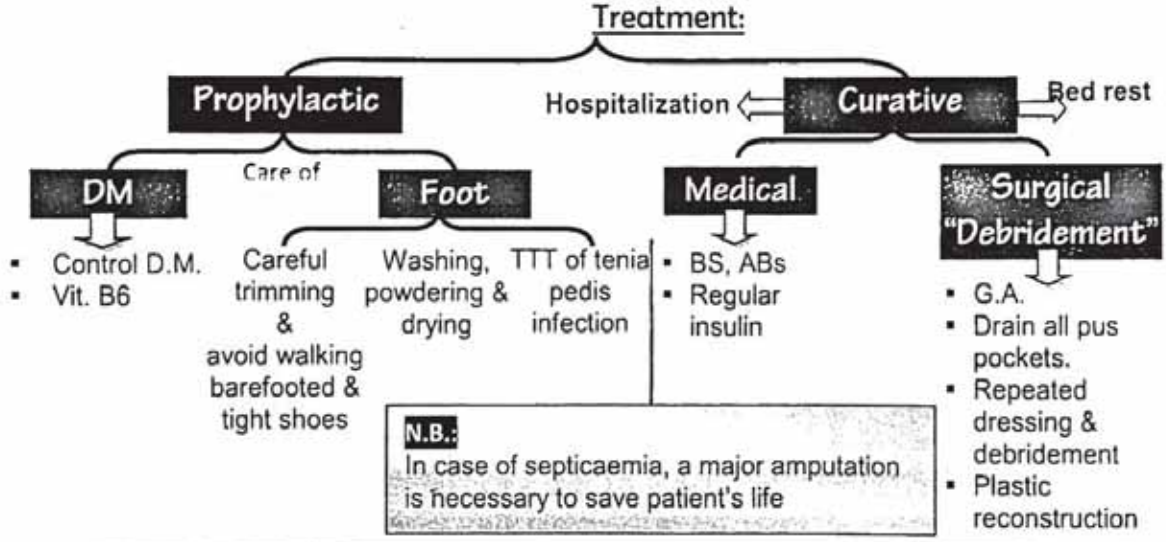
- **Diabetic Foot Infection**

A. Causes:
- Decrease resistance (both humoral and cellular immunity are disturbed).
- Glycosylation of tissue.
- +/- ischemia.
- Neuropathy.

B. C/P:
- Persistent ulcer
- Severely swollen limb, red, hot & tender.
- Pus loculus , tissues becomes dark and slough .
- May spread →osteomyelitis, septic shock.

C. Investigations:
1- accurate detection of blood glucose level.
2- Plain radiographs of the foot should be obtained in every patient with suspected foot infection. X-rays can reveal the presence of a foreign body, gas, osteolysis or joint effusion, as well as delineate anatomy for surgical planning.
3- carefully performed arteriogram must show the appropriate inflow source and outflow target artery(done only if the pulse is not felt)
4- Cultures from the depths of the ulcer should be sent; wound swabs are unreliable and should not be performed.

⇒ **What are the main lines of treatment in such patient?**



N.B.:
- Empiric broad-spectrum antibiotic therapy should be initiated to cover the polymicrobial infections usually seen in diabetic patients
- Mild infections usually require only 7 to 10 days of antibiotic therapy, whereas moderate and severe infections may require up to 3 weeks of treatment.

CASE 28

A 45 year-old male diabetic patient presented to the emergency department with pain & swelling of Rt. Foot. The patient was drowsy; the pulse was 120/min, A.B.P 110/70 mm Hge, & Temp. was39. The foot was markedly swollen, warm & tender.

➡ **Discuss Management**(see case 27).

CASE 29

You are called to see a 74 year old women in the orthopedic department. She underwent a hemiarthoplasty 6 days ago & has reported a sudden onset of a painful left leg which is unable to move. She denies any symptoms of intermittent claudicatios in the past. On examination her left leg is pale & cold. No venous engorgement in the form of limb swelling or edema. Her left femoral pulse is felt & IRREGULAR. There are no distal pulses in the same leg.

➡ **What is your diagnosis?**(see case 22).(case of acute embolic ischemia)
➡ **What investigations are required?**(see case 22).
➡ **What is the treatment?**(see case 22).

CASE 30

A 25-years-old female patient who had recent delivery presented with pain & swelling of the lt. lower limb. Her vital signs were normal. Examination of the affected limb reveled generalized swelling & tenderness extending to the thigh.

➡ **Discuss (Diagnosis - investigations - treatment)?**
DVT see before

CASE 31

A 30 year old female patient who is known to have mitral stenosis developed sudden sever pain in her Rt lower limb. Examination of the affected limb revealed sever pallor, and coldness extending to the thigh.

➡ **What is the likely diagnosis?**
Clinically, it is a case of acute embolic ischemia in right lower limb in femoral artery (statistically the commonest site is superficial femoral artery) associated with atrial fibrillation.
➡ **What investigations would you order?**(see case 22).
➡ **What is the treatment**(see case 22).

CASE 32

A 25 year-old female have Mitral stenosis, developed sudden severe pain in the Rt. Lower limb. Examination revealed pallor & coldness of right leg

➡ **What is Diagnosis.**

- Clinically, it is a case of acute embolic ischemia in right lower limb in femoral artery (statistically the commonest site is superficial femoral artery) associated with atrial fibrillation.

➡ **Discuss Management**(see case 22).

CASE 33

A 25-years-old female patient who had recent delivery presented with pain & swelling of the lt. lower limb. Her vital signs were normal. Examination of the affected limb reveled generalized swelling & tenderness extending to the thigh.

➡ **Discuss Management**(see case 23).(case of DVT)

CASE 34:

A 65 year old male smoker presents to the emergency room complaining of a sharp ,continuous pain in his left back and groin starting earlier in the evening. His vital signs are significant for tachycardia and decreased mental status. there was no associated trauma . He has a history of coronary artery disease and hyperlipedmia . He is taking aspirin and an statins .he smokes approximately one pack per day . On physical examination , the patient is neurosurgically intact but lethargic .He is in sinus tachycardia by ECG. On abdominal examination,he is obese with guarding , but no rebound tenderness. A pulsatile mid-abdominal mass is noted, and no hernias are identifiable. He has palpable femoral pulses , but decreased popliteal and dorsalis pedis pulses.

Key: - 65 year old male smoker
-sharp ,continuous pain in his left back and groin starting earlier in the evening.
-tachycardia and decreased mental status.
-history of coronary artery disease and hyperlipedmia .
- guarding , but no rebound tenderness.
-A pulsatile mid-abdominal mass is noted,
-no hernias are identifiable.
-He has palpable femoral pulses , but decreased popliteal and dorsalis pedis pulses.

➡ **What is your diagnosis?**

Case of retroperitoneal rupture of abdominal aortic aneurysm, however other causes of epigastric swelling and pain should be excluded :

➡ **causes of epigastric pain :**

☑ **Perforated Peptic Ulcer:**
- History of dyspepsia is present.
- Plain X-Ray shows air under the diaphragm.

☑ **Acute Cholecystitis:**
- Pain in the right hypochondrium
- Fever is higher.
- U/S will confirm the diagnosis.

☑ **Intestinal Obstruction:**
- Repeated vomiting.
- Absolute constipation.
- Multiple fluid levels in X-Ray abdomen erect.

☑ **Acute inferior wall myocardial infarction:**
- ECG changes in leads II, III, aVF.
- History of smoking, hyperlipidemia.
- Cardiac enzymes to confirm.

➡ Causes of epigastric swelling:

➢ **Visceral:**

- **Lt. lobe of the liver:**
  1. Amoebic abscess : Occurs usually in endemic areas and responds very well to metronidazole within 72 hours
  2. Hydatid cyst : usually occurs in endemic areas (e.g Algeria) and shows hydatid thrill in 70% of cases
  3. Malignant nodule (cancer) : CT scan is accurate and level of alpha feto protein above 2000 ng/dl is diagnostic
  4. Liver cirrhosis : There may be history of the cause and manifestations of cirrhosis, e.g., bleeding tendency

- **Transverse colon:**
  1. Carcinoma : More in females and usually presents by a mass rather than I.O
  2. Bilharzial colitis : Hard nodular mass and may be associated with portal HTN
  3. Diverticulitis : Occurs usually in old males and may cause massive bleeding per rectum

- **Greater omentum:**
  1. TB peritonitis : There may be ascites, pain or abdominal masses. It is best diagnosed by laparoscopy.
  2. Malignant nodule : "Tumor" rare.

- **Stomach:**
  1. Carcinoma: more in males >50 yrs, presentation within 1 of 5 groups (insidious =anemia , asthenia / dyspepsia / cachaxia / obstruction = cardia …dyspjagia, pylorus … vomiting / epigastric mass) , endoscopy and biopsy are the key for diagnosis.
  2. Epigastric abscess: FAHM
  3. Gastric outlet obstruction : Characteristic projectile, non bilious, foul odor vomiting containing food from previous meals or days especially at the night.

- **Pancreas:**
  - pseudopancreatic cyst: history of acute pancreatitis or trauma, give transmitted pulsations, barium meal (lateral view shows forward gastric displacement, U/S and CT scan are the most accurate.

