LONG CASES
IN
GENERAL SURGERY

Prepared by:

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Contents:

CHRONIC CHOLECYSTITIS

Particulars of the patient:

Name: Salma Khatun

Age: 40 years

Sex: Female

Religion: Islam

Marital status: Married

Occupation: Housewife

Address: Fulpur, Mymensingh

Date and time of admission: 08.02.17; 09.00am

Date and time of examination: 09.02.17;08.30am

Chief complaints:

1. Pain in right upper abdomen for 1 years.
2. Occasional fever and vomiting for 6 months.

History of present illness:

According to the statement of the patient, she was reasonably well 1 year back. Then she developed pain in right upper abdomen which is colicky in nature, radiating to back of right side of chest, aggravated by fatty foods and relieved by medication, associated with nausea. Patient has similar attacks of pain for last 1year initially at an interval of 3–4 months, but for last one month patient is having dull aching constant pain in right upper half of abdomen. Occasionally, pain is associated with vomiting for last 6 months. She used to vomit 2-3 times daily, projectile in nature, vomitus containing partially digested foods, bile stained, bitter in taste. There is history of fever intermittently with chill and rigor with the attack of pain for last 6 months, which subsided with anti-pyretic. She has no HO blood transfusion, IV drug use, tattooing (To exclude hepatitis), no itching sensation (To exclude obstructive jaundice). She has no HO loss of appetite, weight loss and frequent passage of loose stool (Exclude chronic pancreatitis). Her bladder habit is normal. She has no history of cough, chest pain, coughing out blood, yellow colouration skin or eye, passage of black stool or bone pain.

History of past illness:

She has no H/O DM, HTN, heart disease, asthma, tuberculosis.

Personal history:

Patient is non- smoker, non alcoholic (To exclude chronic pancreatitis)

Immunization history:

She is immunized as per EPI schedule. He is not immunized against HBV. (For surgeon's safety)

Socioeconomic history:

She belongs to a middle class family, lives in semi-pakka house and drinks tube-well water, uses sanitary latrine.

Family history:

All other members of his family are enjoying good health.

Menstrual history: If Female

Age of menarche: 12 years
Menstrual cycle: 28+_2 days
Menstrual period: 4-5 days
LMP: 02.02.17
Menstrual flow: Average
Age of last child: 12 years

Drug history:

She took some tablets from local quack but could not mention the names.

General examination:

Appearance: Anxious/ill looking/normal
Body built: Average
Cooperation: Cooperative
Decubitus: On choice
Nutritional status: Average
Jaundice: Absent
Anaemia: +
Cyanosis: Absent
Pulse: 102/min
BP: 130/80 mm of Hg
Temperature: 100^0 F
Respiratory rate: 14/min
Skin condition: Scratch mark over chest and abdomen
Clubbing: Absent
Leuconychia: Absent
Koilonychia: Absent
Dehydration: Present
Oedema: Absent
Thyromegaly: Absent
Neck vein: Not engorged
Lymph node: Not palpable
Hernial orifice: Intact
IV cannula, NG tube, catheter: In situ, If present (Usually absent)

Abdominal examination:

Inspection :

Shape: Scaphoid

Movement with respiration: Abdomino thoracic (Male)/ Thoraco abdominal (Female)

Umbilicus: Centrally placed, inverted and vertically slitted

Scratch mark: Absent

No scar mark, engorged vein, visible peristalsis, fullness in right hypochondrium (due to distended gallbladder: Can be seen in very thin patients)

Palpation:

Temperature: Not raised

Tenderness: Non-tender

No palpable mass, muscle guard or hyperesthesia

Murphy's sign: Negative

Liver, spleen, kidney, UB: Not palpable

Percussion:

- ✓ Tympanic
- ✓ Fluid thrill and shifting dullness absent

Auscultation: Bowel sound present
DRE: Revealed no abnormality

Nervous system examination: Revealed no abnormality
Respiratory system examination: Revealed no abnormality
CVS examination: Revealed no abnormality

Salient feature:

Mrs. Salma Khatun, 40 years old married, muslim, non-smoker, non-alcoholic, non diabetic, normotensive housewife, hailing from Fulpur, Mymensingh admitted to SU-III, MMCH with the complaints of pain in right upper abdomen for year which is colicky in nature, radiating to back of right side of chest, aggravated by fatty foods and relieved by medication, associated with nausea. Patient has similar attacks of pain for last 1year initially at an interval of 3–4 months, but for last one month patient is having dull aching constant pain in right upper half of abdomen. Occasionally, pain is associated with vomiting for last 6 months. She used to vomit 2-3 times daily, projectile in nature, vomitus containing partially digested foods, bile stained, bitter in taste. There is history of fever intermittently with chill and rigor with the attack of pain for last 6 months, which subsided with anti-pyretic. She has no HO blood transfusion, IV drug use, tattooing, no itching sensation (To exclude obstructive jaundice). She has no HO loss of appetite, weight loss and frequent passage of loose stool. Her bladder habit is normal. Her bladder habit is normal. She has no history of cough, chest pain, haemoptysis, jaundice, melaena or bone pain.

On general examination, he is anxious, ill looking, co-operative, average body built and nutritional status. Pulse 102/min, BP 130/80, RR 14/min, temperature normal, no dehydration and oedema. He is non-anaemic, non-ecteric, no cyanosis, no lymphadenopathy, thyromegaly, engorged vein.

On abdominal examination, abdomen is scaphoid shaped, umbilicus is centrally placed, no scar mark, engorged vein, no scratch mark. On palpation, temperature normal, no tenderness

present, no palpable mass, Murphy's sign negative, no organomegaly. Tympanic on percussion and bowel sound present. Digital rectal examination reveals no abnormality. Other system examination reveals normal.

Provisional diagnosis: Chronic cholecystitis
Differential diagnoses:

- ✓ PUD
- ✓ Chronic pancreatitis

Investigations:
Investigation:
For diagnosis: USG of HBS with pancreas:

- ✓ Gall bladder is smaller and wall is thickened
- ✓ Bright echogenic structure with posterior acoustic shadow (Gall stones)

To exclude DD: Upper GI endoscopy (PUD)
Routine:

1. CBC
2. Urine RME
3. RBS
4. S. Creatinine
5. CXR
6. ECG
7. HBs Ag

Treatment: Cholecystectomy. This may be-

- ✓ Open
- ✓ Laparoscopic

Why do you say that it is a case of Chronic cholecystitis?

1. Female patient
2. Age 40 years
3. Recurrent attack of colicky pain in rt hypochondriac region
4. Abdominal discomfort after taking fatty food
5. Fever during attack of pain

What are your DDs?

- ✓ PUD
- ✓ Chronic pancreatitis

Why do you say PUD?

- ✓ Recurrent attack of upper abdominal pain
- ✓ Vomiting associated with pain

Why not PUD ?

1. Recurrent attack of pain in rt hypochondriac region
2. Fever during attack of pain

Why do you say Chronic pancreatitis?

- ✓ Recurrent attack of upper abdominal pain
- ✓ Radiation of pain to back
- ✓ Vomiting associated with pain

Why not Chronic pancreatitis?

- ✓ Colicky pain in rt hypochondriac region
- ✓ Fever during attack of pain
- ✓ No HO DM, malabsorption and weight loss

Murphy's sign:

- ✓ Patient in **sitting posture**
- ✓ Place the right hand just below the right costal margin on the lateral border of right rectus and moderate pressure is exerted with finger to palpate gall-bladder
- ✓ Now ask the patient to take a deep breath in, the gallbladder descends and hurts the examining finger, the patient will wince with catching pain if organ is inflamed.

When do you find Murphy's sign is positive?

Murphy's sign is positive in acute cholecystitis. In chronic cholecystitis Murphy's sign is not positive.

For more curiosity:

How ultrasonography helps in diagnosis of biliary tract disease?

Ultrasonography is a reliable investigation for evaluation of biliary tract disease.

1. **Gallbladder**:
   Size of the gallbladder: Whether gallbladder is normal sized, contracted or distended
   Walls of the gallbladder: Normal wall thickness or any thickening of wall
   Intraluminal calculi: Intraluminal calculi may be seen as a bright echogenic structure with posterior acoustic shadow.
   Any associated mass: In gallbladder may be seen.
2. **Common bile duct:**
   - ✓ The upper end of common bile duct may be seen and its diameter may be measured.
   - ✓ Any intraluminal calculi in the bile duct lumen may be seen.
   - ✓ However, stone at lower end of bile duct may sometimes be missed on ultrasonography.
3. **Liver:**
   - ✓ Liver may be seen well and any solid or cystic lesion in the liver may be ascertained.
   - ✓ Any dilatation of the intrahepatic biliary radicles may be seen well.
4. **Pancreas:**
   - ✓ The pancreas may be seen and any mass in relation to the pancreas may be seen well.
   - ✓ The diameter of the pancreatic duct may be measured.
   - ✓ Any calculus in the pancreatic duct or parenchymal calcification may be seen.
   - ✓ The parenchymal echo texture may be seen clearly and chronic or acute pancreatitis may be diagnosed.

When will you consider doing an ERCP or MRCP in patient with gallstone disease?

1. If there is suspicion of stone in the common bile duct on USG examination.
2. If there is history of jaundice or the patient is having jaundice.
3. If LFT shows elevation of serum enzymes—ALT, AST and Alkaline phosphatase.
4. Ultrasonography shows dilatation of common bile duct.

What are the advantages and disadvantages of MRCP?

Advantages of MRCP:

1. Can give very good picture of the entire biliary tree.
2. Noninvasive investigation, no radiation exposure, no dye is required.
3. Biliary tract dilatation, any obstruction due to stone or growth may be ascertained.

Disadvantages of MRCP: It has only diagnostic value as no intervention is possible.

What are the advantages and disadvantages of ERCP?

Advantages of ERCP:

1. Therapeutic intervention like sphincterotomy and stone extraction or biliary stenting is possible.
2. Biopsy from periampullary lesion or brush cytology from the bile duct may be taken.
3. Bile aspirated may be used for exfoliative cytology.

Disadvantages of ERCP:

1. **Invasive investigation:** Requires introduction of a gastroduodenoscope, cannulation of bile and pancreatic duct and injection of a dye.
2. **Postprocedure cholangitis or pancreatitis:** Chance of postprocedure cholangitis or pancreatitis, which may be life threatening.

Which one will you prefer-open or laparoscopic cholecystectomy?

Laparoscopic cholecystectomy

Why do you prefer laparoscopic cholecystectomy?

Laparoscopic cholecystectomy has been established as gold standard for the treatment of gallstone diseases because:

1. Surgery is safe in the hands of a trained surgeon
2. Less pain, less hospital stays
3. Cosmetic
4. Early return to work is possible
5. More acceptance by the patient.

While you take consent for laparoscopic cholecystectomy what consent should be taken?

1. Informed consent is to be taken.
2. Patient should be explained that if laparoscopic procedure is not safe it may need conversion to open cholecystectomy.

Describe the steps of laparoscopic cholecystectomy?

1. The patient is placed supine on the operating table.
2. Following induction and maintenance of general anaesthetic, the abdomen is prepared in a standard fashion.
3. Pneumoperitoneum is established.
4. An open subumbilical cutdown with direct visualisation of the peritoneum to place the initial port. This port will function as the camera port. An angled telescope (30°) is preferred. Many surgeons use a ‘closed’ technique using a Verres needle to establish pneumoperitoneum prior to placing the initial trocar.
5. Additional operating ports are inserted in the subxiphoid area and in the right subcostal area.
6. Another port in RIF is also made (Not written in book but practically done)

7. The patient is placed in a reverse Trendelburg position slightly rotated to the left. This exposes the fundus of the gall bladder which is retracted towards the diaphragm.
8. The neck of the gall bladder is then retracted towards the right iliac fossa exposing Calot's triangle.
9. This area is laid widely open by dividing the peritoneum on the posterior and on the anterior aspect.
10. The cystic duct is carefully defined, as is the cystic artery. The gall bladder is separated from the liver bed for about 2 cm to allow for confirmation of the anatomy.
11. Once the anatomy is clearly defined and the triangle of Calot has been laid widely open, the cystic duct and artery are clipped and divided.
12. The gall bladder is then removed from the gall bladder bed by sharp or cautery dissection and once free removed via the umbilicus.

[Baily and Love-26th -1110]

Which gas is used to produce pneumoperitonium and why?

CO_2

Because, it is non-inflammable, cost-effective, absorbed by blood.

Can O_2 be used?

No, because it can make fire during electro cautery

How many ports are made? Mention their functions?

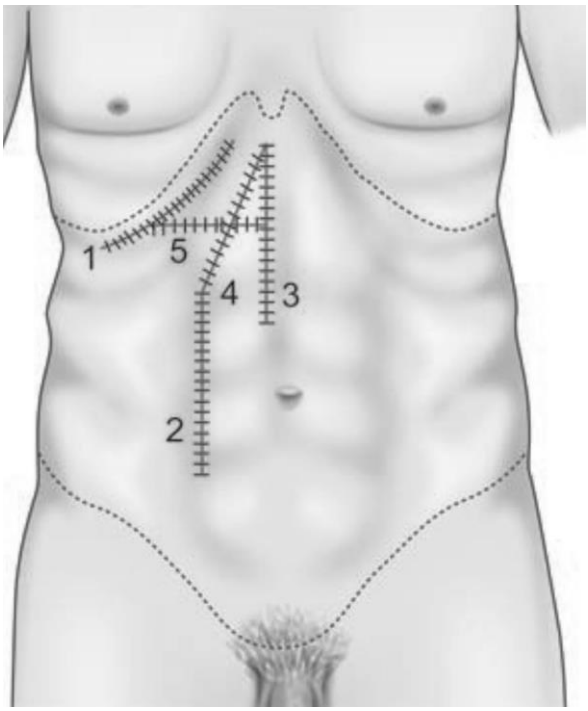
1. **Umbilical port:** 10cm. 1st port to be made.
   Function:
   - ✓ Establishment of pneumoperitonium.
   - ✓ This port will function as the camera port.
   - ✓ Extraction of GB
2. **Epigastric port:** 10cm.
   Function: Functioning port- Surgeon operates through this port
3. **Right hypochondrium: 5 cm.**
   Function: Functioning port- Surgeon operates through this port
4. **RIF:** 10cm.
   Function: Assistant holds the GB through this port.

Port-related complications of lapchole:

- ✓ Injury to gut
- ✓ Injury to major blood vessels i.e. inferior vena cava, abdominal aorta
- ✓ Adhesion
- ✓ Seedling of Ca to abdominal wall

What are the incisions for open cholecystectomy?

1. Right subcostal incision (Kocher's incision)
2. Right upper paramedian incision
3. Midline incision
4. Mayo Robson's incision. Right paramedian with extension to midline
5. Upper abdominal transverse incision



What is cystic pedicle?

It is the two layers of peritoneum covering the cystic duct and the cystic artery and extends from the neck of the gallbladder to the lesser omentum.

What is mini-cholecystectomy?

- ✓ Open cholecystectomy done through a small right subcostal incision of about 5 cm is called minicholecystectomy.
- ✓ This is a good technique with very little postoperative pain, shorter hospital stay and it has been claimed to be comparable to laparoscopic cholecystectomy.

Indications for choledochotomy:

1. Palpable duct stones
2. Jaundice or a history of jaundice or cholangitis
3. A dilated common bile duct (more than 1 cm)
4. Abnormal liver function tests, in particular a raised alkaline phosphatase.
5. Gallbladder contains a single facetted stone with cystic duct dilatation
6. Intraoperative cholangiogram shows a stone in common bile duct

[Baily and Love-26th -1110+Lecture of MMC]

Post-cholecystectomy' syndrome:

In up to 15 per cent of patients, cholecystectomy fails to relieve the symptoms for which the operation was performed. Such patients may be considered to have a 'post-cholecystectomy' syndrome.

However, such problems are usually related to the preoperative symptoms and are merely a continuation of those symptoms.

Management:

- ✓ Full investigation should be undertaken to confirm the diagnosis and exclude the presence of a stone in the bile duct, a stone in the cystic duct stump or operative damage to the biliary tree.

- ✓ This is best performed by MRCP or ERCP, the latter which has the added advantage that if a stone is in the common bile duct it can be removed.

[Baily and Love-26th -1111]

Acalculous cholecystitis:

Acute and chronic inflammation of the gall bladder can occur in the absence of stones and give rise to a clinical picture similar to calculous cholecystitis is known as acalculous cholecystitis.

Some patients have non-specific inflammation of the gall bladder, whereas others have one of the cholecystoses.

The diagnosis is often missed and the mortality rate is high.

Predisposing factors for development of acalculous cholecystitis:

- ✓ Critically ill patients in intensive therapy unit
- ✓ Following major surgery, trauma or burns.

[Baily and Love-26th -1108]

Cholesterosis ('strawberry gall bladder'):

- ✓ There is deposition of cholesterol crystals in the submucosa and they may appear as yellow specks and the interior of the gallbladder looks like a strawberry.
- ✓ In the fresh state, the interior of the gall bladder looks something like a strawberry; the yellow specks (submucous aggregations of cholesterol crystals and cholesterol esters) correspond to the seeds. It may be associated with cholesterol stones.

[Baily and Love-26th -1108]

Lithogenic bile:

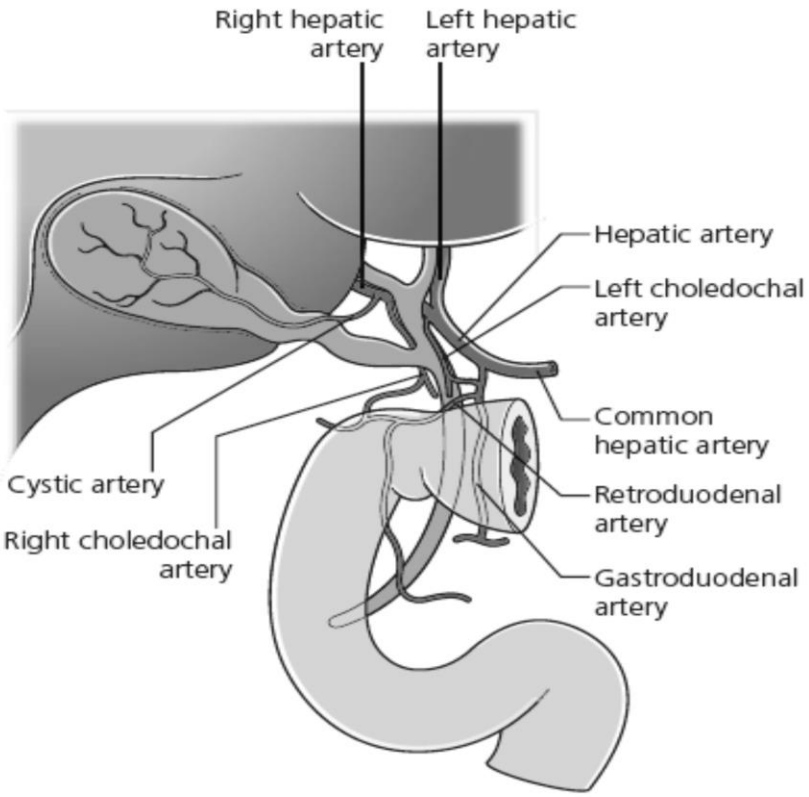
- ✓ In normal bile the cholesterol, phospholipids and bile salts remain in optimum concentration. This keeps the cholesterol in solution.
- ✓ Bile supersaturated with cholesterol is known as lithogenic bile as this predisposes to gallstone formation.

What do you mean by silent gallstone?

Incidentally found gallstones during examination for other pathology or in routine health check- up that does not produce symptoms are called silent gallstones.

GALL BLADDER

SURGICAL ANATOMY AND PHYSIOLOGY:



Gall bladder:

Position:

- ✓ Underside of the liver in the main liver scissura at the junction of the right and left lobes of the liver.
- ✓ The relationship of the gall bladder to the liver varies between being embedded within the liver substance to being suspended by a mesentry.

Size-Shape: Pear-shaped structure, 7.5–12 cm long.

Capacity: About 25–30 mL.

Anatomical divisions:

1. A fundus
2. A body
3. A neck
4. A narrow infundibulum.

Histology:

- ✓ The muscle fibres in the wall of the gall bladder are arranged in a criss-cross manner, being particularly well developed in its neck.
- ✓ The mucous membrane contains indentations of the mucosa that sink into the muscle coat; these are the crypts of Luschka.

[Baily and Love-26th -1097]

Cystic duct:
Length: About 3 cm in, but the length is variable.
Diameter: Lumen is usually 1–3 mm
Valves of Heister: The mucosa of the cystic duct is arranged in spiral folds known as the 'valves of Heister'
Sphincter of Lütkens: Wall is surrounded by a sphincteric structure called the 'sphincter of Lütkens'.
Communication:

- ✓ The cystic duct joins the supraduodenal segment of the common hepatic duct in 80 per cent of cases.
- ✓ Occasionally, the cystic duct may join the right hepatic duct or even a right hepatic sectorial duct.

[Baily and Love-26th -1097]

Common hepatic duct:

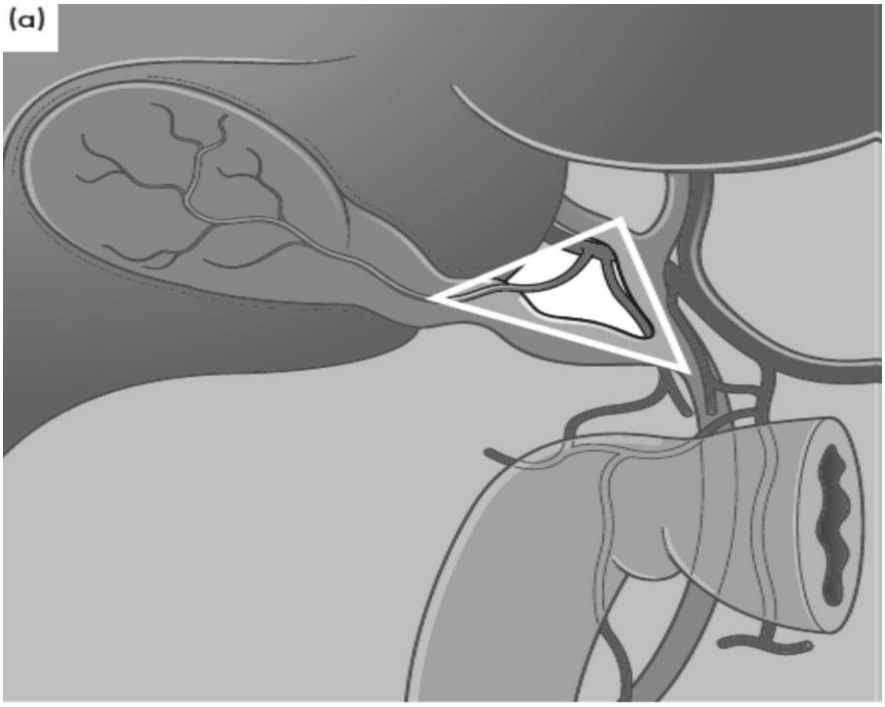
Length: Usually less than 2.5 cm long
Formation: By the union of the right and left hepatic ducts.

The cystic artery, a branch of the right hepatic artery, usually arises behind the common hepatic duct.

Common bile duct:
Length: About 7.5 cm long
Formation: Junction of the cystic and common hepatic ducts.
Divisions: Four parts:

1. **Supraduodenal portion**: About 2.5 cm long, running in the free edge of the lesser omentum.
2. **Retroduodenal portion**
3. **Infraduodenal portion:** Lies in a groove, but at times in a tunnel, on the posterior surface of the pancreas.
4. **Intraduodenal portion:** Passes obliquely through the wall of the second part of the duodenum, where it is surrounded by the sphincter of Oddi, and terminates by opening on the summit of the ampulla of Vater.

[Baily and Love-26th -1097-98]



Calot's triangle or the hepatobiliary triangle:

- ✓ This was described in 1891 by Jean-François Calot.
- ✓ It is an important surgical landmark and should be identified by surgeons performing a cholecystectomy to avoid damage to the extrahepatic biliary system.

Boundary:

Inferiorly: Cystic duct
Medially: Common hepatic
On other arm of triangle: Superior border of the cystic artery.

[Baily and Love-26th -1097-98]

Lymphatics:

Subserosal and submucosal:

- ✓ Drain into the cystic lymph node of Lund (the sentinel lymph node), (which lies in the fork created by the junction of the cystic and common hepatic ducts).
- ✓ Efferent vessels from this lymph node go to the hilum of the liver, and to the coeliac lymph nodes.
- ✓ Subserosal lymphatic vessels of the gall bladder also connect with the subcapsular lymph channels of the liver, (and this accounts for the frequent spread of carcinoma of the gall bladder to the liver.)

[Baily and Love-26th -1098]

Surgical physiology:

Bile:

- ✓ Produced by the liver and stored in the gall bladder from which it is released into the duodenum.
- ✓ The liver excretes bile at a rate estimated to be approximately **40 mL/hour**.
- ✓ About 95 per cent of bile salts are reabsorbed in the terminal ileum (enterohepatic circulation).

Composition: As it leaves the liver, it is composed of

1. **Water:** 97 per cent
2. **Bile salts:**
   - ✓ Cholic and cheno- deoxycholic acids
   - ✓ Deoxycholic and lithocholic acids
3. Phospholipids
4. Cholesterol
5. Bilirubin

[Baily and Love-26th -1098-99]

Functions Of The Gall Bladder:

1. **Reservoir for bile:**
   - ✓ During fasting, resistance to flow through the sphincter of Oddi is high, and bile excreted by the liver is diverted to the gall bladder.
   - ✓ After feeding, the resistance to flow through the sphincter is reduced, the gall bladder contracts and the bile enters the duodenum.
   - ✓ **Hormone responsible:** Cholecystokinin.
2. **Concentration of bile:**
   - ✓ By active absorption of water, sodium chloride and bicarbonate by the mucous membrane of the gall bladder.
   - ✓ The hepatic bile which enters the gall bladder becomes concentrated 5–10 times, with a corresponding increase in the proportion of bile salts, bile pigments, cholesterol and calcium.
3. **Secretion of mucus:**
   - ✓ Approximately 20 mL is produced per day.
   - ✓ With complete obstruction of the cystic duct in an otherwise healthy gall bladder, a mucocoele may develop as a result of ongoing mucus secretion by the gall bladder mucosa.

[Baily and Love-26th -1099]

CHRONIC CHOLECYSTITIS

Commonest complication of gall stone

Clinical features are due:

- ✓ Inflammation of gall bladder: Chronic cholecystitis
- ✓ Obstruction of gateway of gall bladder by impaction of gall stone in Hartman pouch: Acute on chronic cholecystitis

Management:

Symptoms:

1. **Pain:**
   - ✓ In right upper quadrant or epigastrium
   - ✓ Colicky
   - ✓ May radiate to the back
   - ✓ Associated with nausea and vomiting
   - ✓ Exacerbated by heavy meal
   - ✓ Relieved by antispasmotic or spontaneously
   - ✓ Varying degree of severity i.e. slight discomfort to excruciating
   - ✓ Periodic i.e. 4-6 week interval

2. **Fever:** During attack of pain
3. Heart burn, acidity, flatulence and sensation of fullness after meal

Sign:

1. **Murphy's sign:** Negative
2. **On deep palpation:**
   - ✓ There may be mild tenderness on right hypochondrium
   - ✓ Gall bladder is not palpable

D/Ds:

- ✓ PUD
- ✓ Chronic pancreatitis

Investigation:

For diagnosis:

USG of HBS with pancreas:

- ✓ Gall bladder is smaller and wall is thickened
- ✓ Bright echogenic structure with posterior acoustic shadow (Gall stones)

To exclude DD: Upper GI endoscopy (PUD)

Routine:

8. CBC
9. Urine RME
10. RBS
11. S. Creatinine
12. CXR
13. ECG
14. HBs Ag

Treatment: Cholecystectomy. This may be-

- ✓ Open
- ✓ Laparoscopic

[Ward class of MMC + Lecture of MMC]

ACUTE CHOLECYSTITIS

Symptoms:

1. **Pain:** Present in 10–25 per cent of patients.
   - ✓ In right upper quadrant or epigastrium
   - ✓ Colicky, but more often is dull and constant
   - ✓ May radiate to the back
   - ✓ Associated with nausea and vomiting
   - ✓ Relieved by antispasmotic or spontaneously
   - ✓ Lasting for few minute to hour
2. **Other symptoms:**
   - ✓ Dyspepsia
   - ✓ Flatulence
   - ✓ Food intolerance, particularly to fats, and some alteration in bowel frequency.

Sign:

On GE:

Fever
Restless

Tachycardia
Dehydrated
Jaundice

Per abdomen:

3. **Tenderness and rigidity:** In right hypochondrium
4. **Murphy's sign:** Positive
5. **Palpable tender mass in right hypochondrium:** Formed by inflamed GB and greater omentum.

Differential diagnosis of acute cholecystitis:

Common:

- ✓ Appendicitis
- ✓ Perforated peptic ulcer
- ✓ Acute pancreatitis

Rare:

- ✓ Acute pyelonephritis
- ✓ Myocardial infarction
- ✓ Pneumonia – right lower lobe

Investigations: [For viva-mention first 2]

1. CBC: Leukocytosis
2. **USG of hepatobilliary system with pancreas:** To confirm the diagnosis
   Findings:
   - ✓ If stone present: Bright echogenic structure with posterior acoustic shadow
   - ✓ GB wall is thickened
   - ✓ Pericholecystic oedema
3. Liver function test: If jaundice present
4. Plain X-ray abdomen erect posture including both dome of diaphragm:
   -To see radio-opaque shadow (10%)
   -To exclude perforation of gas containing hollow viscus
5. Hepatic imino diacetic scan (HIDA scan)

Treatment:

A. **Conservative measures:** Non-operative treatment is based on four principles:
   1. **Nil per mouth (NPO) and IV fluid**: Until the pain resolves.
   2. **Analgesics**
   3. **Antibiotics:**
      - ✓ As the cystic duct is blocked in most instances, the concentration of antibiotic in the serum is more important than its concentration in bile.
      - ✓ A broad-spectrum antibiotic effective against Gram-negative aerobes is most appropriate (e.g. cefazolin, cefuroxime or gentamicin).
   4. **Subsequent management:**
      - ✓ **When the temperature, pulse and other physical signs show that the inflammation is subsiding:** Oral fluids are reinstated followed by regular diet.
      - ✓ **If the pain and tenderness increase:**
        - ➢ Conservative treatment must be abandoned
        - ➢ Operative intervention and cholecystectomy

- ➢ if the patient has comorbid conditions: Percutaneous cholecystostomy can be performed by a radiologist under ultrasound control.

B. **Surgery:** Cholecystectomy may be performed after approximately 6 weeks.

[Baily and Love-26th -1108+Lecture of MMC]

What are the sequelae of acute cholecystitis?