- **Vascular:**
- **Aorta:** abdominal Aortic aneurysm (AAA) but 95% below level of renal arteries (i.e in the umblinical region)
- **Aortic L.Ns:**
  1. Lymphadenitis: acute & chronic (non-specific & specific e.g. TB lymphadenitis).
  2. Malignancy: lymphoma & metastatic carcinoma.
- **Retroperitoneal sarcoma**

How could you manage this case ?

Management = diagnosis (clinical , investigation) + treatment

- **Clinical picture :**
  - *Symptoms*
    - Sudden severe onset of epigastric pain.
    - Collapse with severe hypotension.
    - May have history of aneurysm under surveillance.

N.B.:

1- Presentation ,either with or without preceding symptoms ,includes 45% of patients with hypotension , 72%with back and abdominal pain and 83% with a pulsatile abdominal mass. Less than 50% of patients present with the classic triad of hypotension abdominal pain and pulsatile abdominal mass.

2- Atypical presentations of ruptured AAA can include pain radiating to the groin ,acute femoral neuropathy or thigh ecchymosis from femoral nerve compression, partial upper gastrointestinal obstruction (third part of duodenum), lower extremity ischemia from emboli of mural thrombi or aortic thrombosis ,visceral thromboembolism , aortic enetric fistula ,trauma and gross haematuria.

  - *Signs*
    - Cardinal sign: unexplained rapid onset hypertension, pain and sweating.
    - A pulsatile abdominal mass is not always present

- **Investigation:**
  1- CT scan is the investigation of choice to investigate painful, leaking or ruptured Aneurysm.
  2- If available an unstable patient without a diagnosis can undergo ultrasound examination in the emergency room especially when there is unclear etiology of hemodynamic instability.Contrast enhanced CTA should be performed in all stable patients where rAAA is suspected, to confirm the presence of AAA and determine operative planning and suitability for EVAR. This will also make available evaluation of the iliac arteries and any venous anomalies.

N.B.:

- Arterio-aortic embolism: mural thrombus within the aneurysm can detach and cause distal emboli
- Embolization may be spontaneously (blue toe syndrome) or iatrogenic during surgery (trash foot).

- **Treatment : as in (case 20)**
  - arrival at the endovascular suite or operating room should occur immediately because it is better to resuscitate there than in the emergency room .
  - fluids must be minimized allowing for permissive hypotension as blood pressure needs only to maintain cerebral and end organ perfusion. resuscitation beyond this can increase bleeding, and crystalloid dilutes the coagulation factors.
- **Prognosis (post management complication):**
  morbidity after rAAA has been documented at 60% ,including respiratory failure ,tracheostomy , renal failure ,sepsis, MI, congestive heart failure ,and bleeding. less commonly seen postoperative complications are stroke ,ischemic colitis , lower extremity ischemia and paraplegia .

Dr. Mohamed El-Matary

DIAGNOSTIC PERITONEAL LAVAGE (DPL)

Indications:

→ Blunt abdominal trauma in adult, associated with:

1. Unexplained hypotension that maybe caused by blood loss
2. Suspicion of organ injury with equivocal signs
3. Unreliable abdominal examination because the patient is unconscious as in
   - Head trauma
   - Drug intoxication
   - Alcohol intoxication

Contraindications:

a. Severe obesity
b. Pregnancy
c. Liver cirrhosis
d. Evident intra-abdominal injury that requires laparotomy
e. Prior abdominal surgery

Procedure:

a. Prepare the abdomen with antiseptic solution & drape with sterile towels
b. Local infiltration with local anesthetic → Lidocaine in midline below umbilicus
c. 2-3 cm skin incision followed by 1 cm incision in the linea alba
d. Peritoneum is entered with dialysis catheter
e. The tube is directed poeteriorly & inferiorly into the pelvis
f. Aspiration with a syringe: **Either**
   1. Brings blood or gross enteric contents:
      - Indication for immediate laparotomy
   2. No blood or gross enteric contents:
      - Inject 1 L of warm saline into peritoneum by I.V tube
      - After waiting 5 minutes, use an empty bottle to remove the fluid out of the abdomen
      - A sample of the fluid is sent to the laboratory

Positive laboratory finding that diagnose intra-abdominal surgery, & require laparotomy
- RBC count > 1000000/ ml
- WBC count > 500/ ml
- Elevated amylase

g. Catheter is removed
h. Linea alba & skin are closed with sutures

AMPUTATION

Indications:

→ **Should be considered if part of the limb is:**

1. **Dead**
   - See causes of gangrene
2. **Deadly**
   - When life of the patient is threatened if the limb is left.
   - This occurs in the following conditions:
     - Malignant tumors: Osteosarcoma, soft tissue sarcoma infiltrating the bone & high grade giant cell tumors.
     - Crush injury that may lead to crush syndrome
     - Gas gangrene
3. **Dead loss**
   - When affected limb is considered below an artificial limb or to no limb at all
   - Amputation in these conditions improve the quality of life:
     - Severe rest pain
     - Severe lacerations & fractures that are not suitable for satisfactory repair
     - Severe contracture or paralysis

Types of amputation:

1. **Provisional:**
   - This is done when 1^{ry} healing is unlikely to occur because of ischemia or infection
   - Amputation is performed at the lowest possible site, so of amputation is needed again we can leave a stump of adequate length
   - Free drainage should be provided by using one of these methods:
     - The guillotine method
     - Flap amputation without closure (better)
2. **Definitive:**
   - This is done when 1^{ry} healing is likely to occur
   - Amputation should be planned to provide an ideal stump
   - There are two types of definitive amputation:
     - End bearing:
       - Performed when weight is taken through the end of the stump
       - The scar must not be terminal
       - The bone end must be solid not hollow (Must be cut through or near a joint)
       - Examples are: Through knee & Syme's amputation
     - Non-end-bearing (Cone bearing):
       - This is the commonest variety
       - All upper limb and most lower limb amputations come in this category
       - The body weight is transmitted by way of artificial limb socket to structures other than the stump end.

Requirements of an ideal amputation stump:

A. Length:

- A short stump is liable to slip out of the prosthesis
- Non-end-bearing stump should be 3 inches shorter than the entire bone to give room for artificial joint

B. Shape:

- Should be smoothly rounded
- Shouldn't be bulbous or pointed

C. Coverings:

- Bone should be covered with subcutaneous tissues & deep fascia (To ensure mobility of skin)

D. Scar:

- Should be linear, freely mobile & not exposed to pressure

E. Function:

- Should be painless with freely movable joint above & smooth bone end below

Techniques of amputation:

A. Guillotine method:

- All tissues are divided at the same level
- Bone end is left exposed on the cut surface
- It's rarely used now days except in extreme emergencies

B. Oblique method:

- An oblique elliptical incision is made
- Its upper end is made above the level of bone section
- Its lower end is made lower than level of bone section by a distance equal to diameter of limb
- This method is used in Syme's amputation

C. Racket method:

- It's used in amputation of toes or fingers
- The proximal end of the incision is straight line (Like handle of the racket)
- The distal end is circular or elliptical (Like blade of the racket)

D. Flap method:

- The most popular method is to use flaps which maybe a single flap, two equal or unequal flaps

The following rules should be respected in making the flap

- The length of a single flap or combined length of two flaps should be equal to one & half times the diameter of limb at the level of bone section
- The width of the flaps should be equal to half the circumference of the limb **but** when unequal flaps are used the shorter flap should be broader than the other
- The flap should be semicircular rather than rectangular in shape (Conical rather than cylindrical is desired)
- Flap should consist of skin & deep fascia with some muscle tissue at their bases

Operative steps:

1. Get a consent from the patient
2. General or spinal anesthesia
3. A tourniquet is used unless there is arterial insufficiency
4. Anterior & posterior flaps of equal length are used in upper limb & for above knee amputation. In below knee amputation a long posterior flap is used.
5. Muscles are divided distal to the site of bone section, then the opposing groups are sutured over the bone end to each other & to periosteum thus providing a better muscle control & circulation.
6. Nerves are divided proximal to the bone cut
7. The main vessels are tied
8. The bone is cut across the required level after division of the periosteum. If two bones are present, divide the smaller one first.
9. The tourniquet is removed & every bleeding point is meticulously ligated
10. Deep fascia is closed
11. Skin is sutured without tension. (Suction drain is recommended)
12. Stump is firmly bandaged

Post-operative care:

1. Rest the stump on a pillow
2. Use suitable splints to prevent flexion deformity of the hip & knee joints
3. Avoid change of the stump dressings for 5-7 days unless excessive oozing occurs or signs of infection are clear.
4. Remove the drain 24-48 hrs. postoperatively
5. Remove skin sutures after 10-14 days
6. Do stump muscles & joint exercise with the help of supervised physiotherapy
7. Use crepe bandages or elastic stump stockings to achieve smooth conical stump.
8. Use a prosthesis.

The prosthesis

- Must fit comfortably
- Should function well & look good
- It is used once the stump is healed and conical & the scar is stable

Complications:

A. Early:

1. Complications of any operation especially hematoma, infection & 2^{ry} hemorrhage.
2. Special complications:
   a. Breakdown of skin flap: May be due to ischemia or suturing under excessive tension
   b. Gas gangrene: Clostridia spores from the perineum may infect a high above knee amputation especially if performed through ischemic tissues.