1. **Resolution:** Inflammation subsides and patient recovers.
2. **Mucocele**
3. **Empyema gall bladder**
4. **Gangrene:** Infection may lead to gangrenous change in gallbladder manifested by increasing pain, toxemia and appearance of rebound tenderness.
5. **Perforation of gallbladder:** Perforation may be:

✓ **Localized:** Localized abscess formation manifested by severe pain, fever with chill and rigors, and extreme tenderness in right upper quadrant of abdomen.

✓ **Generalized perforation:** Leading to generalized biliary peritonitis manifested by generalized pain abdomen, muscle guard or rigidity and extreme tenderness all over abdomen. Perforation into a neighboring viscus most commonly duodenum, stomach or colon.

[Bedside Clinics in Surgery-2nd-131-32]

Site of perforation:

1. At the fundus, which is farthest away from the blood supply
2. At the neck from pressure necrosis of an impacted calculus

GALLSTONES (CHOLELITHIASIS)

Cholecystectomy one of the most common operations performed by general surgeons. :-D

Causal factors in gallstone formation:

Gallstones can be divided into three main types:

1. **Cholesterol:** Cholesterol or mixed stones contain 51–99 per cent pure cholesterol plus an admixture of calcium salts, bile acids, bile pigments and phospholipids.
2. **Pigment:** Pigment stone is the name used for stones containing less than 30 per cent cholesterol. 2 types:
   a. **Brown:** Rare in the gall bladder. They form in the bile duct and are related to bile stasis and infected bile.
      - ✓ Contain calcium bilirubinate, calcium palmitate and calcium stearate, as well as cholesterol.
      - ✓ Stone formation is related to the deconjugation of bilirubin deglucuronide by bacterial glucuronidase. Insoluble unconjugated bilirubinate precipitates.
      - ✓ Brown pigment stones are also associated with the presence of foreign bodies within the bile ducts, such as endoprosthesis (stents), or parasites, such as *Clonorchis sinensis* and *Ascaris lumbricoides*.

   b. **Black:**
      - ✓ Largely composed of an insoluble bilirubin pigment polymer mixed with calcium phosphate and calcium bicarbonate.

- ✓ Associated with haemolysis, usually hereditary, spherocytosis or sickle cell disease.

3. Mixed stones

In the United States and Europe, 80 per cent are cholesterol or mixed stones, whereas in Asia, 80 per cent are pigment stones.

[Baily and Love-26th -1106-07]

Pathophysiology of stone formation:

- ✓ Cholesterol, which is insoluble in water, is secreted from the canalicular membrane in phospholipid vesicles.
- ✓ Whether cholesterol remains in solution depends on the concentration of phospholipids and bile acids in bile, and the type of phospholipid and bile acid.
- ✓ Micelles formed by the phospholipid hold cholesterol in a stable thermodynamic state.
- ✓ When bile is supersaturated with cholesterol or bile acid concentrations are low, unstable unilamellar phospholipid vesicles form, from which cholesterol crystals may nucleate, and stones may form.

[Baily and Love-26th -1106]

Causes of gall stone formation:

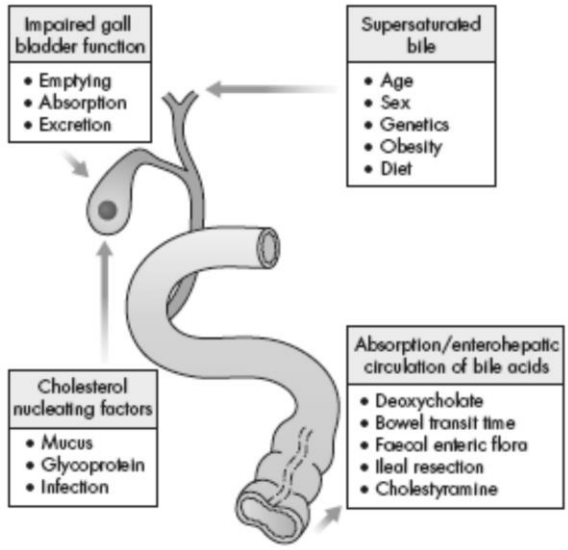


Figure 67.26 Factors associated with gallstone formation.

For understanding purpose only:

- ✓ The process of gallstone formation is complex, and many areas remain unclear.
- ✓ Obesity, high caloric diets and certain medications (e.g. oral contraceptives) can increase secretion of cholesterol and supersaturate the bile increasing the lithogenicity of bile.
- ✓ Resection of the terminal ileum, which diminishes the enterohepatic circulation, will deplete the bile acid pool and result in cholesterol supersaturation.
- ✓ Nucleation of cholesterol monohydrate crystals from multilamellar vesicles is a crucial step in gallstone formation.
- ✓ Abnormal emptying of the gall bladder function may aid the aggregation of nucleated cholesterol crystals.

[Baily and Love-26th -1106-07]

Management:

Clinical presentation: Usually patient present with features of acute or chronic cholecystitis.

Impaction of stone in the neck: FO acute cholecystitis

Due to inflammation of GB: FO chronic cholecystitis

Symptoms:

1. **Asymptomatic:** Being detected incidentally as imaging is performed for other symptoms.
2. **Pain:** Present in 10–25 per cent of patients.
   - ✓ In right upper quadrant or epigastrium
   - ✓ Colicky, but more often is dull and constant
   - ✓ May radiate to the back
   - ✓ Associated with nausea and vomiting
   - ✓ Relieved by antispasmotic or spontaneously
   - ✓ Lasting for few minute to hour
3. **Other symptoms:**
   - ✓ Dyspepsia
   - ✓ Flatulence
   - ✓ Food intolerance, particularly to fats, and some alteration in bowel frequency.

Sign:

1. **Jaundice:** May result if the stone migrates from the gall bladder and obstructs the common bile duct.
2. **Fever:** Due to cholecystitis or cholangitis
3. **Murphy's sign:** Positive in acute acute cholecystitis, negative in chronic cholecystitis.

Investigations:

1. CBC: Leukocytosis
2. **USG of hepatobilliary system with pancreas:** To confirm the diagnosis.
   Findings: Bright echogenic structure with posterior acoustic shadow
3. **MRCP:** If jaundice is present, an is performed to exclude choledocholithiasis.
1. **Routine:**
   - ✓ RBS
   - ✓ S.creatinine
   - ✓ CXR PA view
   - ✓ ECG
   - ✓ Urine RME

Treatment:

- ✓ **Observe patients:** With asymptomatic gallstones
- ✓ **Acute cholecystitis**: Rx of acute cholecystitis
- ✓ **Chronic cholecystitis:** Rx of chronic cholecystitis

Effects and complications of gallstones:

In GB:

1. Biliary colic
2. Acute cholecystitis
3. Chronic cholecystitis
4. Empyema of the gall bladder
5. Mucocoele
6. Perforation

In CBD and pancreas:

1. Biliary obstruction
2. Acute cholangitis
3. Acute pancreatitis

In intestine: Intestinal obstruction (gallstone ileus)

[Baily and Love-26th -1107+Lecture of MMC]

Why it is necessary to remove GB instead of removing only stones?

Abnormal emptying of the gall bladder function may aid the aggregation of nucleated cholesterol crystals; hence, removing gallstones without removing the gall bladder inevitability leads to gallstone recurrence.

[Baily and Love-26th -1106]

Prophylactic cholecystectomy: May be considered for

1. Diabetic patients
2. Congenital haemolytic anaemia
3. **Patients undergoing bariatric surgery for morbid obesity:** As it has been found in these groups that the risk of developing symptoms is increased.

[Baily and Love-26th -1108]

Saint's triad:

1. Gall stone
2. Diverticulosis of colon
3. Hiatus hernia

Nucleation:

Is a process by which cholesterol monohydrate crystal forms and aggregates.

MUCOCELE OF GALL BLADDEE/HYDROPS OF GB / RAMS HORN

Definition:

It may be defined as the distension of gall bladder by a clear watery mucinous secretion due to total obstruction of the cystic duct.

Pathogenesis:

When there is obstruction to the cystic duct or the neck of the gallbladder by a stone or a growth then the contained bile in the gallbladder is absorbed by the gallbladder epithelium and is replaced by mucus secreted by the gallbladder epithelium. The content is usually a clear sterile fluid.

Aetiology: Obstruction due to any cause-

- ✓ Stone in the cystic duct (most commonly)
- ✓ Neoplasia involving the cystic duct ie cholangio carcinoma (in 10% cases)
- ✓ Kinking of the duct

Macroscopically:

1. Hugely distended
2. Thin walled
3. Normal colour
4. Vascular markings
5. Stone at the neck

Microscopically: Mucosa becomes atrophied having no columnar or cuboidal cell.

Clinical feature:

1. Usually asymptomatic or any feature of chronic cholecystitis
2. Painless ,palpable ,non-tender gall bladder without jaundice.

Investigation: USG of HBS & pancreas:

- ✓ GB is enlarged, thin walled
- ✓ May contain single or multiple bright echogenic structure casting an acoustic shadows

Treatment: Cholecystectomy

EMPYEMA OF THE GALL BLADDER/ PYOCELE / SUPPURATIVE CHOLECYSTITIS

Definition:

It is the condition in which gall bladder is filled up with frank pus

Pathogenesis:

Empyema may be a sequel of acute cholecystitis or the result of a mucocoele becoming infected. The gall bladder is distended with pus. In 50% cases the contained pus is sterile.

Aetiology:

1. Acute cholecystitis
2. When a mucocele becomes infected.

Source of infection:

1. Ascending infection
2. Local infection (Liver infection)
3. Cystic artery
4. Portal vein

Macroscopically:

1. Gall bladder is enlarged, bright red, green violet in colour.
2. Wall is thick, opaque, lustreless
3. Vessel can not be seen
4. Serosa is covered by fibrinous exudate

Management:

Clinical feature:

Symptoms:

1. Pain
2. Fever with Chills, rigor
3. Nausea & vomiting

Signs:

1. Patient is toxic
2. Raised temperature
3. Tachycardia

4. Localised tenderness and muscle guarding
5. A tender lump may be palpable

Investigation:

1. CBC: Polymorphonuclear lcukocytosis
2. USG of HBS and pancreas

Treatment:

A. Conservative:

1. NPO
2. NG suction
3. IV fluid
4. Analgesic
5. Parenteral antibiotic

B. **Observation for 24-48 hours:** Monitor pain, Pulse, temperature, general condition

1. **If improvement:** Continue conservative management, cholecystostomy(drainage) and interval cholecystectomy after 6-8 weeks.
2. **If condition deteriorates:** Emergency cholecystectomy

[Baily and Love-26th -1108+Lecture of MMC]

OBSTRUCTIVE JAUNDICE (DUE TO CHOLEDOCHOLITHIASIS)

Particulars of the patient:

Name: Mushfiqur Rahim

Age: 30 years

Sex: Male

Religion: Islam

Marital status: Married

Occupation: Farmer

Address: Fulpur, Mymensingh

Date and time of admission: 28.01.17; 09.00am

Date and time of examination: 28.01.17;08.30am

Chief complaints:

1. Pain in left loin for 21 days.
2. Fever for same duration.
3. Yellow coloration of eye and skin for same duration.

History of present illness:

According to the statement of the patient, he was reasonably well 21 days back. Then he developed pain in right upper abdomen which is colicky in nature, radiating to back of right side of chest, aggravated by fatty foods and relieved by medication, associated with nausea and occasional vomiting. There is history of fever intermittently with chill and rigor with the attack of pain for last 1 months, which subsided with anti-pyretic. Patient complains of yellowish discoloration of eyes, skin and urine for last 21 days. The onset of jaundice was preceded by an attack of pain, yellowish discoloration was increasing in intensity initially, but during last one week the intensity of yellowish discoloration is diminishing. Patient complains of itching all over the body and passing clay colored stool for same duration. He has no history of repeated blood transfusion, consanguinal marriage of parents (Exclude jaundice due congenital haemolytic anaemia), no history of contact with jaundice patient, bowel- bladder habit is normal (Exclude hepatic jaundice). He gave no history of weakness, pallor, weight loss, chest pain, cough, haemoptysis, bone pain or haematemesis (General and metastatic features of Ca: To exclude Ca of head of pancreas and periampullary carcinoma).

History of past illness:

He has no H/O DM, HTN, heart disease, asthma, tuberculosis. He has no history of previous gallbladder surgery (may lead to bile strictures and jaundice.)

Personal history:

Patient is non- smoker, non alcoholic, no history of IV drug using and no extramarital sexual exposure. (To exclude hepatocellular jaundice)

Immunization history:

He is not immunized against HBV. (For surgeon's safety)

Socioeconomic history:

He belongs to a middle class family, lives in semi-pakka house and drinks tube-well water, uses sanitary latrine.

Family history:

All other members of his family are enjoying good health.

Menstrual history: If Female

Age of menarche: 12 years
Menstrual cycle: 28+_2 days
Menstrual period: 4-5 days
LMP: 02.02.17
Menstrual flow: Average
Age of last child: 12 years

Drug history:

He took some tablets from local quack but could not mention the names.

General examination:

Appearance: Anxious/ill looking/normal
Body built: Average
Cooperation: Cooperative
Decubitus: On choice
Nutritional status: Average
Jaundice: +++ (May be absent. Because there is intermittent jaundice)
Anaemia: Absent
Cyanosis: Absent
Pulse: 102/min
BP: 130/80 mm of Hg
Temperature: 100^0 F
Respiratory rate: 14/min
Skin condition: Scratch mark over chest and abdomen
Clubbing: Absent
Leuconychia: Absent
Koilonychia: Absent
Dehydration: Present
Oedema: Absent
Thyromegaly: Absent
Neck vein: Not engorged
Lymph node: Not palpable
Hernial orifice: Intact
IV cannula, NG tube, catheter: In situ, If present

Abdominal examination:

Inspection :

Shape: Scaphoid

Movement with respiration: Abdomino thoracic (Male)/ Thoraco abdominal (Female)

Umbilicus: Centrally placed, inverted and vertically slitted

Scratch mark: Present all over the abdomen.

No scar mark, engorged vein, visible peristalsis, fullness in right hypochondrium (due to distended gallbladder: Can be seen in very thin patients)

Palpation:

Temperature: Not raised

Tenderness: Non-tender

No palpable mass, muscle guard or hyperesthesia

Murphy's sign: Negative

Liver, spleen, kidney, UB: Not palpable

Percussion:

- ✓ Tympanic
- ✓ Fluid thrill and shifting dullness absent

Auscultation: Bowel sound present

DRE: Revealed no abnormality

Nervous system examination: Revealed no abnormality

Respiratory system examination: Revealed no abnormality

CVS examination: Revealed no abnormality

Salient feature:

Md. Kurban Ali, 30 years old, muslim, non-smoker, non-alcoholic, non diabetic, married farmer, hailing from Muktagancha, Mymensingh admitted to MMCH with complaints of pain right hypochondrium which is colicky in nature, radiating to back of right side of chest, aggravated by fatty foods and relieved by medication, associated with nausea and occasional vomiting. There is history of fever intermittently with chill and rigor with the attack of pain for last 1 months, which subsided with anti-pyretic. Patient complains of yellowish discoloration of eyes, skin and urine for last 21 days. The onset of jaundice was preceded by an attack of pain, yellowish discoloration was increasing in intensity initially, but during last one week the intensity of yellowish discoloration is diminishing. Patient complains of itching all over the body and passing clay colored stool for same duration. He has no history of repeated blood transfusion, consanguinal marriage of parents, no history of contact with jaundice patient, no H/O extramarital sexual exposure or IV drug use. bowel- bladder habit is normal. He gave no history of weakness, pallor, weight loss, chest pain, cough, haemoptysis, bone pain or haematemesis. All other members of his family are well.

On general examination, patient is ill looking, average body built and nutrition, cooperative. Pulse 102/min, BP 130/80 mm of Hg, RR 14/min, temperature 101^0F. Patient is severely ecteric but non-anaemic. Scratch marks are present over chest and abdomen. Clubbing, leuconychia, koilonychia, dehydration, oedema, thyromegaly absent. Neck vein not engorged, lymph nodes not palpable, hernial orifice intact.

On abdominal examination, abdomen is scaphoid shaped, umbilicus is centrally placed, no scar mark, engorged vein but scratch mark present all over the abdomen. On palpation, temperature normal, no tenderness present, no palpable mass, Murphy's sign negative, no organomegaly. Tympanic on percussion and bowel sound present. Digital rectal examination reveals no abnormality. Other system examination reveals normal.

Provisional diagnosis: Obstructive jaundice due to choledocholithiasis
Differential diagnoses:

- ✓ Periampullary Ca
- ✓ Ca head of pancreas

Investigations:
For diagnosis:

1. USG of whole of abdomen
2. Liver function tests:
    - ✓ S.bilirubin (Not a LFT actually)
    - ✓ S.albumin
    - ✓ SGPT
    - ✓ ALP
    - ✓ PT with INR (International normalization ratio)

Routine investigations for GA fitness:

1. CBC
2. RBS
3. S.creatinine
4. CXR PA view
5. ECG
6. Urine RME
7. HBs Ag (For surgeons safety)

Confirmatory diagnosis: Obstructive jaundice due to choledocholithiasis
Treatment:

Cholecystectomy with choledocholithotomy with T-tube insertion (Must be said accordingly maintaining the serial)

Why do you say that it is a case of obstructive jaundice?

6. Yellow colouration of sclera (/eye), skin
7. High colour urine and pale stool
8. Itching sensation
9. Scratch marks present

Why due to stone in common bile duct?

1. Painful
2. Fever
3. Intermittent jaundice

Why not due to Ca of head pancreas?

In such case there should be -

3. Painless
4. Progressive jaundice

Why not due to periampullary Ca?

In such case there should be -

1. Painless
2. Fluctuating jaundice

How does palpable gall bladder feel?

When distended it can be felt as tense globular swelling projecting downwards and forwards from below the liver just lateral to the outer border of rectus muscle (Below the 9th rib tip)

- ✓ Moves with respiration
- ✓ Upper limit continuous with liver
- ✓ Can be moved slightly from side-to-side.

Murphy's sign:

- ✓ Patient in **sitting posture**
- ✓ Place the right hand just below the right costal margin on the lateral border of right rectus and moderate pressure is exerted with finger to palpate gall-bladder
- ✓ Now ask the patient to take a deep breath in, the gallbladder descends and hurts the examining finger, the patient will wince with catching pain if organ is inflamed.

Cause of palpable gallbladder :

1. Mucocele
2. Empyema
3. Obstructive jaundice due to carcinoma pancreas
4. Carcinoma of gallbladder

Courvoisier's Law:

In a patient with jaundice if there is a palpable gallbladder it is not due to stones on common bile duct.

Explanation:

- ✓ In pathology of gallbladder like calculus cholecystitis there will be fibrosis of the gallbladder and hence it can not enlarge if there is a distal obstruction.
- ✓ But if the pathology is there outside gallbladder due to CBD carcinoma, pancreatic carcinoma you can palpate the gallbladder.

Exceptions to this Law:

- ✓ Double impaction of stone—one in CBD and other in cystic duct
- ✓ Oriental cholangiohepatitis
- ✓ Pancreatic calculus obstructing ampulla of vater

- ✓ Mucocele due to stone in cystic duct

SURGICAL JAUNDICE (OBSTRUCTIVE JAUNDICE)

Definition:

Jaundice due to mechanical obstruction to the biliary tree, usually in the common bile duct which can be corrected surgically.

[Lecture of MMC]

Causes:

A. In the lumen:
1. Stone
2. Round worm

B. In the wall:
1. Stricture:
   - ✓ Post-operative
   - ✓ Sclerosing cholangitis
   - ✓ Congenital atresia
2. Cholangiocarcinoma

C. Outside the wall:
1. Periampullary carcinoma
2. Ca of head of pancreas

Common causes:
- ✓ Choledocholitiasis
- ✓ Periampullary carcinoma
- ✓ Ca of head of pancreas

[Lecture of MMC]

Common Bile Duct Stones:

Primary:
- ✓ Formed in bile duct itself
- ✓ Brown pigment stones

Secondary: Formed in gallbladder and enters CBD (Cholesterol stones).

Surgical approach to case of jaundice:

A. First identify the type of jaundice: Haemolytic, hepatocellular or obstructive

Haemolytic:
- ✓ Usually at young age
- ✓ Mild jaundice
- ✓ Anaemia = +
- ✓ Organomegaly= Hepatosplenomegaly

Hepatocellular:
- ✓ Mild to severe jaundice
- ✓ Fever
- ✓ Pain in right hypochondrium

Obstructive:
- ✓ Severe jaundice
- ✓ May be associated with pain and fever

B. Locate the site of obstruction:

1. Stone of CBD:

- ✓ Painful
- ✓ Fever
- ✓ **Intermittent jaundice:** When obstructs jaundice present. But when pressure of bile increases, multifaceted stone rotate and bile passes by causing disappearance of jaundice.

2. **Ca of head pancreas:**
   - ✓ Painless
   - ✓ **Progressive jaundice:** As tumour enlarges and causes increasing pressure effect causing progressively increasing jaundice.
3. **Periampullary Ca:**
   - ✓ Painless
   - ✓ **Fluctuating jaundice:** As the mass increases more rapidly than angiogenesis, there is necrosis of growing part. So, jaundice reduces but doesn't touch the baseline. When mass grows again, jaundice increases.

[Lecture of MMC]

Management:

A. Symptoms:

1. **Pain:**
   - ✓ In right hypochondrium
   - ✓ Colicky in nature
   - ✓ Radiating to inferior angle of scapula or tip of righr shoulder
   - ✓ Aggravated by fatty foods and relieved by medication
   - ✓ Associated with nausea and occasional vomiting.
2. **Fever:** Intermittent fever with chills and rigor if cholangitis develops.
3. **Jaundice:**
   - ✓ Intermittent (If due to stone)/ Progressive (If due to Ca of head pancreas)/ Fluctuating (Periampullary Ca)
   - ✓ Generalized itching, more in trunks and extremities
   - ✓ Dark coloured urine
   - ✓ Pale offensive bulky stool which float on water (In the pan)

B. On GE:

Anaemia: May be present in malignancy
Jaundice (See in symptoms)
Temperature: May be raised in cholangitis
Skin condition: Scratch mark over chest and abdomen
Dehydration: Present
Lymph node: Palpable in malignancy

Per abdomen:

Tenderness in right hypochondrium
Lump in epigastrium: Ca head of pancreas
Gall bladder:
    Palpable: Ca head of pancreas
    Impalpable: Choledocholithiasis
Liver: May be enlarged in malignancy
Ascites: Present in malignancy
DRE: Pelvic deposition may be present in Ca of head of pancreas

Investigations:

Specific:

A. **USG of HBS and pancreas:**
   Findings: Dilated CBD proximal to obstruction
B. **Liver function tests:**
   1. **Serum bilirubin:** Total, conjugated and unconjugated bilirubin
      - ✓ Increased direct bilirubin (Suggests obstructive type)
   2. ALP: Elevated > 10 times normal is strongly suggestive of obstruction
   3. Gamma-glutamyl transferase: Simultaneous elevation confirms obstruction (increases up to 40 fold)

      Sources of gamma-glutamyl transferase:
      - ➢ Hepatocyte
      - ➢ Bile duct epithelium
      - ➢ Reticuloendothelial system
      - ➢ Placenta
      - ➢ Testes and ovary
   4. **Prothrombin time with INR** (International Normalized Ratio): Vitamin K is fat soluble vitamin, absorption of which requires presence of bile salts in intestine which is absent in patients with obstructive jaundice due to obstruction. So, reduced absorption of vit K dependent clotting factor leads to prolonged PT.
   5. **SGPT and SGOT:** Normal or slightly raised
C. **Ba-meal X-ray:** To see Ca head of pancreas.
   - ✓ Widening of C curve
   - ✓ Duodenul appearance inverted three sign
   - ✓ Irregular filling defect of duodenum: Rose thorn pattern

D. **Endoscopic retrograde cholangiopancreatography (ERCP):** When USG shows dilated extrahepatic biliary tree but cause is unknown.
E. **Magnetic resonance cholangiopancreatography (MRCP)**
F. **CT scan of abdomen:** More specific in detecting the level of obstruction and the cause of obstruction than ultrasound.
G. **PTC (**Percutaneous transhepatic cholangiopancreatography): When USG shows dilated intrahepatic biliary tree but cause is unknown.

Routine:

1. CBC
2. Urine RME
3. RBS
4. S. Creatinine
5. S. calcium
6. CXR
7. ECG
8. HBs Ag

Treatment:

A. **Preoperative preparation in a case with obstructive jaundice:**
   Metabolic problems in a patient with obstructive jaundice:

1. Malnutrition
2. Increased incidence of infection: Because static bile is highly infective
3. Bleeding tendency due to deficit of vitamin K
4. **Renal problems:** Increased chance of renal failure in postoperative period (hepatorenal syndrome).

Causes:

- ✓ Gram-negative endotoxemia (Most common cause)
- ✓ Decreased intravascular volume
- ✓ Kidneys are more sensitive to ischemia
- ✓ Bile salt deposition in the renal tubules
- ✓ Anemia
- ✓ Diminished carbohydrate reserve
- ✓ Dehydration

Preoperative preparation involves correction of the above metabolic abnormalities to reduce the development of postoperative complications.

1. **Nutritional improvement:**
   - ✓ High CHO intake
   - ✓ Oral glucose
   - ✓ In unable to take then IV glucose
2. **Correction of coagulopathy:**
   - ✓ In. Vit K (Konakion) IM daily for 5 days.
   - ✓ If PT with INR not corrected then repeat the schedule
   - ✓ If still not corrected, administer fresh frogen plasma
   - ✓ Transfusion of fresh frozen plasma
3. **Prevention and control of infection:** 3rd generation cephalosporin+Metronidazole
4. **Correction of dehydration and maintenance of renal function:**
   - ✓ Plenty of fluids by mouth.
   - ✓ On day of operation, IV fluid is to be started from morning.
   - ✓ Continuous catheterization
   - ✓ In case of inadequate urine output frusemide or mannitol may be administered.
   - ✓ Avoid nephrotoxic drugs

B. Surgery:

- ✓ **Choledocholitiasis:** Cholecystectomy with choledocholithotomy with T-tube insertion (Must be said accordingly maintaining the serial)
- ✓ **Periampullary carcinoma and Ca of head of pancreas:** Whipple's procedure

[Lecture of MMC+Rajamahendran-1st-126-132+Bedside clinics in surgery-2nd-136-150]

What structures will you remove in Whipple's operation?

Whipple's pancreaticoduodenectomy involves excision of following structures:

1. Whole of duodenum up to 10 cm of proximal jejunum
2. Head and neck of pancreas including uncinate process
3. Distal 40–50% of stomach
4. Lower end of common bile duct (CbD)
5. Gallbladder
6. Pericholedochal, periduodenal and peripancreatic lymph nodes.

ERCP: Gold Standard for CBD Stone Removal

Other uses:

1. Stenting for inoperable tumors
2. Endoscopic basketting and stone retrieval
3. Biopsy
4. Preoperative bile drainage
5. Sphincter of Oddi dysfunction: sphincterotomy.

Complications of ERCP:

1. Acute pancreatitis (5%)
2. Duodenal perforation
3. Hemorrhage
4. Infection
5. Stent migration

Why PT is important and inj. Vit K is given?

Liver is the main site for synthesis of all coagulation proteins. Abnormalities of these factors can be determined by measuring prothrombin time (PT)—which measures the rate of conversion of prothrombin to thrombin, which requires vitamin K dependent clotting factors (factor 2, 7, 9, 10).

Vitamin K is fat soluble vitamin, absorption of which requires presence of bile salts in intestine which is absent in patients with obstructive jaundice due to obstruction.

So, prothrombin time is prolonged—hence, injection of vitamin K should normalize the prothrombin time in obstructive jaundice.

Mirrizi Syndrome:

It refers to the obstruction or stricture of the common hepatic duct as result of extrinsic compression by a gallstone in the Hartmann's pouch.

Charcot's triad: CBD stone causing cholangitis.

1. Pain
2. Jaundice
3. Fever with chills and rigor

Reynolds pentad:

It includes charcots + septic shock+ mental status changes:

Most common organisms: E. coli, Klebsiella, S. faecalis, bacteroides
First investigation of choice: USG
Definitive investigation: ERCP (gold standard for gallstones in CBD)
Best noninvasive investigation: MRCP.

What is double duct sign?

In ERCP or MRCP or other imaging if both the bile duct and the pancreatic duct show dilatation with constriction of both the ducts in the region of head of pancreas it is called double duct sign.

Found in:

- ✓ Periampullary carcinoma
- ✓ Carcinoma of head of pancreas
- ✓ Chronic pancreatitis

Missed or Retained or residual bile duct stones:

Stones in the bile duct detected within two years following cholecystectomy are defined as retained stones.

Rx:

1. **If T tube present:**
   - ✓ Flushing with heparinized saline
   - ✓ Dissolution with **methyl tertbutyl ether**
   - ✓ Percutaneous stone extraction via T-tube tract after 4 to 6 weeks **(Burhenne technique)**
2. **If T tube absent:** ERCP stone removal.

Recurrent bile duct stones:

Stones which form within the bile duct 2 years after initial operation are grouped as recurrent bile duct stones. Most common due to nonabsorbable suture materials, clips get internalized and get covered with calcium bilirubinate to form brown pigment stones

Rx:

- ✓ ERCP: 1st approach
- ✓ If duct dilated >2 cm: Choledochoduodenostomy or transduodenal sphincteroplasty.

[Bedside clinics in surgery-2nd-149+ Rajamahendran-1st-141]

Post operative management of a patient with T-tube:

1. Measure the amount of bile daily in a sterile container connected with long vertical limb.
2. **Observe for:**
   - ✓ Jaundice: Increasing or not
   - ✓ Temperature: Increasing or not
   - ✓ Dressing is soaked with bile or not
   - ✓ Tenderness in the hypochondrium
3. On 7th day: Clamp the t-tube.
   7th POD: Clamping for 2 hours
   8th POD: Clamping for 4 hours
   9th POD: Clamping for 8 hours
   10th POD: Clamping for 24 hours
4. On 11th day: T-tube cholangiogram should be done
5. If T-tube cholangiogram is normal then remove the t-tube on 12th or 13th day.

What investigation will you do before removal of a T-tube?

T-tube cholangiogram

When will you remove it?

If T-tube cholangiogram on 11th day is normal then remove the t-tube on 12th or 13th day.

How will you remove T-tube?

By slow and sustained traction

Name the clinical conditions where this appliance is used.

1. Choledocholithiasis

2. Palpable stone/ worm in CBD
3. Dilated CBD
4. Raised alkaline phosphatase
5. Cholelithiasis with jaundice or recent H/O jaundice

What is your next step of action?

Removal of tube by slow & sustained traction.

Why not intra-operative?

If it is intra-operative, there would shadows of instruments.

When T-tube is removed?

- ✓ No stone
- ✓ Normal flow of bile into duodenum

Which dye is used?

- ✓ Biligrafin
- ✓ Hypaque

In which route?

Through T-tube

Why clamping is required?

To alter the pathway of bile from T-tube to duodenum.