B. Late:

1. **Skin:**
   → Eczema, callosities, ulceration, redundancy & adherent scar.
2. **Muscle:**
   → Excess muscles left at the end of the stump gives sense of insecurity →may prevent the use of proper prosthesis
3. **Artery:**
   → Progress of arterial occlusive disease produces ischemia of the stump
4. **Nerve:**
   → *Phantom limb*: This is the conscious feeling of the missing limb which persists for sometime & then fades gradually. Patient may feel pain in phantom limb
   → *Stump neuroma:* Usually painless unless irritated by pressure
   → *Causalgia:* This is severe burning pain due to formation of artificial synapses between efferent sympathetic & afferent sensory fibers. It is relieved by sympathectomy.
5. **Joint:**
   → Joint above amputation maybe stiff & deformed
6. **Bone:**
   → Formation of spur
   → Osteomyelitis & ring sequestrum
   → A projecting bone end may result from the use of short flaps or from continued growth of bone in children.

Lower Limb Amputation

Distal amputations:

A. Local toe amputation:

- In patients with toe gangrene
- The surrounding tissues have relatively good blood supply because it's due to disease of small-vessel.
- Local amputation of the toe may result in healing.

B. Ray amputation of the toe:

- Part of the metatarsal bone is excised.
- Recommended when metatarsophalangeal joint region is involved.

C. Transmetatarsal amputation:

- Indicated when several toes are affected & irreversible ischemia has extended to the forefoot
- A viable long planter flap is essential for satisfactory healing.

D. Syme's amputation:

- Is a disarticulation at the ankle with removal of malleoli & tibial articular surfaces
- It is very satisfactory provided that the circulation of the limb is good
- Disadvantages:
  - Prosthesis is ugly **AND** after 7-10 years reamputation is usually required as the stump is end bearing & results in ulceration, callosities & exostosis.

Major amputations:

A. Below the knee amputation:

- Most common amputation for vascular disease & infection
- 90 % of unilateral & 75 % of bilateral amputees learn to walk independently

Operative notes:

- Optimum length is 6 inches below the joint line or one hand breadth below tibial tubercle.

- At lower levels the circulation is poor & the bone is not well protected by soft tissue
- Stump shouldn't be shorter than 2 inches so it can be retained inside socket during flexion of knee.

- Done using a long posterior & short anterior flap (because blood supply of posterior flap is better than the anterior)
- Flap should include deep fascia.
- The calf muscles are included in the posterior flap
- The fibula is cut first & 1 inch higher than the tibia to obtain a conical stump
- Sharp anterior margin of the tibia should be beveled.

Syme's amputation is better than below knee amputation because:

- Less catastrophic to the patient
- Allows the patient to walk in his room without prosthesis
- Maintains the pleasure of earth feeling
- Requires a cheap stump boot known as "elephant boot"

B. Through the knee amputation:

→ Not popular because:

- Requirements are rarely available
- The end can't be fitted with a good artificial limb

C. Above the knee amputation:

→ Indications:

- Blood flow is inadequate for healing at lower level
- Patient is unable to walk because of other debilitating disease
- Serious infection making lower amputation impossible

→ Main advantage:

- Greater probability of healing

→ Main disadvantage:

- Ambulation following amputation has lower rate

→ Operative notes:

- Ideal length is 11 inches from tip of greater trochanter & the minimum is 6 inches.

- At higher levels sufficient adductor power is not preserved

- Amputation can be carried out through equal or unequal anteroposterior flaps

D. Hip disarticulation:

- Rarely indicated
- Very difficult to fit with a prosthesis
- Main indication in malignant disease

E. Hindquarter amputation (Hemipelvectomy):

- Only performed for malignant disease
- Classic operation involves removal of the entire lower extremity & varying amount of pelvic bone

Upper Limb Amputation

Distal amputations:

A. Partial finger amputation:

- Carried out through the phalanx or interphalangeal joints using single palmar flap

B. Complete finger amputation:

- Usually combined with excision of metacarpal head → To minimize the deformity & enable the fingers to be flexed closely
- Dorsal racket incision is made with:
  - Blade: Encircling the root of the finger
  - Handle: Lying on the dorsum along the metacarpal bone
- The phalanx is disarticulated & the metacarpal head is excised

C. Thumb amputation:

The thumb represents 50% of the function of hand.

- Preservation of any part is the rule
- If the metacarpal is the only thing left, the web between it & the index is deepened by incision to create a new thumb.

D. Hand amputation:

- No formal amputations are described because the smallest stump is better than any artificial hand
- The rule is to preserve the hand as much as you can

E. Wrist amputation:

→ Better than higher amputation because:

- Allows the most possible pronation & supination
- Provides better prosthetic control

Major amputations:

A. Below the elbow amputation:

- Optimum length is 7 inches from the tip of the olecranon
- Equal anteroposterior flaps are done to obtain a terminal transverse scar which won't be drawn up between the two bones.

Even if only a short stump can be achieved, forearm amputation is better than above elbow amputation

B. Disarticulation of the elbow:

→ Carried out through either:

- Single posterior flap
- Equal anterior & posterior flap

C. Above the elbow amputation:

- Optimum length is 8 inches from the acromion process

D. Disarticulation of the shoulder:

- Rarely indicated

E. Forequarter amputation:

- Indicated for malignant tumors
- Operation includes removal of whole upper limb with the shoulder girdle.

Even if a very high amputation is necessary, the head of the humerus should be spared since it serves as a support for a prosthesis & maintains shoulder width

HOW TO ANSWER WRITTEN QUESTION

GENERAL SCHEME:

***DISCUSS QUESTION*:** all the following points must be fulfilled :

1-Introduction about the topic and its definition

2-Incidence in the community

3-Etiology including : predisposing ,precipitating factors and risk factors.

4-Pathology, pathogenesis: development ,macroscopic picture, microscopic picture ,staging of the disease and its complications

5-Clinical picture :

- Clinical picture according to patient criteria
- Clinical picture of the disease : symptoms and signs (general and local)
- Clinical picture of the complication
- Clinical picture of associated conditions
- Differential diagnosis for this clinical picture

6-Investigations : *(especialy if the Q is investigations only)*

- Of the disease
- To exclude other D.D
- Of the etiology
- Of the complications
- (in case of tumors : investigation for diagnosis , investigations for staging ,preoperative investigations ,investigations for follow up)

7-Treatment :

- If the patient is shocked we must start with resuscitation.
- Write different modalities of treatment whether medical or surgical. (if the treatment is surgical mention some post. operative complication)
- Treatment of the cause (etiology) and treatment of complications.
- Prophylactic treatment if possible.

8-Prognosis : morbidity and mortality of the disease , complications ,treatment.

DISCUSS COMPLICATIONS OF CERTAIN DISEASE:

The following points must be fulfilled:

- Enumerate different complications
- There incidence
- Clinical picture of these complications

- Investigations for these complications
- Treatment of the complications.

DISCUSS THE PATHOLOGY OF CERTAIN DISEASE :

The following must be fulfilled

- Incidence.
- Criteria of the patient.
- Etiology.
- pathogenesis
- Macroscopic picture
- Microscopic picture
- Staging
- Complications

DISCUSS ETIOLOGY :

- Incidence.
- Criteria of the patient.
- Risk factors.
- Predisposing factors.
- Precipitating factors.

DISCUSS MANAGEMENT OF CERTAIN DISEASE :

- Clinical picture.
- Urgent resuscitation if the patient is shocked.
- Investigations (details)
- Treatment (details)

D.D ***(time is very important, all the Q is answered in our books)***

- introduction
- DD
- Clinical picture of each in short ------- السهوله حسب مجمعه او مفرقه
- Investigation------ السهوله حسب مجمعه او مفرقه
- must be differentiated from other causes of هتعمل مستطيل و تكتب
- D.D. of D.D

Q: discuss Graves disease

ANSWER:

✓ ***Introduction :***

primary toxic goiter or graves disease is the most common cause of hyperthyroidism (76%) ,it is an autoimmune disease which is more commonly affects young females.

✓ ***Etiology :***

It is believed to be autoimmune disease,it is considered type v hypersensitivity due to the presence of thyroid stimulating antibodies .

✓ ***Pathology :***

- Development :Graves disease has abrupt onset with remission and exacerbations
  It is an autoimmune disease caused by thyroid stimulating antibody which activate and increase production of T4 leading to a hypermetabolic state affecting different body systems
- Macroscopically : diffuse enlargement of the thyroid, fleshy ,well defined
- Microscopically : increase the vascularity of the thyroid with proliferation of the epithelial lining of the acini which is columnar and full of granules.