History of Ca Breast

Particulars of the patient:

Name: Mst. Hazera Banu
Age: 45years
Sex: Female
Religion: Islam
Marital status: Married
Occupation: Housewife
Address: Muktagancha, Mymensingh
Date and time of admission:
Date and time of examination:

Chief Complaints:

1. Lump in the right breast for 1 year
2. Discharging ulcer over the lump for last 5 months
3. Pain for last 1 month

History of present illness:

According to the statement of patient she was reasonably well 1 year back, and then suddenly she noticed a lump in the upper outer quadrant of her breast while bathing. The lump was initially small in size but gradually increased in size involving the nipple and areola and ulceration of the overlying skin for last 5 months. The ulcer was gradually spreading, painless with scanty foul smelling discharge which was sometimes blood stained.

The patient also complained of pain in the lump for last 1 month, which initially was painless. Pain was continuous dull aching in nature and was aggravated by doing household work and relieved by taking rest. There was no history of associated fever (To exclude mastitis) and trauma (To exclude haematoma or traumatic fat necrosis).

The patient also gives a history of significant weight loss (General features of Ca). She did not gave history of any other lump elsewhere in the body. She has no history of chest pain, haemoptysis, malena, jaundice or bone pain (To exclude metastasis). Her bowel and bladder habits are normal.

With the above complaints she got herself admitted in Surgery Unit III of MMCH for better management.

History of Past Illness:

There was no history of trauma or any other surgery of the breast or surrounding area or any other chronic disease. The patient is normotensive, non diabetic and non asthmatic.

Family History:

She has three sons and all were breastfed. She delivered her first child at the age of 23 years. She has no relevant family history of any such disease or any other associated disease.

Personal History:

She is non smoker, non alcoholic but gives a history of chewing betel leaves.

Menstrual History:

- ✓ She has a normal menstrual cycle.
- ✓ She gives no history of associated pain or tenderness in the lump during menstruation.
- ✓ Her menarche started at around 14 years of age.

Drug History:

Patient gave a history of taking oral contraceptive pills for last 10-15years.

Socio-economic History:

She belongs to a low middle class family.

Immunization history:

She is fully immunized as per EPI schedule.

General Examination:

Appearance: Pale, ill looking
Body Built: Average
Co-operation: Co-operative
Decubitus: On choice
Nutrition: Average
Anemia: (+)
Jaundice: Absent
Cyanosis: Absent
Clubbing: Absent
Koilonychia: Absent
Leuconychia: Absent
Dehydration: Absent
Oedema: Absent
Engorged vein: Absent
Pigmentation: Absent
Thyroid Gland: not palpable
Hair distribution: normal
Pulse: 84/min
Blood pressure: 130/70 mm of Hg
Respiratory Rate: 14/min
Temperature: Normal
Bony tenderness: Absent

Lymph Nodes: Right axillary and supra clavicular lymph nodes are palpabel. They are

- ✓ 6 in number
- ✓ Non-tender
- ✓ Hard and
- ✓ Fixed with overlying skin

Systemic Examination:

Local examination of the Breast:

Inspection:

Left breast: Is normal in position and appearance. There's no visible abnormality in left breast. Nipple and areola are normal.

Right Breast: It is hugely enlarged in comparison to the left breast and is pendulous. A large visible lump is present in the upper outer quadrant of the breast which is approximately 3x4 cm in size and irregular in shape. There's ulceration of the overlying skin with foul smelling, blood stained discharge. There's puckering of the surrounding skin with peau-d-orange appearance. There's retraction of the right nipple and lies below the level of left nipple.The areola is cracked n fissured. There are no engorged vessels or any other eczematous changes in breast.

Palpation:

- ✓ **Local temperature:** Raised
- ✓ **Tenderness:** Present
- ✓ **Lump:** On palpation there was an intra-mammary lump in the upper outer quadrant of the right breast, approx. 3x4 cm in size with irregular surface and ill defined margin, hard in consistency and free from underlying structures but fixed to overlying skin.
- ✓ **Ulcer:** There's an ulceration present over the lump. The ulcer is about 2x3 cm in size, irregular in shape with an everted edge, ill-defined margin, indurated base and floor covered with slough and bleeds on touch. There's a scanty discharge present. The overlying skin is red and swollen.
- ✓ **Lymph Nodes:** Right axillary and supraclavicular lymph nodes are palpable. They are-
  - ➢ 6 in number
  - ➢ Non-tender
  - ➢ Smooth surface
  - ➢ Hard in consistency and
  - ➢ Fixed with overlying skin

Alimentary system:

Inspection: Abdomen is normal in size and shape, umbilicus-inverted. There are no visible veins or scar mark. Hernial orifice intact.

Palpation: No organomegaly

Percussion: Tympanic

Auscultation: Bowel sound present

DRE: Reveals no abnormality

Per-vaginal examination: Reveals no abnormality

Other systems: No abnormality

Salient Features:

Mst. Hazera Banu, a 40 years old lady hailing from Muktagancha, Mymensingh, normotensive, non smoker, non alchoholic, non diabetic presented with the complaints of a lump in the right breast for 1 year, ulceration of the lump with discharge for 5 months and pain for last 1 month. According to the statement of patient she was reasonably well 1 year back, and then suddenly she noticed a lump in upper outer quadrant of her right breast which was initially small in size but gradually increased in size involving the nipple and areola and ulceration of the overlying skin for last 5 months. The ulcer was gradually spreading, painless with scanty foul smelling discharge which was sometimes blood stained. The patient also complained of pain in the lump for last 1 month, which initially was painless. Pain was continuous dull aching in nature and was aggravated by doing household work and relieved by taking rest. There was no history of associated fever. The patient also gives a history of significant weight loss. She did not gave history of any other lump elsewhere in the body. She has no history of chest pain, haemoptysis, malena, jaundice or bone pain. Her bowel and bladder habits are normal. She has three sons and all were breastfed. She delivered her first child at the age of 23 years. She gave a history of taking oral contraceptive pills for past 10-15 years. She has no relevant family history of any such disease or any other associated diseases.

O/G/E of the patient, she was mildly anaemic, non icteric and non oedematous. All the vital signs are within normal range. Right axillary and supraclavicular lymph nodes are palpable and are non-tender, hard in consistency and fixed with overlying skin.

On local Examination of the right breast, its hugely enlarged and pendulous. A large visible and tender lump is present in the upper outer quadrant of the breast which is approx. 3x4 cm in size and irregular in shape, hard in consistency and free from underlying structures but fixed to overlying skin. There's ulceration of the overlying skin with foul smelling, blood stained discharge. There's puckering of the surrounding skin with peau-d-orange appearance. Right nipple is retracted and lies below the level of left nipple. The areola is cracked and fissured.The ulcer is about 2x3 cm in size, irregular in shape with an everted edge, ill-defined margin, indurated base and floor covered with slough and bleeds on touch. There's a scanty discharge present. The overlying skin is inflamed.

Examination of other system reveals no abnormality.

Provisional Diagnosis: Carcinoma of the right breast

Differential Diagnosis:

- ✓ Fibroadenoma
- ✓ Fibrocystic disease

Investigation:

For diagnosis: FNAC from the lump

For staging:

- ✓ Chest X-Ray P/A view
- ✓ USG of whole abdomen
- ✓ Bone Scan
- ✓ Liver function tests

For pre-operative assessment:

- ✓ Blood for Hb%, TC, DC, ESR
- ✓ Blood grouping and Rh typing
- ✓ Random blood sugar
- ✓ S.creatinine, urea
- ✓ Urine R/M/E
- ✓ Chest X-Ray
- ✓ ECG

Confirmatory Diagnosis: Carcinoma of the right breast stage III b

Treatment:

Neo-adjuvant chemo therapy 3 cycles, followed by modified radical mastectomy and then 3 cycles of adjuvant chemotherapy after surgery and hormone therapy if receptor status positive.

Follow up:

- ✓ History
- ✓ Examination
- ✓ Investigation if needed (e.g. FNAC for new lump, bone scan if bone pain etc.)

Related question frequently asked:

Points in favour of your diagnosis. Why you calling is STAGE-IIIB?

1. Age of the patient
2. Short history
3. Increasing size of lump
4. Lump is irregular in shape, hard in consistency and free from underlying structures but fixed to overlying skin
5. There's ulceration of the overlying skin with foul smelling, blood stained discharge
6. Palpable axillary lymph nodes

STAGE-IIIB: Cutaneous ulceration present

Why not fibroadenoma ?

Points in favour: Lump present

Ponits against:

1. Age of the patient
2. Short history
3. Increasing size of lump
4. Lump is irregular in shape, hard in consistency and free from underlying structures but fixed to overlying skin
5. There's ulceration of the overlying skin with foul smelling, blood stained discharge
6. Palpable axillary lymph nodes

Why not fibrocystic disease?

Points in favour:

- ✓ **Age**: Perimenopausal
- ✓ Lump

Ponits against: No cyclical mastalgia

What are the risk factors present in this patient?

Answer from below discussion

CARCINOMA OF THE BREAST

Aetiological factors: [GAGGDER]

1. **Geographical:**
   - ✓ Carcinoma of the breast occurs commonly in the Western world, accounting for 3–5 per cent of all deaths in women.
   - ✓ In developing countries it accounts for 1–3 per cent of deaths.
2. **Age:**
   - ✓ Carcinoma of the breast is extremely rare below the age of 20 years.
   - ✓ Thereafter, the incidence steadily rises so that by the age of 90 years nearly 20 per cent of women are affected.
3. **Gender:** Less than 0.5 per cent of patients with breast cancer are male.
4. **Genetic:** It occurs more commonly in women with a family history of breast cancer than in the general population.
5. **Diet:**
   - ✓ There is some evidence that there is a link with diets low in phyto-oestrogens.
   - ✓ A high intake of alcohol is associated with an increased risk of developing breast cancer.
6. **Endocrine:**
   - ✓ **Nulliparous women:** More common
   - ✓ **First child at an early age:** Also protective, especially if associated with late menarche and early menopause.
   - ✓ **Breastfeeding:** Protective.
   - ✓ **Postmenopausal obese women:** More common. This is thought to be because of an increased conversion of steroid hormones to oestradiol in the body fat.
   - ✓ **Long-term exposure to the combined preparation of HRT**: Significantly increases the risk.
7. **Previous radiation:**
   - ✓ The risk appears about a decade after treatment of Hodgkin's disease.
   - ✓ Higher risk if radiotherapy occurred during breast development.

[Baily and Love-26th-808]

Pathology:

- ✓ Breast cancer may arise from the epithelium of the duct system anywhere from the nipple end of the major lactiferous ducts to the terminal duct unit, which is in the breast lobule.
- ✓ The disease may be entirely in situ, an increasingly common finding with the advent of breast cancer screening, or may be invasive cancer.
- ✓ The degree of differentiation of the tumour is usually describedusing three grades:

1. Well differentiated
2. Moderately differentiated
3. Poorly differentiated

- ✓ Commonly, a numerical grading system based on the scoring of three individual factors
  1. Nuclear pleomorphism
  2. Tubule formation
  3. Mitotic rate

[Baily and Love-26th-809]

Types of Carcinoma Breast:

A. **Carcinoma in situ:**

1. **Ductal carcinoma (DCIS):**
   - a. Comedo
   - b. Intermediate
   - c. Noncomedo
     - – Solid
     - – Cribriform
     - – Papillary
2. Lobular carcinoma (LCIS)

B. **Invasive Carcinoma:**

1. Paget's disease of nipple
2. Invasive ductal carcinoma
   - a. Adenocarcinoma with productive fibrosis (80%), (Scirrhous, Simplex, NST)
   - b. Medullary carcinoma (4%)
   - c. Mucinous (colloid) carcinoma (2%)
   - d. Papillary carcinoma (2%)
3. Invasive lobular carcinoma (10%)
4. Rare cancers
   - ✓ Adenoid cystic
   - ✓ Squamous cells

[Rajamahendran-2nd-72]

Current nomenclature:

1. **Ductal carcinoma:** Most common
2. **Lobular carcinoma** occurring in up to 15 per cent of cases. There are subtypes
   - ✓ **Classical type:** Carries a better prognosis than the pleomorphic type
   - ✓ **Pleomorphic type**
3. **Mixed:** with both ductal and lobular features.

[Baily and Love-26th-809]

Inflammatory carcinoma:

- ✓ Is a fortunately rare, highly aggressive cancer that presents as a painful, swollen breast, which is warm with cutaneous oedema.
- ✓ This is the result of blockage of the subdermal lymphatics with carcinoma cells.
- ✓ Inflammatory cancer usually involves at least one-third of the breast and may mimic a breast abscess.
- ✓ A biopsy will confirm the diagnosis and show undifferentiated carcinoma cells. It used to be rapidly fatal but with aggressive chemotherapy and radiotherapy and with salvage surgery the prognosis has improved considerably.

[Baily and Love's-26th-809]

In situ carcinoma:

Is preinvasive cancer that has not breached the epithelial basement membrane.

This was previously a rare, usually asymptomatic, finding in breast biopsy specimens but is becoming increasingly common because of the advent of mammographic screening.

Types:

1. Ductal (DCIS)
2. Lobular (LCIS): Often being multifocal and bilateral.

Both are markers for the later development of invasive cancer, which will develop in at least 20 per cent of patients.

Treatment:

[Baily and Love's-26th-810]

Paget's disease of the nipple:

Paget's disease of the nipple is a superficial manifestation of an underlying breast carcinoma.

Presentation:

- ✓ As an eczema-like condition of the nipple and areola, which persists despite local treatment.
- ✓ The nipple is eroded slowly and eventually disappears.
- ✓ If left, the underlying carcinoma will sooner or later become clinically evident.

Investigation: Nipple eczema should be biopsied if there is any doubt about its cause.

Microscopically:

Paget's disease is characterised by the presence of large, ovoid cells with abundant, clear, pale-staining cytoplasm in the Malpighian layer of the epidermis.

[Baily and Love-26th-810]

The spread of breast cancer:

A. Local spread:

- ✓ Tumour increases in size and invades other portions of the breast.
- ✓ Involves the skin and to penetrate the pectoral muscles and even the chest wall if diagnosed late.

B. Lymphatic metastasis: By permeation and embolization.

Primarily:

- ✓ Axillary
- ✓ Internal mammary

Late:

- ✓ Supraclavicular nodes
- ✓ Contralateral lymph nodes

Significance (Both biological and chronological significance):

It represents not only an evolutional event in the spread of the carcinoma but is also a marker for the metastatic potential of that tumour.

C. Spread by the bloodstream:

Skeletal metastases: Deposits are generally osteolytic. According to incidence

1. Lumbar vertebrae
2. Femur
3. Thoracic vertebrae
4. Rib

5. Skull

Visceral:

1. Liver
2. Lungs
3. Brain
4. Occasionally, the adrenal glands and ovaries;
5. In fact, most body sites

[Baily and Love-26th-810-11]

Common sites:

Although any portion of the breast, including the axillary tail, may be involved, breast cancer is found most frequently in the upper outer quadrant.

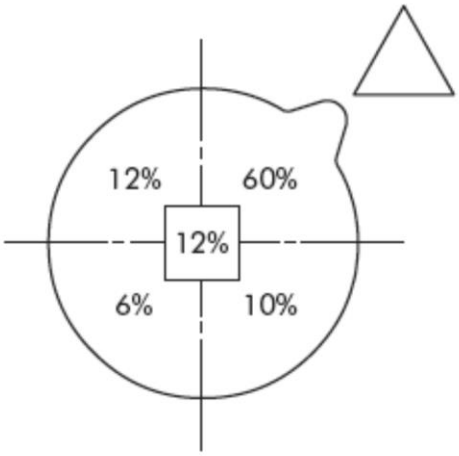


Figure 53.23 The relationship of carcinoma of the breast to the quadrants of the breast.

[Baily and Love-26th-811]

Staging of breast cancer:

Breast Cancer Stages:

Once breast cancer has been diagnosed, the next step is to determine how big the tumor is and how far the cancer has spread. This process is called staging.

Grading: Degree of differentiation.

Common staging systems:

- ✓ TNM staging
- ✓ Manchester staging

TNM (tumour– node–metastasis) or UICC (Union Internationale Contre le Cancer):

TNM staging:

T-Tumor size: Doctors measure tumors in centimeters (cm).

T 0 = Non-palpable tumor
T 1 =≤ 2 cm
T 2 = 2-5cm
T 3 => 5 cm
T 4 = skin/chest wall involvement

N-Nodes:

N 0= No nodal involvement

N 1 = Ipsilateral, mobile axillary lymph node
N 2 = Fixed
N 3 = Supraclavicular/ Internal Mammary.

M = Metastasis

M0= No metastasis
M1= Distant metastatis

[Browse's-4th-321]

Stage I breast cancer:

1. **T:**Tumor is no more than 2 cm (3/4 inch) in diameter.
2. **N:**The cancer hasn't spread to lymph nodes.
3. **M:**The cancer hasn't spread outside breast.

Stage II breast cancer:

1. **T:** 2-5 cm in diameter
2. **N:** Mobile axillary L.N
3. **M:** No metastasis

Stage IIIa breast cancer:

1. **T:** >5cm in diameter
2. **N:**.Fixed axillary LN
3. **M:** No metastasis

Stage IIIb breast cancer:

1. **T_4:** Irrespective of size if there is any cutaneous ulccration or fixity to underiying structure
2. **N:** Other than axillary LN involvement i e ipsilateral supraclavicular LN involvement
3. **M :** No metastasis

Stage IV breast cancer: Stage IV breast cancer is also called metastatic breast cancer.

1. **M:** Metastasis present
2. No consideration about T & N

To Remember:

•Stage 4 = distant metastasis
•Stage 3b = T4 / N3
•Stage 3a = N2 ; T3N1M0
•Stage 2
•Stage 1 = T1N0M0

[Lecture of MMC]

Management:

History:

1. Age of onset
2. Duration of symptoms
3. **Menstrual history:** Age of menarche, Age of menopause
4. **Family history:** Whether positive or negative
5. History of breast feeding

- ✓ As breast feeding is protective Marrital status
- ✓ Nulliparous suffers more

6. **Treatment history:**
   - ✓ OCP / Hormone replacement therapy (HRT)
   - ✓ H/O previous excision of breast lump

Symptoms:

1. Hard lump (Most breast cancers will present),
2. Indrawing of the nipple
3. **Skin involvement:** As the disease advances locally.
   - ✓ Peau d'orange/Orange skin appearance
   - ✓ Frank ulceration
   - ✓ Fixation to the chest wall
4. Nipple discharge: Blood stained
5. Change in size and shape of the breast
6. **Constitutional symptoms:** Anorexia, weakness, weight loss etc.
7. **Features of metastases:**

   Bones: Bone pain, fracture, spinal cord compression
   Respiratory: Chest pain, cough, respiratory distress
   Liver: Abdominal lump, jaundice
   Brain: Headache, seizure, vertigo

Signs:

General Examination (JACOL)

1. Jaundice
2. Anaemia
3. Lymphadenopathy
4. Oedema of arm
5. Cyanosis

Local Examination:

Inspection:

1. Lump in the breast usually in the upper &. outer quadrant.
2. Skin tethering and peau'd orange
3. Discharge from nipple
4. Nipple levels - May be unequal
5. Nipple retraction - May be present
6. Nipple eczema and ulceration may be present
7. There may be dimpling of the skin

Palpation

Lump:

1. Tender, temperature may be raised
2. Irregular lump, hard in consistancy
3. May be fixed to underlying and overlying structure
4. **Lymp nodes:**
   - ✓ Axillary lymp nodes may be enlarged
   - ✓ Supra-clavicular lymp nodes enlarged

5. If ulceration is present it should be examined accordingly
6. Other examination of lump should be examined accordingly

Systemic examination:

- ✓ Respiratory system
- ✓ Plural effusion
- ✓ Consolidation
- ✓ Collapse

Abdomen:

- ✓ Hepatomegaly
- ✓ Ascites
- ✓ Any mass

Skeletal: Local tenderness

Neurological exam of lower limb: Motor Power, Gait

Differential Diagnosis:

- ✓ Fibroadenoma
- ✓ Breast abscess
- ✓ Fibrocystic disease

Investigation:

For diagnosis: FNAC from the lump

For staging:

- ✓ Chest X-Ray P/A view: Cannon ball shadow
- ✓ USG of whole abdomen
- ✓ Bone Scan
- ✓ Local X-ray of bone: Osteolytic lesion, pathological deformity
- ✓ Liver function tests

For pre-operative assessment:

- ✓ Blood for Hb%, TC, DC, ESR
- ✓ Blood grouping and Rh typing
- ✓ Random blood sugar
- ✓ S.creatinine, urea
- ✓ Urine R/M/E
- ✓ Chest X-Ray
- ✓ ECG

Treatment: [Very very variable with book to book and sir to sir, always obey examiner's choice :-D]

Basic principles of treatment: To reduce the chance of local recurrence and the risk of metastatic spread.

Modalities of treatment:

1. Surgery
2. Radiotherapy

3. Chemotherapy
4. Hormone therapy

Stage I: Simple Mastectomy with axillary sampling + Adjuvant chemotherapy + Hormone therapy (If positive receptor status)

Stage II: Modified Radical Mastectomy + Adjuvant chemotherapy + Hormone Therapy (recp. +ve).

Stage III: Neo-adjuvant chemo (3 cycle) + Modified Radical Mastectomy + Adjuvant chemo (3 cycle) + Hormone Therapy (if receptor +ve).

Stage IV:

1. Radiotherapy
2. Systemic chemotherapy
3. **Surgery:** Toilet mastectomy

[Baily and Love-26th-811-16+Lecture of MMC]

Toilet mastectomy:

In case of locally advanced breast cancer with fungation, palliative mastectomy is done to get rid of the foul smelling fungating mass. This is called toilet mastectomy.

Cardinal sign of breast carcinoma

- ✓ Hard, irregular, non tender mass
- ✓ Local fixity
- ✓ Palpable axillary L.N.

Triple assessment of a breast lump:

1. History and examination
2. Imaging by mammography and/or ultrasound scanning
3. Cytology by aspiration or histology by core biopsy

[Browse's-443]

Prognosis of breast cancer:

The best indicators of likely prognosis in breast cancer remain tumour size, grade and lymph node status. Some large tumours will remain confined to the breast for decades whereas some very small tumours are incurable at diagnosis.

Nottingham prognostic index:

NPI= (0.2 X Tumor in cm) + LN score + Tumor Grade Score

Stage of nodes::

1 = no nodes
2 = 1–3 nodes positive
3 = 4 or more nodes positive

Grades=1, 2, 3

For more curiosity:

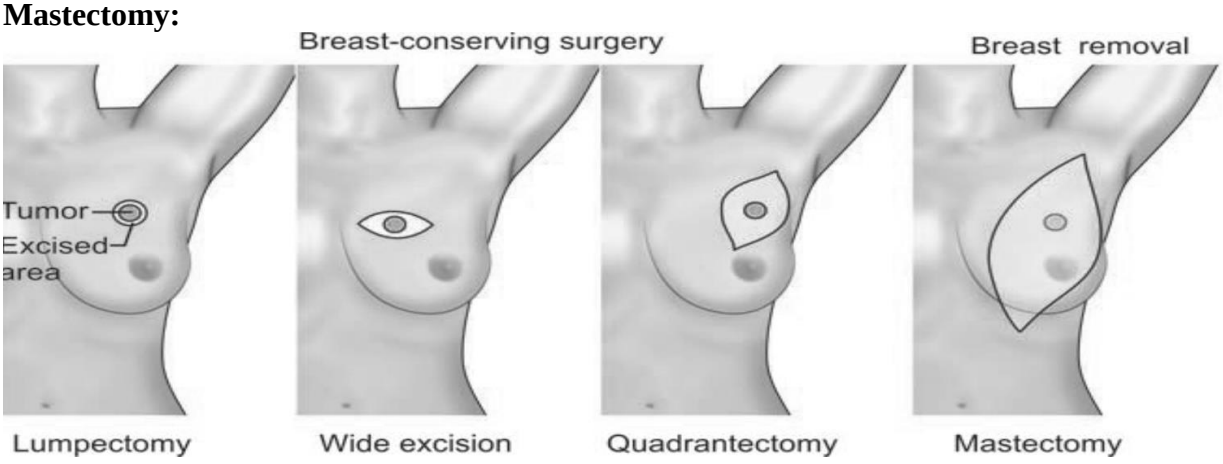
Prognostic groups:

Excellent: NPI ≤ 2.4
Good: NPI ≤ 3.4
Moderate I: NPI ≤ 4.4

Moderate II: NPI ≤ 5.4
Poor: NPI > 5.4

[Baily and Love-26th-811+Lecture of MMC]

Mastectomy:



Indication:

1. Large tumours (in relation to the size of the breast)
2. Central tumours beneath or involving the nipple, multifocal disease
3. Local recurrence
4. Patient preference

[Baily and Love-26th-812]

Radical Halsted mastectomy:

Excision of –

1. Breast
2. Axillary lymph nodes
3. Pectoralis major and minor muscles

No longer indicated as it causes excessive morbidity with no survival benefit.

[Baily and Love-26th-812]

Simple mastectomy:

Removal of only the breast with no dissection of the axilla, except for the region of the axillary tail of the breast, which usually has attached to it a few nodes low in the anterior group.

[Baily and Love-26th-812]

Modified radical (Patey) mastectomy: More commonly performed.

The breast and associated structures are dissected en bloc. Excised mass is composed of:

1. Whole breast
2. A large portion of skin the centre of which overlies the tumour but which always includes the nipple
3. All of the fat, fascia and lymph nodes of the axilla

The pectoralis minor muscle is either divided or retracted to gain access to the upper two-thirds of the axilla.

Structures preserved:

1. Axillary vein
2. Thoracodorsal trunk: Nerves to the serratus anterior and latissimus dorsi

Warning: The intercostal brachial nerves are usually divided in this operation and the patient should be warned about sensation changes postoperatively.

[Baily and Love-26th-812]

Conservative breast cancer surgery: Its the standard treatment now for DCIS, stage 1 or 2 Ca breast.

Involves the following three steps apart from removal of cancer alone:

1. Removal of tumor with wide margin
2. Adjuvant radiotherapy
3. With or without assessment of axillary lymph node status.

Procedures:

1. **Wide local excision:** Removing the tumour plus a rim of at least 1 cm of normal breast tissue.
2. **Lumpectomy:** An operation in which a benign tumour is excised and in which a large amount of normal breast tissue is not resected.
3. **Quadrantectomy:** Removing the entire segment of the breast that contains the tumour.

Why breast conservation surgery: Oncologically equivalent.

- ✓ Better aesthetic outcome
- ✓ Psychological advantage with breast preservation

Indications:

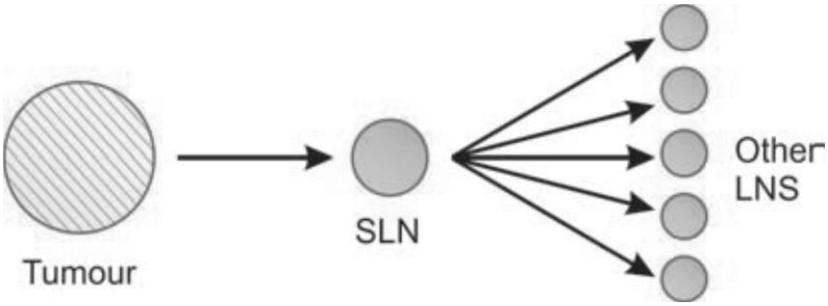
1. Solitary cancer
2. Possible to excise the tumor with tumor free margins without disrupting the breast cosmetically
3. No contraindications to RT (e.g. pregnancy, collagen vascular disorders which
4. may exaggerate the reaction and prior RT to same breast)
5. Well motivated patient.

Contraindications:

1. Presence of two or more primary tumors in separate areas of breast
2. Diffuse malignant appearing calcification
3. History of prior radiation to breast (will be a contraindication for full breast radiation)
4. Persistent positive margins after two attempts.
5. **Pregnancy (1st and 2nd trimester)** can be done in third trimester.
6. Collagen vascular disorders where RT cannot be given (RT exaggerates the disorder)
7. Large tumor in a small breast that does not respond to induction chemotherapy or where chemotherapy is contraindicated.

[Baily and Love-26th-812+Rajamahendran-2nd-80]

Sentinel node: 1st node to drain the tumor.



Sentinel node biopsy: Usually in patients with clinically node-negative disease.

Localization:

- ✓ Is localised peroperatively by the injection of patent blue dye and radioisotope labeled albumin in the breast.

- ✓ **Site of injection:** Subdermal plexus around the nipple although some still inject on the axillary side of the cancer.

Detection: The marker passes to the primary node draining the area and is detected visually and with a hand-held gamma camera.

Advantage: Unnecessary axillary dissection can be avoided if the node is negative for metastasis.

[Baily and Love-26th-814]

What are the malignant lesions where sentinel node biopsy is practiced?

- ✓ Cancer penis (sentinel node of Cabana)
- ✓ Malignant melanoma
- ✓ Cancer breast

What is the average number of sentinel lymph node?

There are 2–3 sentinel lymph nodes in each patient.

Why sentinel node biopsy is not suitable in clinically involved axilla?

- ✓ If axillary lymph node is clinically palpable then sentinel lymph node biopsy may be fallacious.
- ✓ This may be due to a change in the lymphatic flow as a result of replacement of the sentinel node with metastatic deposit.
- ✓ The radioactive colloid or blue dye bypasses the sentinel node and move on to a non sentinel lymph node.

Radiotherapy:

Indication: In selected patients in whom the risks of local recurrence are high.

1. Large tumours
2. Large numbers of positive nodes
3. Extensive lymphovascular invasion.

Adverse effects:

1. Lymphedema of arms
2. Cancer-en-cuirasse
3. Lymphangiosarcoma (Stewart—Treves syndrome)

Hormone therapy: Women with hormone receptorpositive tumours will obtain a worthwhile benefit from about five years of endocrine therapy.

Premenopausal: Tamoxifen (most widely used)

Postmenopausal: Aromatase inhibitors

- ✓ Anastrozole
- ✓ Letrozole
- ✓ Exemestane

LHRH agonists:

- ✓ Induce a reversible ovarian suppression.
- ✓ Have the same beneficial effects as surgical or radiation-induced ovarian ablation in premenopausal receptor-positive women, and the oral aromatase inhibitors (AIs) for postmenopausal women.

[Baily and Love-26th-815-16]

Tamoxifen:

- ✓ Partial agonist/antagonist

- ✓ Antagonist to estrogen only in breast

Advantage: As it is estrogen agonist in other regions, it decreases osteoporosis and blood cholesterol.

Adverse effects:

1. Bone pain, hot flushes, nausea, vomiting
2. Thromboembolic manifests
3. Hypercalcemia
4. Endometrial carcinoma
5. Increased cataract surgeries

Follow-up: For endometrial carcinoma by uterine aspiration and ultrasound.