✓ ***Clinical picture***

- ***Toxic manifestations:***

  Throtoxicosis affects different body systems :
  - Metabolic :loss of weight inspite of increase appetite (thyroid paradox),excessive sweating,tremors and intolerance to hot weather
  - Nervous system:nervousness , insomnia , tremors with exaggerated reflexes (Achilles reflex is shortened)
  - Cardiovascular : palpitation ,tachycardia with high sleeping pulse,water hammer pulse up to heart failure(dyspnea ,orthopnia ,paroxysmal nocturnal dyspnea).
  - Muscular : rapid exhaustion , muscle weakness, proximal muscle myopathy and atrophy.
  - GIT : diarrhea
  - Urinary : polyuria

- Menstrual irregularities

➢ ***Autoimmune manifestations :***

- Skin :pretibial myxedema ,clubbing ,patchy pigmentations
- Hepatosplenomegaly
- Eye :
  - ❖ True exophthalmus : it is due to the effect of antibodies leading to deposition of fluid and round cell infilterate in the retrobulbar tissue which can lead to diplopia
  - ❖ False exophthalmus :it is due to upper eyelid retraction due to contraction of muller muscle as the thyroid hormone increase the senstivity of muller muscle to circulating catecholamines.
- Other ocular manifestations :
  - ❖ Stellwag sign
  - ❖ Darlymple's sign
  - ❖ Von graves sign
  - ❖ Moebius sign
  - ❖ Joffrey's sign

✓ ***Complications :***

1. High COP Heart failure
2. Osteoporosis
3. Myopathy
4. corneal ulceration due to exophthalmus
5. Thyrotoxic crisis

✓ ***Differential diagnosis :***

Other causes of thyrotoxicosis as :

- ➢ Toxic nodular goiter
- ➢ Toxic adenoma
- ➢ Other rare causes as : neonatal , drugs ,inflammatory (hashimoto, De Quervan thyroiditis),malignant (struma ovarii ,functioning secondary carcinoma ,TSH secreting adenoma of pituitary gland)

✓ ***Investigations :***

- ➢ increased T3 and T4 with low TSH
- ➢ +ve antibodies (TSI)
- ➢ U/S : diffuse enlargement
- ➢ Thyroid scan :hot gland (increase uptake)

- No role of FNAB as the incidence of malignancy in toxic goiter is very low
- For heart failure :ECG is done

✓ ***Treatment :***

- Main line of treatment is medically waiting for spontaneous remission by :
- Neomercazole 10 mg tds + inderal 80-160 mg/d
- Until the patient become euthyroid then neomercazole is given by dose 5mg tds for one year.
- Diazepam is added in severe CNS affection.
- If medical treatment fail :
  - ❖ Patient <45 years with large goiter the best line is subtotal thyroidectomy after medical preparation with neomercazole 10mg tds, inderal until patient is euthyroid then neomercazole 5mg tds till evening prior to operation + lugol iodine for 2 weeks to decrease vascularity.
  - ❖ Patient >45 years treated by radioactive iodine I131
- Treatment of exophthalmus :
  - ❖ Add L thyroxine to the antithyroid drug to avoid release of exophthalmus producing factor
  - ❖ If surgery is indicated subtotal thyroidectomy is done 6 months after stationary exophthalmus.
  - ❖ Eye care by local steroids , and lateral tarsorrhaphy.
- Treatment of heart failure if developed:
- Treatment of heart condition has the priority , by Diuretics , digitalis
- Treatment of thyrotoxic crisis :

Patients with thyroid storm should be treated in an ICU setting for close monitoring of vital signs,Correct electrolyte abnormalities ,Treat cardiac arrhythmia ,Aggressively control hyperthermia by applying ice packs and cooling blankets ,propranolol to minimize sympathomimetic symptoms.,Correct the hyperthyroid state. Administer antithyroid medications to block further synthesis of thyroid hormones (THs).

Q: Discuss pathology of grave's disease

ANSWER:

primary toxic goiter or graves disease is the most common cause of hyperthyroidism (76%) .

- ✓ ***Etiology :***
  - It is believed to be autoimmune disease,it is considered type v hypersensitivity due to the presence of thyroid stimulating antibodies ,it has sudden onset affecting young females 20-30 years subjected to trauma ,pregnancy , lactation , occurring on top of normal gland
- ✓ ***Development :***Graves disease has abrupt onset with remission and exacerbations

  It is an autoimmune disease caused by thyroid stimulating antibody which combine with thyroid stimulating hormone receptor in the thyroid cell leading to release of CAMP which activate and increase production of T4, the excess of thyroid hormone lead to a hypermetabolic state affecting different body systems whoever some complications as eye manifestations occurs due to the auto antibodies.
- ✓ ***Macroscopically :*** diffuse enlargement of the thyroid, fleshy ,well defined
- ✓ ***Microscopically :*** increase the vascularity of the thyroid with proliferation of the epithelial lining of the acini which is columnar and full of granules.
- ✓ ***Complications :***
  1. High COP Heart failure
  2. Osteoporosis
  3. Myopathy
  4. corneal ulceration due to exophthalmus
  5. Thyrotoxic crisis

Q : Discuss complications of Grave's disease

Answer:

✓ ***Complications :***

1. High COP Heart failure
2. Thyrotoxic crisis
3. corneal ulceration due to exophthalmus
4. Myopathy
5. Osteoporosis

1-high COP heart failure :

➢ *Symptoms :*

Dyspnea , orthopnea , paroxysmal nocturnal dyspnea , tachypnea
Easy fatigue , fainting , tachycardia

➢ *Signs :*

Congested neck veins , lower limb edema , cyanosis , enlarged tender liver

➢ *Investigation :*

ECG and Echo

➢ *Treatment:*

Diuretics , digitalis , treatment of the cause .

2-Thyrotoxic crisis

➢ *Symptoms and signs :*

- ➢ tachycardia (palpitations)
- ➢ increased body temperature
- ➢ Chest pain
- ➢ Shortness of breath
- ➢ Anxiety and irritability
- ➢ Disorientation
- ➢ Increased sweating
- ➢ Weakness
- ➢ Heart failure

➢ *Investigation :*

Increase T3 and T4 with low TSH

➢ *Treatment*

Patients with thyroid storm should be treated in an ICU setting for close monitoring of vital signs,Correct electrolyte abnormalities ,Treat cardiac arrhythmia ,Aggressively control hyperthermia by applying ice packs and cooling blankets ,propranolol to minimize sympathomimetic symptoms.,Correct the hyperthyroid state. Administer antithyroid medications to block further synthesis of thyroid hormones (THs).

3- *Corneal affection on top of exophthalmus*

Ulceration of the cornea occurs which can lead to corneal scarring and decrease visual acuity.

➢ *Treatment of exophthalmus :*

- ❖ Add L thyroxine to the antithyroid drug to avoid release of exophthalmus producing factor
- ❖ If surgery is indicated subtotal thyroidectomy is done 6 months after stationary exophthalmus.
- ❖ Eye care by local steroids , and lateral tarsorrhaphy.

Treatment of thyrotoxicosis

medical

INDICATIONS :

- 1ry thyrotoxicosis in patients <45 years
- Pre-operative preparation in 2ry thyrotoxicosis ,toxic nodule

REGIMEN:

- Neomercazole 10mg tds + inderal 80-160mg/day
- Until the patient is euthyroid then give neomercazole 5 mg tds for 1 year
- Diazepam may be added in severe CNS affection

IN PREGNANCY

✓ FIRST TRIMESTER :

- Propylthiouracil 50 mg tds + indral

✓ SECOND TRIMESTER

- Subtotal thyroidectomy

✓ THIRD TRIMESTER

- Antithyroid drugs + L-thyroxine (to avoid thiouracil transmitted goiter
- # radiotherapy

✓ DURING LACTATION :

- Propyl thiouracil

irradiation

INDICATIONS

- 1ry thyrotoxicosis in patient >45 years after failure of medical ttt
- High risk patients

REGIMEN:

- Radioactive iodine I_{131}
- 10 milli curie
- The beta rays destroy major part of the gland without affecting adjacent structures

IN CHILDREN

- Antithyroid drugs waiting for spontaneous remission
- Surgery may be done after puberty
- # Radiotherapy

TTT OF TRUE EXOPHTHALMUS

THYROTOXICOSIS	EXOPHTHALMUS
➢ Anti-thyroid drugs +Lthyroxine	- lateral tarsorraphy
➢ If surgery is indicated,subtotal	- orbital de-roofing
➢ Thyroidectomy is done after	- Diuretics
➢ Stationary exophthalmus for 6Months	

surgical

INDICATIONS:

- 2ry thyrotoxicosis
- Huge goiter ,pressure manifestations, restrosternal goiter
- Failure of medical treatment of 1ry thyrotoxicosis

REGIMEN :

✓ PREOPERATIVE :

- Thyroid function tests
- Indirect laryngeoscope
- Neomercazole 10 mg tds + inderal till the patient is euthyroid then 5 mg tds till the evening prior to operation + lugol iodine for two weeks to dec. vascularity

✓ OPERATION :

- Subtotal thyroidectomy

✓ POST OPERATIVE :

- Propranalol for few days (inderal)