[Rajamahendran-2nd-84]

Ovarian ablation for premenopausal patients:

1. **Medical:** LHRH agonists (Buserelin, Goserelin)
2. **Surgical:** Oophorectomy
3. **Radiation induced**

Because adrenal glands are the main site of production of estrogen after menopause we do adrenal suppression by;

1. Medical adrenalectomy—aromatose inhibitors
2. Surgical adrenalectomy

[Rajamahendran-2nd-85]

Chemotherapy:

Adjuvant chemotherapy: Chemotherapy that is given after surgery.

Neoadjuvant chemotherapy: Involves giving chemotherapy before surgery.

First-generation regimen: Six monthly cycle of CMF;

1. Cyclophosphamide
2. Methotrexate
3. 5-fluorouracil

Modern regimens:

1. **Anthracycline:** Doxorubicin or epirubicin
2. **Newer agents:** Such as the taxanes.
3. **Newer 'biological' agents:**
   - ✓ **Trastuzamab (Herceptin):** Is active against tumours containing the growth factor receptor c-erbB2.
   - ✓ **Bevacizumab:** A vascular growth factor receptor inhibitor
   - ✓ **Lapitinab:** An oral combined growth factor receptor inhibitor.

[Baily and Love-26th-815-16]

Adverse Effects:

Cyclophosphamide:

1. Hemorrhagic cystitits
2. Neutropenia
3. Bone marrow suppression

Adriamycin:

1. Cardiotoxicity
2. Alopecia

Follow up of breast cancer:

- ✓ Followed up for life to detect recurrence and dissemination.

- ✓ Yearly or two-yearly mammography of the treated and contralateral breast.

[Baily and Love-26th-816]

Phenomena resulting from lymphatic obstruction in advanced breast cancer:

1. **Peau d'orange:**
   - ✓ Peau d'orange is caused by cutaneous lymphatic oedema.
   - ✓ Where the infiltrated skin is tethered by the sweat ducts it cannot swell, leading to an appearance like orange skin.
   - ✓ Occasionally, the same phenomenon is seen over a chronic abscess.
2. **Late oedema of the arm**:
   Complications: Susceptible to bacterial infections following quite minor trauma**.**
   Treatment:
   - ✓ Antibiotic
   - ✓ Limb elevation, elastic arm stockings and pneumatic compression devices
3. **Cancer-en-cuirasse:**
   - ✓ The skin of the chest is infiltrated with carcinoma and has been likened to a coat.
   - ✓ It may be associated with a grossly swollen arm.
4. **Lymphangiosarcoma:**
   - ✓ A rare complication
   - ✓ It takes the form of multiple subcutaneous nodules in the upper limb and must be distinguished from recurrent carcinoma of the breast. The prognosis is poor but some cases respond to cytotoxic therapy or irradiation.

[Baily and Love-26th-816]

Familial breast cancer: Account for less than 5 per cent of all cases of breast cancer.

Breast cancer predisposition genes:

1. **BRCA:**
   - ✓ Located on the long arm of chromosome 17 (17q)
   - ✓ Associated with an increased incidence of breast and ovarian cancer
2. **BRCA2:**
   - ✓ Located on chromosome 13q
   - ✓ Associated with familial male breast cancer
3. **p53**

[Baily and Love-26th-817]

Hormone replacement therapy

- ✓ HRT does increase the risk of developing breast cancer if taken for prolonged periods and in certain high-risk groups.
- ✓ HRT may also prolong symptoms of benign breast disorders such as cysts and mastalgia and make mammographic appearances more difficult to interpret.
- ✓ Patients who develop breast cancer while on HRT appear to have a more favourable prognosis. The consequences in terms of recurrence in women using HRT following breast cancer are unknown.

[Baily and Love-26th-817]

What causes breast pain?

1. Puberty
2. Menstruation and premenstrual syndrome (PMS)

3. Pregnancy -more often during the first trimester
4. **Days following childbirth:** As milk comes in Breastfeeding Mastitis, which is caused by a milk duct that is not properly draining and becomes infected, should be treated. It has no correlation with cancer, but it can become a serious infection if left untreated.
5. Menopause
6. Fibrocystic Breast Tissue
7. **Medications:**
    - ✓ Digitalis preparations
    - ✓ Methyldopa (Aldomet)
    - ✓ Spironolactone (Aldactone)
    - ✓ Certain diuretics
    - ✓ Anadrol
    - ✓ Chlorpromazine

[Lecture of MMC]

Investigation of breasts:

Mammogram:

Mammogram is an x-ray that allows a qualified specialist to examine the breast tissue for any suspicious areas.

Sensitivity increases with age as breast becomes less dense. (used in age >40 years)

Two views:

1. Craniocaudal
2. Mediolateral oblique

Indications:

1. Age greater than 50 years
2. Age greater than 40 with risk factors
3. Already operated for one side
4. In the same breast: If we plan for conservative surgery rule out multifocal involvement.
5. For the opposite breast we can screen routinely.
6. Mammography guided biopsy.

How does mammography helps in diagnosis of carcinoma of breast?

1. **In evaluation of patient with breast lump**: As part of triple assessment an imaging with mammography in patient older than 40 years is essential.
2. May show a characteristic lesion suggestive of malignancy.
3. Can detect multicentric breast carcinoma which will preclude breast conserving therapy.
4. May detect an impalpable lesion in the opposite breast.
5. **Digital mammography:** Is superior to traditional film mammography in younger patient with dense breast.

Features Suggestive of Cancer:

1. Mass effect
2. Architectural distortion
3. Symmetry lost
4. Spiculation
5. Branching calcification
6. Clustering
7. Microcalcification

[Lecture of MMC+Rajamahendran-2nd-70+Bedside Clinics in Surgery-2nd-211]

Ultrasonography:

- ✓ No radiation exposure
- ✓ Can differentiate cystic lesions from solid mass
- ✓ Can not detect less than 5mm

Other Radiological Examination:

1. Computed Tomography or Magnetic Resonant Imaging:

- ✓ To expensive
- ✓ For detection of vertebral metastasis

2. Interventional Technique:

Ductography: Inject radio-opaque contrast media into the mammary duct

Breast Biopsy:

The only sure way to determine whether a lump is cancer is to do a biopsy. The results will show whether the lump is cancer, and if so, what type. There are several forms of breast cancer, and treatments are carefully matched to the type of cancer.

Types of biopsy:

1. **FNAC:** FNAC could not differentiate between noninvasive and invasive breast carcinoma AND Hormone receptor study. So FNAC is now superseded by core needle biopsy.

   Procedure:

   Done by aspiration of the material from the tumor tissue by a fine needle of 22 G or 23 G attached to a syringe and aspiration of tissue from the tumor done.

2. **Core biopsy:** A number of wedge of tissue is taken and has become the standard of care for biopsy of breast lesion.

   Role:

   - ✓ A histological diagnosis of invasive or noninvasive carcinoma may be made
   - ✓ The tumor grade and any lymphovascular invasion may be assessed
   - ✓ The ER/PR and Her2-neu status may also be assessed in the core biospy specimen.

   Procedure:

   - ✓ For a well palpable lesion core biopsy can be done without image guidance. For small or nonpalpable lesion USG/mammographic or MRI guided core biopsy may be done.
   - ✓ After antiseptic cleaning and draping, local anesthesia with injection of 2% lignocaine hydrochloride
   - ✓ A small stab incision is made in the skin and a 11gauge core needle biopsy needle is inserted into the lesion with vacuum assistance and tissue sample is obtained
   - ✓ 6–8 biopsy sample is to be taken for histological examination.

3. **Surgical biopsy:**

Indication: When core biopsy is inconclusive

Precaution:

- ✓ It is important to keep the incision for biopsy within the boundary of subsequent incision for mastectomy or wide local excision.
- ✓ Incision should be curvilinear (circumareolar) rather than radial.

- ✓ Diathermy should not be used while taking biopsy specimen. Use of electrocautery may distort the histologic picture of the tumor and may invalidate tissue level of hormonal receptors.

When will you consider excisional biopsy?

When lump is small (<4 cm) in size then whole lump with a 1 cm clear margin may be excised in a suspicious lesion.

Targeted therapy:

- ✓ Targeted therapy block the action of an abnormal protein (such as HER2) that stimulates the growth of breast cancer cells.
- ✓ Trastuzumab(Herceptin®) or lapatinib(TYKERB®) may be given to a woman whose lab tests show that her breast tumor has too much HER2.

[Lecture of MMC]

BREAST RECONSTRUCTION:

Breast Forms:

- ✓ An alternative to breast reconstruction is to be fitted for a breast form.
- ✓ This is a breast-shaped prosthesis that fits inside your bra.

[Lecture of MMC]

Breast Self-Exams: Forty percent of diagnosed breast cancers are detected by women who feel a lump, so establishing a regular breast self-exam is very important.

- ✓ It was once widely recommended that women check their own breasts once a month.
- ✓ Begin at age 20, continue monthly

Recommendation:

1. All women ages 29 to 39 should have clinical examinations every 3 years preferably be part of a periodic health examination.
2. All women ages 40 years and older have regular (every 1 to 2 years) mammograms.
3. Asymptomatic women ages 40 and older should continue to receive clinical breast examination preferably be part of a periodic health examination annually.

When to do BSE:

Menstruating women: 5 to 7 days after the beginning of their period.

- ✓ Increase estrogen levels before menstruation in effect breasts become more nodular.
- ✓ Nodules appearing during the premenstrual phase should be re-evaluated at this later time.

Menopausal women: same date each month

Pregnant women: same date each month

Why don't more women practice BSE:

- ✓ Fear
- ✓ Embarrassment
- ✓ Youth
- ✓ Lack of knowledge
- ✓ Too busy, forgetfulness

[Lecture of MMC]

Steps in breast self examination:

1. **Inspection before a mirror:**
   - ✓ Stand and face a mirror with your arms relaxed at your sides or arms resting on your hips; then turn to the right and left for a side view look.
   - ✓ Look for any flattening in the side view
2. **Palpation:**

   Lying Position:
   - ✓ Place a pillow under your right shoulder and place the right hand behind your head.
   - ✓ Use the finger pads (tips) of the three middle fingers (held together)on your left hands to feel the lumps.
   - ✓ Press the breast tissue against the chest wall firmly enough to know how your breast fells.

   Standing or Sitting:
   - ✓ Repeat the examination of both breasts while upright with one arm behind your head. This position makes it easier to check the upper part of the breast and toward the armpit.
   - ✓ Optional: Do the upright BSE in the shower. Soapy hands glide more easily over when wet

Report any changes to your health care provider.

[Lecture of MMC]

Level of Axillary Nodes:

Level 1: Lateral to lateral border of pectoralis minor

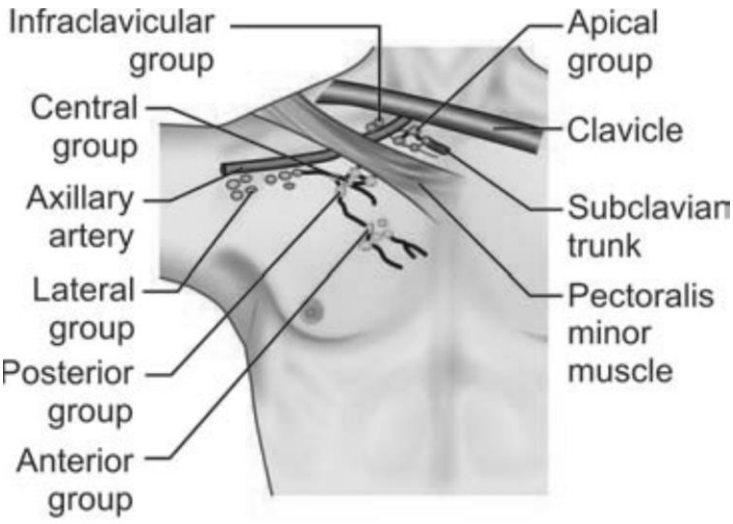
1. Anterior (Pectoral)
2. Posterior (Subscapular)
3. Lateral (Brachial)

Level 2: Behind pectoralis minor

1. Central

Level 3: Medial to medial border of pectoralis minor

Apical (Infraclavicular)



What is the cause of death in patients treated for breast cancer?

Metastatic disease

What are the examinations required in the excised breast specimen after MRM?

1. Histopathological type of tumor
2. Resected margins to be commented (tumor infiltration +/- at the margins)
3. Grade of tumor
4. ER/PR status
5. Her 2 neu status
6. Axillary nodes (number of nodes removed and number involved, extracapsular invasion)

BENIGN BREAST DISORDER

Classification:

A. Congenital disorders:
1. Inverted nipple
2. Supernumerary breasts/nipples
3. Non-breast disorders
4. Tietze's disease (costochondritis)
5. Sebaceous cysts and other skin conditions

B. Injury:
- ✓ Haematoma
- ✓ Traumatic fat necrosis

C. Inflammation/infection:
1. ANDI (aberations of normal differentiation and involution)
   - ✓ Cyclical nodularity and mastalgia
   - ✓ Cysts
   - ✓ Fibroadenoma
2. Duct ectasia/periductal mastitis
3. Pregnancy-related
   - ✓ Galactocoele
   - ✓ Puerperal abscess

[Baily and Love-26th-808]

FIBROADENOMA

- ✓ Second most common tumor of breast

Pathophysiology:

1. Benign tumors
2. Arise from hyperplasia of a single lobule and usually grow up to 2–3 cm in size. Surrounded by a well-marked capsule (So, can thus be enucleated through a cosmetically appropriate incision.)
3. Their development is considered to be an aberration of normal development. The cause is unknown.
4. Usually arise in the fully developed breast between the ages of 15 and 25 years.
5. Fibroadenomas may involute in postmenopausal women, and coarse calcifications may develop.
6. Conversely, the tumors may grow rapidly during pregnancy, during hormone replacement therapy, or during immunosuppression, in which case they can simulate malignancy.

[Baily and Love-26th-808+Lecture of MMC]

Types:

1. **Simple/Solitary**
2. **Few (< 5 / breast)**
3. **Multiple (> 5 / breast)**
4. **Giant (> 5 cms):**
   - ✓ Occasionally occur during puberty.
   - ✓ Often rapidly growing
5. **Juvenile:** Between the ages of 10 -18
6. **Complex:**
   - ✓ Contain other histological changes such as sclerosing adenosis, duct epithelial Hyperplasia, epithelial calcification.
   - ✓ Associated with slightly increased risk of cancer.

Management:

Clinical features:

1. Between the ages of 15-25 years & size of 2-3cm
2. Painless lump-capsulated, smooth, firm, well defined, nontender**,** highly mobile (**BREAST MOUSE) (**Confused with phyllodes)

Investigations:

1. USG
2. Mammogram
3. **Core biopsy**

Treatment:

1. In those <35 years and with a triple assessment supporting the diagnosis then observation with regular review is acceptable.
2. In those > 35 years and in younger patients requesting it, excision biopsy should be considered.
3. A fibroadenoma does not require excision unless-
   - ✓ Associated with suspicious cytology,
   - ✓ It becomes very large
   - ✓ The patient expressly desires the lump to be removed
4. **Newer techniques** -laser ablation & cryoablation

[Lecture of MMC+ Baily and Love-26th-808+]

FIBROCYSTIC BREAST DISEASE

This is the most common lesion of the female breast.