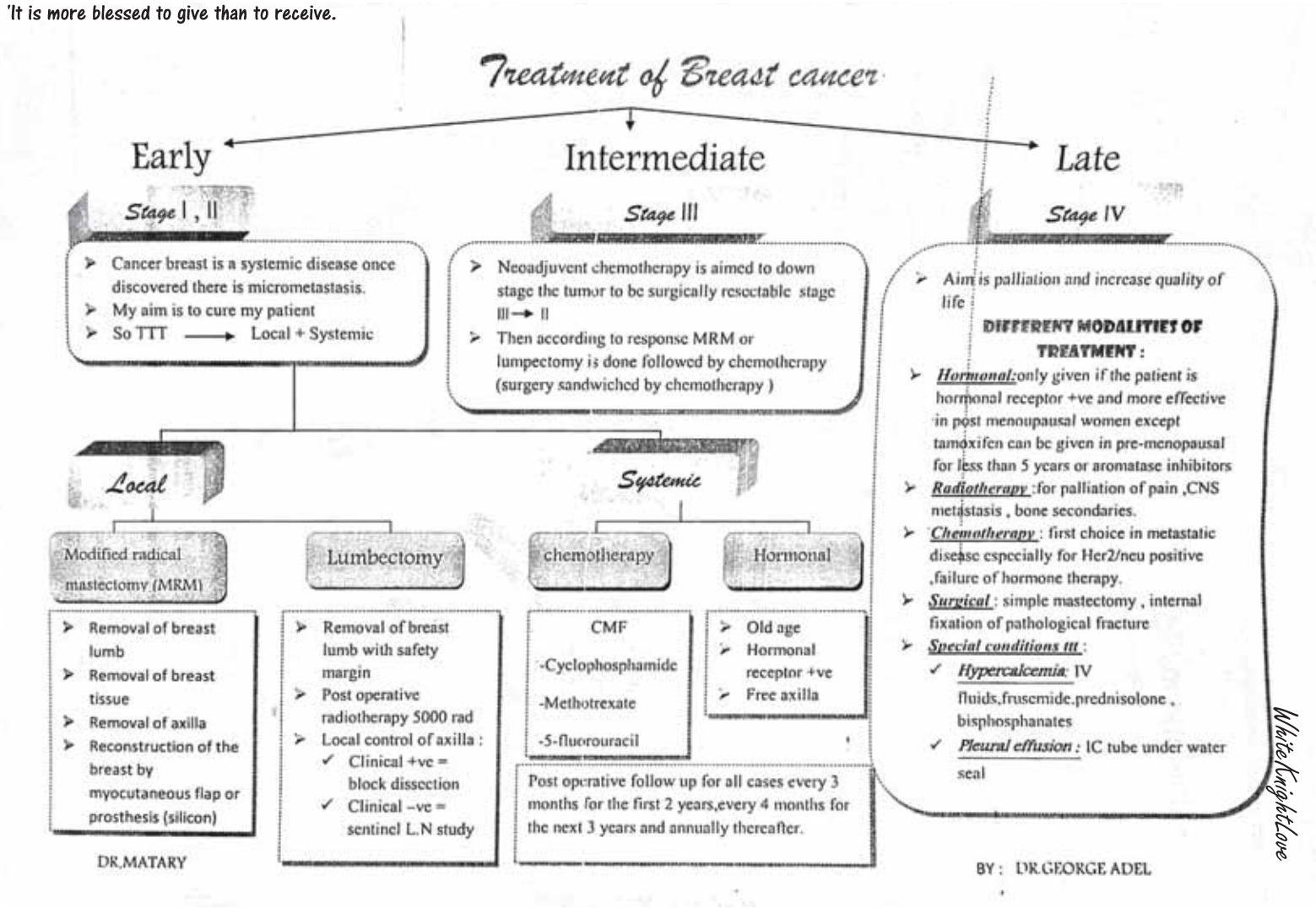
RAPID PRE-OPERATIVE PREPARATION :

Inderal may be given without neomercazole for 4 days before surgery and continued for 1-2 weeks post operative to avoid thyrotoxic crises.

DR.MATARY

BY: DR.GEORGE ADEL

'It is more blessed to give than to receive.



Q : Discuss malignant melanoma

ANSWER:

✓ **Definition** : malignant melanoma is a malignant neoplasm of the melanocytes in the epidermis which penetrate the basement membrane

✓ **Incidence** : in western countries the incidence of melanoma is increasing due to defective ozone layer , almost unknown before puberty ,the most common type is superficial spreading (50-70%) and the worst prognosis is the amelanotic melanoma

✓ **Etiology** : De novo presentation is more common than malignant melanoma on top of benign melanoma .

- Predisposing factor includes :
  - Prolonged exposure to sunlight (UV rays)
  - Increase incidence in albinism , xeroderma pigmentosa
  - On top of benign melanoma (if exposed to chronic irritant)

✓ **Pathology and clinical types** :

Malignant melanoma may develop on top of giant hairy pigmented naevi , junctional naevi where malignant transformation is detected by :increase pigmentation , irregular border , hard in consistency , become painful.

- **Subtypes** :
  - **Superficial spreading melanoma** :

    The most common type ,where malignant cells spread on the surface(radial growth) with no site of prediction ,has irregular edge and raised surface and it is of good prognosis
  - **Nodular melanoma** :

    Affects trunk , head , neck , raised edge with smooth surface , vertical growth and it is of bad prognosis .

DR.MATARY

- Acral lentigo :

  Affect dark skinned old patients , affects mainly sole , palm , under nails ,has poor prognosis

- Amelanotic melanoma :

  Undifferentiated melanoma and it has the worst prognosis.

- Lentigo maligna :

  Affect face of old patients , it has the best prognosis as it slowly grow and even may regress in size .

- Macroscopic picture : nodule or ulcer ,there may be satellite lesion,LN enlargement , liver metastasis.
- Microscopic picture : malignant melanocytes in the epidermis with basement membrane penetration and dermal affection.

- Spread:
  - Direct involvement of subcutaneous tissue
  - Lymphtic spread by permeation leading to satellite lesion or by embolism.
  - Blood spread to distant organ :bone ,brain , lung , liver

- Complications
  1. Metastasis and cancer cachexia
  2. Hemorrhage
  3. Infection and ulceration

- Prognosis:

  Prognosis mainly depends on depth of lesion and it is better described by Breslow than clark's classification

BRESLOW CLASSIFICATION

Stage	infilteration
1	<0.75 mm
2	0.75-1.5 mm
3	1.75-4 mm
4	>4mm

DR.MATARY

✓ Investigation

For diagnosis : excisional biopsy with safety margin 3 mm where biopsy include whole skin , subcutaneous tissue,paraffin section is better than frozen section
For staging : CT scan ,sentinel LN
Preoperative investigation :CBC,ECG,KFT,LFT,FBS

✓ Treatment

➢ Operable :

1-Surgical excision with safety margin :

- ❖ 1cm if thickness <1mm
- ❖ 2cm if thickness 1-4 mm
- ❖ 3cm if thickness >4mm

2-For L.N :

- ❖ Prophylactic dissection is Contraindicated
- ❖ If L.Ns are enlarged .....radical dissection is done
- ❖ If L.Ns not enlarged .....sentinel L.N study

➢ inoperable

1. palliative excision
2. chemotherapy(actinomycin D)
3. immunotherapy (Interleukin 2)

➢ prognosis

- according to the depth, LN affection

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Q: Discuss pathology of malignant melanoma

Answer:

Malignant melanoma may develop on top of giant hairy pigmented naevi , junctional naevi where malignant transformation is detected by :increase pigmentation , irregular border , hard in consistency , become painful.

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    The most common type ,where malignant cells spread on the surface(radial growth) with no site of prediction ,has irregular edge and raised surface and it is of good prognosis
  - Nodular melanoma :
    Affects trunk , head , neck , raised edge with smooth surface , vertical growth and it is of bad prognosis .
  - Acral lentigo :
    Affect dark skinned old patients , affects mainly sole , palm , under nails ,has poor prognosis
  - Amelanotic melanoma :
    Undifferentiated melanoma and it has the worst prognosis.
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➢ Spread:

- ❖ Direct involvement of subcutaneous tissue
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- ❖ Blood spread to distant organ :bone ,brain , lung , liver

➢ Complications

1. Metastasis and cancer cachexia
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Prognosis mainly depends on depth of lesion and it is better described by Breslow than clark's classification

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1	<0.75 mm
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3	1.75-4 mm
4	>4mm

EXAMPLES FOR MODEL ANSWER OF SOME ESSAY QUESTIONS

Q: Discuss diverticular disease of colon

ANSWER:

- ✓ ***Introduction*** : diverticular disease in form of diverticulosis is a very common disease especially in communities with low fiber diet and more commonly in old age , in western countries it affect 60% above 50 years, in Egypt it affects younger age group due to bilharizial colitis.
- ✓ ***Incidence*** : more common in western countries ,in old age with low fiber diet and chronic constipation.
- ✓ ***Etiology*** :
  - ➢ predisposing factor : old age with chronic constipation
  - ➢ Precipitating factors Include bad dietary habits with low fiber diet
- ✓ ***Pathology :***
  - Development :
    the disease is due to chronic constipation leading to increase intraluminal colonic pressure which cause pulsion diverticula of the colonic mucosa through points of entery of blood vessels between taenia coli this stage is called non complicated diverticular disease
  - Site :
    sigmoid colon is the most affected site ,rectum is never affected (due to absence of taenia coli)
- ✓ ***Complications :***

1-acute diverticulitis secondary to obstruction of its neck.(D.D acute appendicitis)

2-hemorrhage

3-perforation on top of acute diverticulitis leading to generalized peritonitis

4-chronic diverticulitis complicated by colonic stricture and mass (D.D carcinoma)

5-fistula formation (colovesical , colovaginal or colointestinal fistula may develop)

✓ ***Clinical picture*** :

1-most commonly asymptomatic only 10 % will be complicated.

2- Acute diverticulitis (DD acute appendicitis) :

- *symptoms :*
  - ➢ General : FAHM
  - ➢ Local : severe abdominal pain which mimic acute appendicitis but on the left side with previous history of chronic constipation.
- *Signs :*
  - ➢ General : fever, tachycardia , tachypnea
  - ➢ Local : tenderness,guarding , rigidity, rebound tenderness.

3-Chronic diverticulitis (DD carcinoma):

- *Symptoms :*

  Long history of recurrent attacks of pain with passage of blood and mucous
- *Signs :*

  By palpation tender mass is found in the left iliac fossa which can mimic carcinoma.

4-Acute hemorrhage :

- ➢ General : pallor , cold skin , decrease blood pressure ,thready pulse
- ➢ Local : severe bleeding per rectum (D.D angiodysplasia)

5-colovesical fistula presented by recurrent cystitis and faeculuria.

✓ ***Investigation :***

- ➢ The most important investigation in non complicated case is the barium enema which can show saw tooth appearance of the colon.
- ➢ In acute diverticulitis :barium enema is contraindicated and the investigation of choice is CT scan which reveals wall thickening and may show peridiverticular abscess .
- ➢ Sigmoidoscope will reveal diverticular mouth and exclude malignancy
- ➢ In acute hemorrhage the investigation of choice is Tc angiography to detect bleeder site .

✓ ***Treatment :***

- In Stage of diverticulosis high fiber diet is prescribed ,antispasmodics for abdominal colic
- Acute diverticulitis usually responds to conservative treatment unless complicated by pericolic abscess where ultrasound guided aspiration is done or complicated by generalized peritonitis where urgent laparotomy and peritoneal toilet is done followed by resection of the perforated colon by Hartman's procedure
- Chronic diverticulitis is treated by colectomy after medical preparation.
- In bleeding diverticular disease first resuscitate the patient with wide bore cannula and IV fluids until blood is available,usually bleeding stops spontaneously , if not resection of the affected part is done guided by the angiography.

Q : Discuss complications of diverticular disease of the colon

ANSWER :

Complications of diverticular disease include :

1-Acute diverticulitis secondary to obstruction of diverticular neck.(D.D acute appendicitis)
2-Hemorrhage (bleeding per rectum)
3-Perforation on top of acute diverticulitis leading to generalized peritonitis.
4-Chronic diverticulitis complicated by colonic stricture and mass (D.D carcinoma).
5-Fistula formation (colovesical , colovaginal or colointestinal fistula may develop)

1- Acute diverticulitis (DD acute appendicitis) :

symptoms :

- General : FAHM
- Local : severe abdominal pain which mimic acute appendicitis but on the left side with previous history of chronic constipation.

Signs :

- General : fever, tachycardia , tachypnea
- Local : tenderness,guarding , rigidity, rebound tenderness.

Investigations :

- Barium enema is contraindicated and the investigation of choice is CT scan which reveals wall thickening and may show peridiverticular abscess .

Treatment :

- Acute diverticulitis usually responds to conservative treatment unless complicated by pericolic abscess where ultrasound guided aspiration is done or complicated by generalized peritonitis where urgent laparotomy and peritoneal toilet is done followed by resection of the perforated colon by Hartman's procedure .

2- *Acute hemorrhage :*

Symptoms and signs:

- General : pallor , cold skin , decrease blood pressure ,thready pulse, decrease urine output
- Local : severe bleeding per rectum (D.D angiodysplasia) ,tenderness .

Investigation :

- The investigation of choice is Tc angiography to detect bleeder site.

Treatment :

- Resuscitate the patient with wide bore cannula and IV fluids until blood is available,usually bleeding stops spontaneously , if not resection of the affected part is done guided by the angiography.

3-Chronic diverticulitis (D.D carcinoma).

Symptoms :

- Long history of recurrent attacks of pain with passage of blood and mucous

Signs :

- By palpation tender mass is found in the left iliac fossa which can mimic carcinoma.

Investigation :

- The most important investigation is the barium enema which can show saw tooth appearance of the colon.
- Sigmoidoscope will reveal diverticular mouth and exclude malignancy

Treatment :

- Chronic diverticulitis is treated by colectomy after medical preparation.

DR.MATARY

Q :Discuss pathology of diverticular disease of the colon

ANSWER:

✓ ***Etiology*** :

- Predisposing factor : old age with chronic constipation, connective tissue disorders (such as Marfan syndrome and Ehlers Danlos Syndrome) that may cause weakness in the colon wall,hereditary or genetic predisposition
- Precipitating factors Include bad dietary habits with low fiber diet.

✓ ***Development :***

- in early stages of the disease there is only muscular spasm and incoordination leading to increase intraluminal colonic pressure which cause bulging of the colonic mucosa through circular muscle layer at the points of entery of blood vessels between taenia coli this stage is called non complicated diverticular disease , it is acquired pulsion diverticula ,it is considered

✓ ***Site :*** sigmoid colon is the most affected site ,rectum is never affected (due to absence of taenia coli)

✓ ***Complications :***

1. Acute diverticulitis secondary to obstruction of its neck.(D.D acute appendicitis)
2. Hemorrhage
3. Perforation on top of acute diverticulitis leading to generalized peritonitis
4. Chronic diverticulitis complicated by colonic stricture and mass (D.D carcinoma)
5. Fistula formation (colovesical , colovaginal or colointestinal fistula may develop)

✓ ***Clinical picture :***

1-most commonly asymptomatic only 10 % will be complicated.

2- Acute diverticulitis (DD acute appendicitis) :

symptoms :

- General : FAHM
- Local : severe abdominal pain which mimic acute appendicitis but on the left side with previous history of chronic constipation.

DR.MATARY

Signs :

- General : fever, tachycardia , tachypnea
- Local : tenderness,guarding , rigidity, rebound tenderness.

3-Chronic diverticulitis (DD carcinoma):

Symptoms :

- Long history of recurrent attacks of pain with passage of blood and mucous

Signs :

- By palpation tender mass is found in the left iliac fossa which can mimic carcinoma.

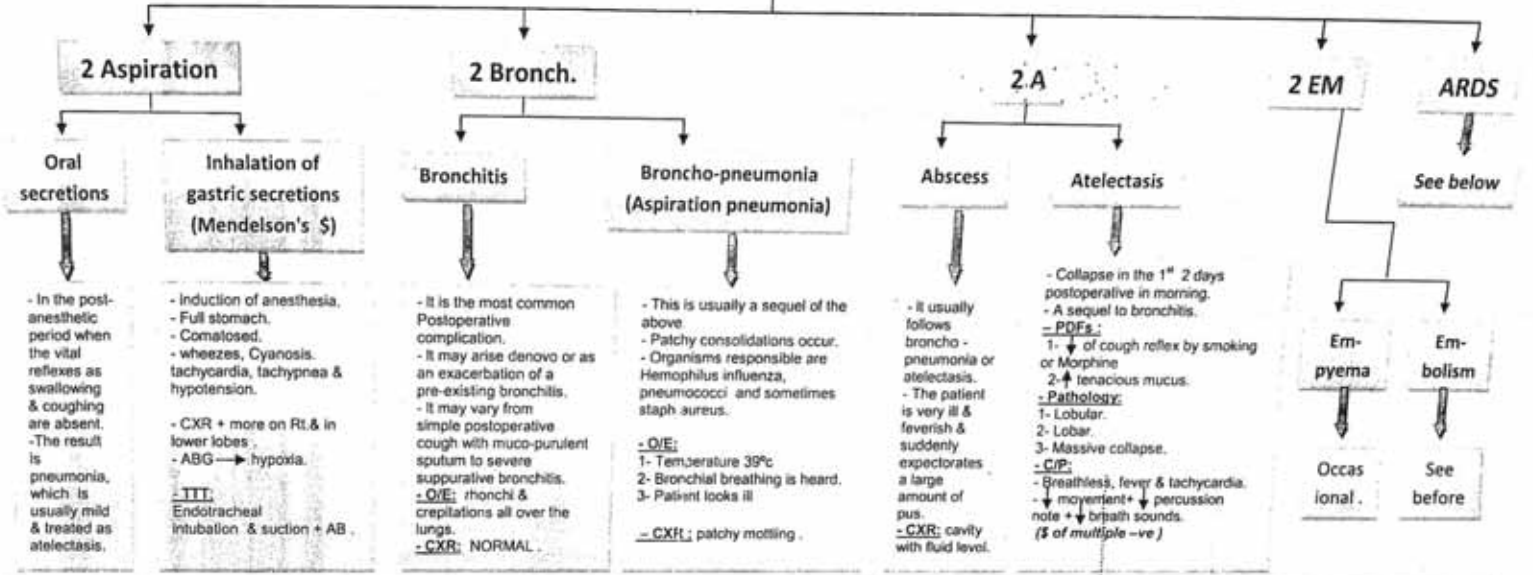
4-Acute hemorrhage :

- General : pallor , cold skin , decrease blood pressure ,thready pulse
- Local : severe bleeding per rectum (D.D angiodysplasia)

5-colovesical fistula presented by recurrent cystitis and faeculuria.

'It is more blessed to give than to receive.

POST-OPERATIVE PULMONARY COMPLICATIONS



Predisposing factors	Prophylaxis	Predisposing factors	Prophylaxis
Pre-operative		-Premedication with atropine (produce thick mucous)	Avoid excess atropinization.
1- age : extremes of age are more liable to complications.	----------	Inhalation of blood or vomitus (Mendelson's $)	Avoidance , high risk patients should have a nasogastric tube.
2- sex : Males > Females.	----------	2- nature of operation : Thoracic , upper abdominal , emergency, vascular , diaphragm operations ,malignant diseases .	- avoid tight strapping and banding of chest and Abd . - avoid rough manipulations and undue prolongation .
3- smoking & alcoholism.	Prohibit smoking and alcohol intake.	*Post-operative*	
4- chronic bronchitis& RTIs.	- Eradication of respiratory infections . - Breathing exercises .	1- post operative dehydration.	Correction of dehydration.
5- dehydration .	Correct dehydration.	2- post operative pain.	Adequate analgesia.
Operative		3- lack of mobility in bed.	- early ambulation . - encouragement of deep breathing , coughing and breathing exercises .
1- Anesthesia : - prolonged unconsciousness	- avoid deep anesthesia. - anesthesist avoid cyanosis.	4- inhibition of cough reflex by heavy narcotics (or pain).	- avoid heavy sedation. - clear secretions , postural drainage
- trauma to tracheobronchial Tree.	Avoid trauma during Intubation.	5- Abd. distention (p.ileus).	Supportive care.

ARDS : (non cardiogenic pulmonary edema)

Causes : severe sepsis , severe shock , major trauma , extensive burns , iatrogenic (non-filtered bl. transfusion , over transfusion of fluids , use of oxygen conc. > 50% , massive doses of steroids)

C/P : 1- history of the cause .
2- initial state : (shock , lactic acidosis , hyperventilation)
3- phase of hemodynamic equilibrium (lasts for several days)
4- phase of clinical Resp. distress followed by Resp. failure .

Investigations :
- Lap. : ABG → hypoxemia / CBC → WBCs in sepsis .
- Radiology : 1- CXR → may show fluids in the lungs .
2- CT chest : required in some situations (CXR is sufficient)
3- Echocardiogram : exclude heart problems
- Instrumental : 1- Monitor with Pulm. artery catheter to exclude cardiac causes
2- Bronchoscope : exclude lung infection .

Treatment : (NO specific therapy for ARDS exists)
1- Admission to ICU.
2- Supplemental oxygen .
3- Treatment of the cause (correct shock , eradicate sepsis)
4- IV fluids (to avoid dehydration but carefully monitored)
5- Administration of some drugs :
- Antibiotics . - Anti-inflammatory (corticosteroids)
- diuretics . - Anti-anxiety , inhaled drugs .

White knight love

	SPLEEN	LIVER 15-20% mortality	KIDNEY
Incidence	Most common visceral trauma	2nd common	Rare as it is well supported
Etiology	Closed: direct (car accident) ,indirect (fracture ribs) ,spontaneous (pathological) Opened: Gun shots , puncture , iatrogenic as in gastrectomy , liver biopsy		
Pathology	Subcapsular hematoma ,superficial tear ,deep tear ,avulsion of pole ,complete depulping ,avulsion of vascular pedicle		
Types	✓ Fatal (severe shock) ✓ Delayed(minor trauma passed unnoticed forming subcapsular hematoma rupture after weeks) ✓ Classic type		✓ Extra-peritoneal (80%):Minimal shock, no peritoneal irritation,meteorism ✓ Intra-peritoneal (20%): In infants ,previous pathology or underdeveloped Gerota fascia
Symptoms	History of trauma to abdomen or lower chest followed by abdominal pain (pain in flanks In rupture kidney)		
Signs	✓ General: Hypovolemic shock (tachycardia, hypotention ,cold skin, pallor, thready pulse, decrease urine output) ✓ Local: Inspection: Ecchymosis, bruises, fracture ribs, decreased abdominal movements , Cullen sign (late) Palpation: Rigidity, guarding, tenderness, rebound tenderness. Percussion: shifting dullness + balance sign(shifting dullness on right side+ fixed dullness on left side in rupture spleen) Auscultation: ↓ intestinal sounds DRE: fullness in rectovesical pouch , douglas pouch N.B: KEHR's sign is pathognomonic to rupture spleen (referred pain in the left shoulder + hyperesthesia due to diaphragmatic irritation)		
Complications	✓ Hemorrhage (internal or external) ✓ Associated injuries	✓ Hemorrhage (internal or external) ✓ Associated injuries ✓ Biliary leakage → biliary peritonitis ✓ Infarction of liver tissue	✓ Hemorrhage (internal or external) ✓ Associated injuries ✓ Anuria(shock-reflex inhibition of other kidney-injury to solitary kidney) ✓ Late: pseudo-hydronephrosis, perinephric abscess, renal fibrosis and hypertension , renal artery aneurysm ,A-V fistula
Investigations	✓ U/S ,CT scan (most important) replace the diagnostic peritoneal lavage,show free blood ,hematoma,pathological types ,other organ injury ✓ Plain x-ray: elevated copula of diaphragm , obliteration of psoas shadow, (indentation of fundic air bubble in rupture spleen) ✓ Diagnostic and therapeutic angiography ✓ Laboratory : CBC , KFT , LFT , FBS N.B: IVP is done in rupture kidney as medicolegal for the other kidney		
Treatment Definitive ttt.	first aid: ABCD Primary survey: ABCDE Secondary survey: Head to toe examination +AMPLE history +Resuscitation & Monitoring		
	✓ Adult: laparotomy and splenectomy ✓ Children: splenic preservation ✓ Pneumococcal vaccine, post-operative penicillin	✓ Immediate laparotomy,priority is to arrest bleeding by Pringle's maneuver ✓ If hematoma:ligate damaged vessels+Abs	✓ Laparotomy ✓ If small tear : suture ✓ Avulsion : partial nephrectomy ✓ Complete depulp : total nephrectomy

'It is more blessed to give than to receive.

The X factor

الذين يزرعون بالدموع يحصدون بالابتهاج
انظروا إلى الأجيال القديمة وتأملوا. هل توكل أحد على الرب فخزي؟
الذي بدأ معكم اول الطريق لن يتركك في منتصفه
هو شايف هو عارف مش بينسى ☺

How to use this notes:

- This notes provide you with the basic scheme to answer most of the essay questions in surgery, it has an "aetio-pathological" arrangement so its advised to help you review the surgery syllabus through a different approach.
- **Here you are a suggested way to study using this notes in 5 steps:**
  1) Read one section in this note e.g. tumors
  2) Go through your surgery books looking for the tumors in every system
  3) Read what's written in your book concerning different tumors taking notes with what's different, special, or unique in every tumor (different from the general scheme)
  4) Make your own notes or papers presenting the difference you notices
  5) Now go study from your own notes.

Carcinomas

Definition: malignant transformation of (the cell of origin)

Epidemiology:

- Age, sex, Race: usually Male >40 y (exceptions??)
- Incidence & prevalence (according to the tumor if available)
- Other specific

Etiology: the exact etiology is unknown,however the following are predisposing factors;

1. Chronic irritation (e.g prolonged exposure to uv rays in skin cancers)
2. Precancerous lesions (e.g duct papilloma in cancer breast)
3. Genetic factor (BRCA 1,BRCA 2 in cancer breast)

Pathology:

- **Site:** ((think of the etiology → which part is more subjected to irritation))
- **Macro:** ((think of the organ harboring the tumor solid or hollow??))
  - Solid→ star-shaped infiltrating mass with areas of hge& necrosis , not (or incompletely) encapsulated (or false capsule)
  - Hollow →
    - Exophytic: cauliflower fungating mass or papillary growth (more common in wide areas e.g. fundus of the stomach)
    - Endophytic: ulcer or stricture (more common in narrow lumens as pylorus)
- **Micro** : ((think of the type of epithelium))
  - Sq.→scc
  - Col.→ adenocarcinoma
  - Transitional → TCC

IN ALL TYPES

Microscopic features of Anaplasia (Loss of polarity, Pleomorphism, Hyperchromatism, Altered nuclear/cytoplasmic ratio, abnormal "bizarre" mitotic figures)

- **Grading** (according to the degree of differentiation)
  - Grade I well differentiated
  - Grade II moderately differentiated
  - Grade III poorly differentiated
- **Staging**(according to the spread) : **TNM staging**

Complications:

- General: Anemia, cachexia, etc...
- Local: Hemorrhage, infection, necrosis, loss of function, others
- Spread:
    1. Direct
    2. Lymphatic
    3. Blood (BLBL)
    4. Others (Transluminal, Transcoelomic, etc..)

Clinical picture:

- Type of patient: (see epidemiology)
- Symptoms (presentation):
    a) Asymptomatic
    b) Symptomatic:
        - Typical: pain (usually late), swelling, and disturbance of function.
        - Atypical e.g. Paramalignant syndromes .
    c) Of Complications
- Signs: specific to the system and site of metastasis (jaundice in liver metastasis)

Investigation:

1. Screening?(In very common tumors)(e.g family screening in FPC)
2. For diagnosis
3. For staging
4. Preoperative investigations (ECG,KFT,LFT,FBS)
5. For follow up (tumor markers)

Treatment:

1. ***Operable:*** My aim is to cure my patient
    a) Main line: surgery
    b) Adjuvant chemo & radio (neo adjuvant therapy is given to down stage the tumor to be operable)

2. ***Inoperable:***
    a) Resectable→ palliative resection +chemo and/or radiotherapy.
    b) Irresectable → palliative chemo and/or radiotherapy,pain killers.

Infections

Definition:

- Acute/chronic, diffuse/localized, suppurative/non-infection of ...(organ)...

Epidemiology:

- Incidence/ prevalence
- Age :
- Gender

Etiology:

1. Causative organism (gram +ve/-ve/anaerobes)
2. mode of transmission (direct , blood , lymphatic , through natural passage)
3. predisposing factors (bad general condition , bad hygiene, stasis)

Clinical picture:

- Type of patient
- Symptoms :
  - *General :* FAHM
  - *Local :* pain (dull aching in diffuse or throbbing in abscess) , swelling , disturbance of function.
- Signs :
  - *General :* fever (hectic fever in abscess), tachycardia , others.
  - *Local:* red ,hot, tender , swollen ,enlarged draining L.Ns

Complications :

- *General*: toxemia , pyemia , septicemia,bacteremia
- *Local* :spread , chronicity , abscess formation

Investigations

a) Lab:
- CBC : leukocytosis
- ↑ESR
- ↑CRP
- Culture and sensitivity from discharge if present.

b) Imaging:
- Xray, U/S, CT, MRI →according to the site of infection.

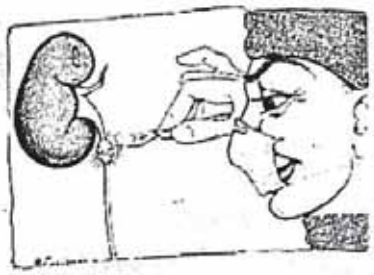
Treatment

1. **General measures**
   - Rest
   - Elevation
   - Hot fomentation
2. **Medical treatment**
   - Analgesic –antipyretic
   - Antibiotic: first empirical (according to the suspected organism) then according to C&S.
3. **Surgical ttt**

Abscess = drainage

- Aspiration if (accessible, thin wall, unilocular, thin contents)
- Open drainage if not a candidate for aspiration.

Stones



Etiology

1. **Disturbance in the normal constituents**
   (Something that it's normally present become in excess or deficient)
   e.g. in gallstone → Bile pigment, cholesterol bile salts ratio ....etc.
   In kidney → dehydration, increased calcium in HPT ...etc.

2. **Abnormal constituents:**
   (The presence of something that's normally not present)
   e.g. infection creating nidus

3. **Stasis**

Pathology:

Types + complications

a) **Types:**
   - According to etiology (1ry -2ry)
   - According to shape
   - According to composition

b) **Complications**
   HIMOM (hge, infection , migration , obstruction , malignancy)

Clinical picture:

- *Type of patient:* 6F in gallstone, middle age male in renal stones
- *Symptoms:*
  - Asymptomatic
  - Pain
  - Complications
- *Signs:*
  - General : signs of infection if present
  - Tenderness
  - Special signs

Investigations

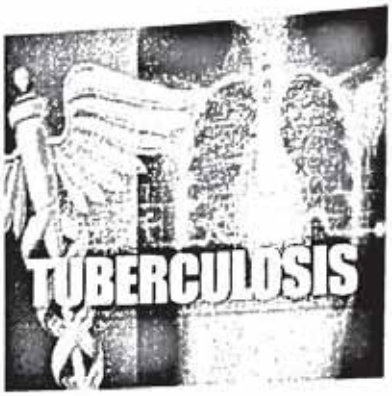
a) Lab
   e.g. urine analysis , renal functions , liver function test and liver enzymes

b) Imaging
   e.g. Xray , U/S

Treatment:

a) Treatment of acute attack (analgesics ,fluids ,antispasmodics , antibiotics)
b) Management of stone (conservative, instrumental, operative)
c) Prevention of recurrence

TUBERCULOSIS



Definition:
Chronic granulomatous inflammation affecting (ORGAN) caused my mycobacterium species, characterized by tubercles formation with or without casseation.

Incidence :
It is more common in poor communities with bad hygiene and overcrowding, it is more common in children and young adults.

Etiology :

- *Organism:* Mycobacterium tuberculosis or mycobacterium bovis
- *Route :*
  - *1ry* :air borne through droplets causing pulmonary T.B or by ingestion of contaminated milk containing M.Bovis causing intestinal T.B hypertrophic type
  - *2ry:* blood borne or lymphatic spread from pre-existing pulmonary or intestinal T.B as in (T.B enteritis ulcerative type ,T.B lymphadenitis ,Renal T.B ,T.B epididymitis(2ry to urinary T.B) ,T.B spine ,Bone T.B , T.B of joints)
- *Predisposing factor :* poverty , overcrowding , bad immunity

Pathology :

- *Site :*
  - T.B enteritis ulcerative type affects payer's Patches of terminal ileum while hypertrophic type affects ileo-coecal region.
  - T.B Lymphadenitis blood borne affects the medulla of L.N through the hilum ,while lymphatic borne affects the cortex which most commonly affects the upper deep cervical L.Ns,mediastinal ,mesenteric L.Ns
  - T.B joints most commonly affects the hip joint , while most common bone to be affected is the vertebrae.
  - T.B spine (pott's disease) most commonly affects the dorso-lumbar spine ,it affects adjacent parts of the bodies of vertebrae and there discs.
  - In T.B epididymitis tail is the first site to be affected through lymphatic route, while in blood route head is the first site to be affected.

- *Macroscopic :*
  - Enlarged L.Ns are rubbery , non tender ,matted with early caseation in lymphatic borne T.B lymphadenitis and not matted in blood borne type with late caseation.
  - Ulcerative type of T.B enteritis show multiple transverse lesions with indurated base, caseous floor ,undermined edge and cyanotic margin ,while in hypertrophic type there is wall thickening and narrowing of the lumen with early involvement of the regional L.Ns.
  - In Pott's the vertebral body is destroyed and replaced by caseous material with destruction of the disc and collapse of the vertebrae.
  - In T.B epididymitis the Epididymis is enlarged showing multiple sinuses posteriorly ,Vas is thickened and beaded in lymphatic route while vas is normal in blood route.
  - Renal T.B : charectarized by formation of caseous material in the renal parenchyma which might ulcerate in the renal pelvis (ulcerocavernous –caseocavernous) causing extensive fibrosis and calcification to the kidney (autonephrectomy) ,it can extend to the ureter which may cause stricture,may extends to the urinary bladder causing contraction and fibrosis of the bladder (thimble bladder) and the opening of the ureter becomes patent giving golf hole appearance,affection of the genitalia is considered

- *Microscopic :* tubercles which is formed of epithelioid cells ,giant cells surrounded by lymphocytes and fibroblasts.
- *Complications :*
  - *General :*systemic spread forming milliary T.B
  - *Local :*according to the affected site (cold abscess , sinus formation , fistula , hot cold abscess , pressure manifestations , disabilities , calcification)
    - ✓ T.B enteritis could be complicated by intestinal obstruction ,fistula.
    - ✓ Pott's could be complicated by cold abscess , psoas abscess , paraplegia which is early reversible then ir-reversible , angular kyphosis which is more common with the osseus type.

Clinical picture :

- *Type of patient:* usually affect child and young adult (old age in blood borne T.B lymphadenitis)
- *Symptoms*
  - *General :* night sweats , loss of appetite
  - *Local :* according to affected site (cough , expectoration , diarrhea, dull aching bone pain , swelling , disturbance of function),earliest manifestation of renal T.B is polyuria then hematuria

- *Signs*
  - *General :* night fever , loss of weight , T.B toxemia
  - *Local :* according to affected site
    - ✓ T.B epididymitis :multiple sinuses posteriorly discharging caseous material ,by DRE T.B nodules in the prostate and seminal vesicles are found.

Investigations :

a. ***Lab :***

- CBC :anemia , leucopenia with relative lymphocytosis
- ↑ESR
- ↑CRP
- +ve tuberculin test
- PCR
- Culture from discharge or stool on Lowenstein Jehnsen media
- Urine analysis in renal T.B showing sterile pyuria .
- Ascending pylography show moth eaten appearance in renal T.B

b. ***Imaging :***

- Chest x-ray
- Ba follow through in T.B enteritis showing +ve sterlin sign

Treatment :

- ***General:*** senatorial treatment (sun,air,nutrition).
- ***Medical*** :Anti T.B drugs :INH+Rifampicin +Streptomycin combination for 9 months.
- ***surgical :***
  - L.N removal in single accessible groups of L.Ns
  - Cold abscess :aspiration by z technique + injection of streptomycin
  - In T.B enteritis right hemicolectomy is done if complicated .