Other Names:

1. Fibroadenosis
2. Fibrosclerosis
3. Chronic Mastitis
4. Mastopathy

Management:

Clinical features:

1. **Age**: Perimenopausal
2. Lump
3. Cyclical mastalgia

4. Nipple discharge

Diagnosis:

1. Mammography
2. USG of breast
3. Cytology: By FNAC or core biopsy

Treatment:

1. **Reassurance**
2. **Adequate support:** Firm bra during the day and a softer bra at night
3. **Exclude caffeine:** Works for some
4. **Consider medication:**
   - ✓ Evening primrose oil (GLA). Better effect in women over 40 years old than in younger women
   - ✓ Danazol, 100 mg t.d.s.
   - ✓ Tamoxifen
5. **Surgical Treatment:**

   Indications:
   - ✓ Intractable pain
   - ✓ Florid epitheliosison fnac
   - ✓ Blood good cyst

   Surgery:
   - ✓ Excision of the cyst or localized excision of the diseased tissue
   - ✓ Subcutaneous mastectomy with prosthesis placement

[Lecture of MMC+ Baily and Love-26th-808+]

GOO DUE TO CARCINOMA STOMACH

Particulars of the patient:

Name: Habibul Bashar
Age: 60 years
Sex: Male
Religion: Islam
Marital status: Married
Occupation: Athlet
Address: Shamoly, Dhaka
Date and time of admission: 08.03.17; 09.00am
Date and time of examination: 09.03.17;08.30am

Chief complaints:

3. Pain in upper abdomen for 5 months.
4. Vomiting for 5 months.
5. Lump in upper abdomen for 3 months.

History of present illness:

According to the statement of the patient, he was reasonably well 5 months back. Then he developed pain in upper abdomen which is continuous dull aching in nature, aggravated by eating , not relieved by antacids but relieved after vomiting, non-radiating, not associated with fever, chills and rigor (Exclusion of cholecystititis, chronic pancreatitis). He also complains of vomiting for last 6 months occurring almost daily for last 4 months, but for last 2 months vomiting has become less as he is taking less food. Vomiting occurring about 1 hour after meal is projectile in nature, foul smelling, sour in taste (Due to gastric acid), whitish in colour containing food material both digested and undigested which relieves abdominal discomfort. He complains of a rolling mass in the upper abdomen, enlarging rapidly, not painful. Complains of loss of appetite and significant weight loss about $1/5^{th}$ of his previous weight for last 4 months. No history of peptic ulcer disease in the past and no history of vomiting out of blood or passage of black tarry stool (Exclude pyloric stenosis due to chronic duodenal ulcer). His bowel and bladder habit is normal. He has no H/O yellow colouration of eye, skin, chest pain, bone pain, cough (Exclude feature of metastasis).

History of past illness:

She has no H/O DM, HTN, heart disease, asthma, tuberculosis.

Personal history:

Patient is non- smoker, non alcoholic (To exclude chronic pancreatitis)

Immunization history:

She is immunized as per EPI schedule. He is not immunized against HBV. (For surgeon's safety)

Socioeconomic history:

She belongs to a middle class family, lives in semi-pakka house and drinks tube-well water, uses sanitary latrine.

Family history:

All other members of his family are enjoying good health.

Menstrual history: If Female

Age of menarche: 12 years
Menstrual cycle: 28+_2 days
Menstrual period: 4-5 days
LMP: 02.02.17
Menstrual flow: Average
Age of last child: 12 years

Drug history:

She took some tablets from local quack but could not mention the names.

General examination:

Appearance: Anxious/ill looking/normal
Body built: Average
Cooperation: Cooperative
Decubitus: On choice
Nutritional status: Below average
Jaundice: Absent
Anaemia: +
Cyanosis: Absent
Pulse: 78/min
BP: 130/80 mm of Hg
Temperature: 98^0 F
Respiratory rate: 14/min
Skin condition: Normal
Clubbing: Absent
Leuconychia: Absent
Koilonychia: Absent
Dehydration: Present
Oedema: Absent
Thyromegaly: Absent
Neck vein: Not engorged
Lymph node: All accessible lymph nodes are not palpable exceptleft supraclavicular lymph node which is palpable.
Hernial orifice: Intact

IV cannula, NG tube, catheter: In situ, If present (Usually present)

Abdominal examination:

Inspection:

Shape: Scaphoid
Fullness in upper abdomen
Visible peristalsis: May be present
Movement with respiration: Abdomino thoracic (Male)/ Thoraco abdominal (Female)
Umbilicus: Centrally placed, inverted and vertically slitted
No scar mark, scratch mark engorged vein,

Palpation:

Temperature: Not raised

Tenderness: Tender in epigastrium

No muscle guard or hyperesthesia

Lump:

There is an intra abdominal lump-

Site: epigastric region

Size: Measuring about 5X6cm

Surface: Irregular

Margin: Ill defined

Consistency: Hard

Non pulsatile

Moves with respiration

Not fixed with overlying skin or underlying structure

Liver, spleen, kidney, UB: Not palpable
Succussion splash: Present/absent

Percussion:

- ✓ Tympanic
- ✓ Fluid thrill and shifting dullness absent

Auscultation: Bowel sound present
Auscultopercussion: Stomach is distended
DRE: Revealed no abnormality

Nervous system examination: Revealed no abnormality
Respiratory system examination: Revealed no abnormality
CVS examination: Revealed no abnormality
Salient feature:

Mr. Habibul Bashar, 60 years old married, muslim, non-smoker, non-alcoholic, non diabetic, normotensive athlet, hailing from Shamoly, Dhaka admitted to SU-III, MMCH with the complaints of pain in upper abdomen which is continuous dull aching in nature, aggravated by eating , not relieved by antacids but relieved after vomiting, non-radiating, not associated with fever, chills and rigor. He also complains of vomiting for last 6 months occurring almost daily for last 4 months, but for last 2 months vomiting has become less as he is taking less food. Vomiting occurring about 1 hour after meal is projectile in nature, foul smelling, sour in taste, whitish in colour containing food material both digested and undigested which relieves abdominal discomfort. He complains of a rolling mass in the upper abdomen, enlarging rapidly, not painful. Complains of loss of appetite and significant weight loss about $1/5^{th}$ of his previous weight for last 4 months. No history of peptic ulcer disease in the past and no history of haematemesis or melaena. His bowel and bladder habit is normal. He has no H/O jaundice, chest pain, bone pain, cough.

On general examination, he is anxious, ill looking, co-operative, below average body built and poor nutritional status. Pulse 78/min, BP 130/80, RR 14/min, temperature normal, dehydrated and no oedema. He is non-anaemic, non-ecteric, no cyanosis, no lymphadenopathy except left supraclavicular lymph node which is palpable, no thyromegaly, engorged vein.

On abdominal examination, abdomen is scaphoid shaped, fullness of epigastrium, umbilicus is centrally placed, no scar mark, engorged vein, no scratch mark. On palpation, temperature normal, tenderness present in epigastrium, no organomegaly, succussion splash present/absent. There is a palpable mass which is in epigastric region, measuring about 5X6cm, irregular surface, ill defined margin, hard in consistency, Non pulsatile, Moves with respiration, Not fixed with overlying skin or underlying structure.Tympanic on percussion and bowel sound present. Stomach is hugely distended on auscultopercussion. Digital rectal examination reveals no abnormality. Other system examination reveals normal.

Provisional diagnosis: Gastric outlet obstruction due to Ca stomach

Differential diagnoses: Gastric outlet obstruction due to pyloric stenosis

Investigation:
For diagnosis/specific: Endoscopy of upper GIT & biopsy
For staging:

1. **Liver function tests:**
   - ✓ SGPT, ALP
   - ✓ PT
   - ✓ S.bilirubin
2. USG of WA
3. CXR PA view

Routine:

1. CBC: Anaemia
2. S. electrolyte (Must & mandatory): Low in Na, K^4, Cl^-
3. Urine RME
4. RBS
5. S. Creatinine: May be increased due to vomiting or dehydration
6. ECG
7. HBs Ag

Treatment:
Conservative:

1. NPO
2. NG suction
3. IV fluid: NS
4. Antibiotic: Ceftriaxone, metronidazole

Surgery: laparotomy followed by lower partial gastrectomy with gastrojejunostomy.

What is your diagnosis?
This is a case of gastric outlet obstruction due to carcinoma of stomach.

Why do you say this is a case of gastric outlet obstruction?

1. Sensation of fullness after meals for last 6 months.
2. Vomiting for last 6 months
3. Rolling mass in abdomen moving from left to right.
4. **On examination**: Fullness in the upper abdomen and visible peristalsis

Why do you say gastric outlet obstruction is due to carcinoma stomach in this patient?
History:

- ✓ Elderly male patient
- ✓ short history of about 6 months
- ✓ Patient complains of anorexia, generalized weakness and weight loss for last 4 months.
- ✓ No history of peptic ulcer disease in the past.

On examination: In addition to features of gastric outlet obstruction there is-

- ✓ Virchows gland present
- ✓ Intra-abdominal lump is palpable in the epigastric region

What is your differential diagnosis?
Pyloric Stenosis
Points in fevour:

1. Upper abdominal pain
2. Vomiting
3. Visible peristalsis: Present
4. Succassion splash: present

5. No shifting dullness or fluid thrill

Points against:

1. Short history
2. No history of PUD in the past
3. Virchows gland present
4. Intra-abdominal lump

GASTRIC CANCER

Gastric cancer:

- ✓ Gastric cancer is one of the most common causes of cancer death in the world
- ✓ Better results are obtained in Japan, which has a high population incidence, screening programmes and a high quality surgical treatment

Incidence:

- ✓ In Japan, the disease is much more common.
- ✓ There are small geographical areas in China where the incidence is double that in Japan.
- ✓ In general, men are more affected by the disease than women and the incidence increases with age.
- ✓ Carcinoma of the distal stomach and body of the stomach is most common in low socioeconomic groups, whereas the increase in proximal gastric cancer seems to affect principally higher socioeconomic groups.
- ✓ Proximal gastric cancer does not seem to be associated with *H. pylori* infection, in contrast with carcinoma of the body and distal stomach.

[Baily and Love-26th-1045-46]

Aetiology:

Gastric cancer is a multifactorial disease (Correa).

1. ***H. pylori*:** *Helicobacter* seems to be principally associated with carcinoma of the body and distal stomach rather than the proximal
2. **Pernicious anaemia and gastric atrophy and gastric polyps:** Patients with pernicious anaemia and gastric atrophy are at increased risk, as are
3. **Peptic ulcer surgery:**
   - ✓ Drainage procedures such as Billroth II or Polya gastrectomy, gastroenterostomy or pyloroplasty, are at approximately four times the average risk.
   - ✓ **Cause:** Duodenogastric reflux and reflux gastritis in these patients.
4. Intestinal metaplasia
5. Cigarette smoking
6. **Dust ingestion:** From a variety of industrial processes.

7. **Diet**:
   - ✓ The ingestion of substances such as spirits may induce gastritis and, in the long term, cancer.
   - ✓ Excessive salt intake, deficiency of antioxidants and exposure to*N*-nitroso compounds are also related.
8. **Obesity and higher socioeconomic status:** Mainly proximal gastric cancer.
9. **Genetic**

[Baily and Love-26th-1046]

Site:

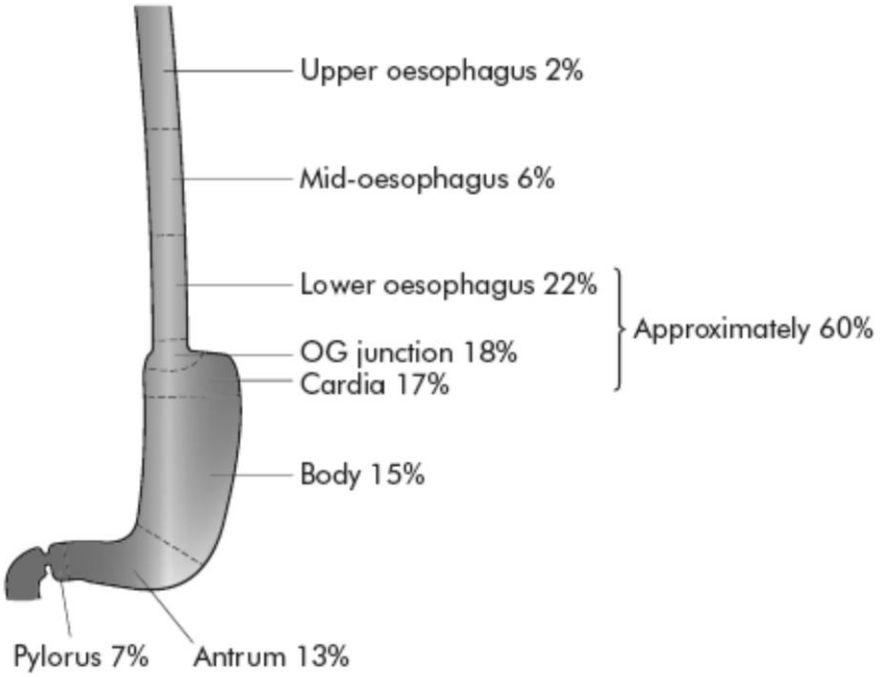


Figure: Ca in various parts of stomach

[Baily and Love-26th-1047]

Pathology:

Lauren classification: The most useful classification of gastric cancer.

Principally two forms of gastric cancer:

1. **Intestinal gastric cancer:**
   - ✓ It probably arises in areas of intestinal metaplasia.
   - ✓ The tumour resembles a carcinoma elsewhere in the tubular gastrointestinal tract
   - ✓ Forms polypoid tumours or ulcers
2. **Diffuse gastric cancer:**
   - ✓ Infiltrates deeply into the stomach without forming obvious mass lesions, but spreads widely in the gastric wall.
   - ✓ Has a much worse prognosis.
3. **Mixed:** A small proportion of gastric cancers are of mixed morphology.

[Baily and Love-26th-1046-47]

Another classification: Gastric cancer can be divided into-

1. **Early gastric cancer:** Early gastric cancer is defined as cancer limited to the mucosa and submucosa with or without lymph node involvement (T1, any N).
   Japanese classification of early gastric cancer:
   - ✓ Protruding
   - ✓ Superficial
   - ✓ Excavated

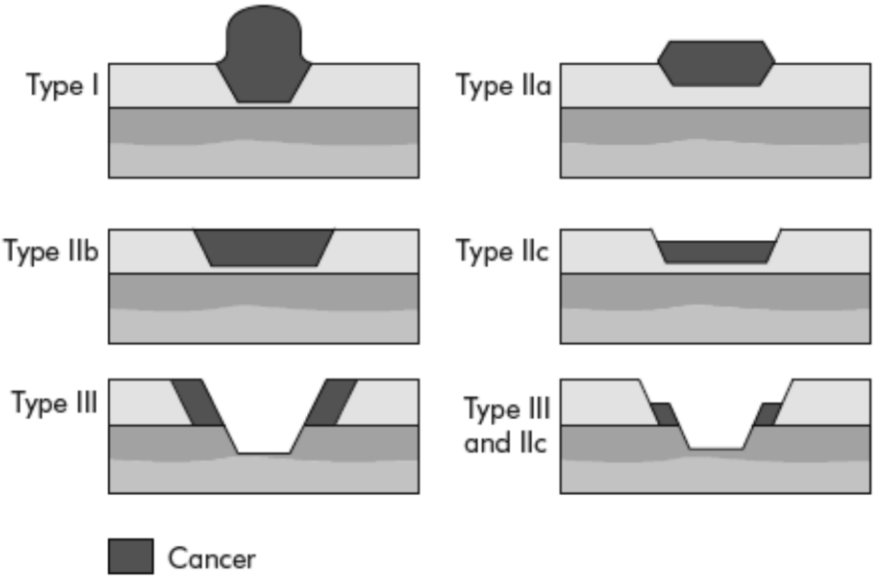


Figure: Early gastric cancer, Japanese classification

2. **Advanced gastric cancer:**
   - ✓ Advanced gastric cancer involves the muscularis.
   - ✓ Its macroscopic appearances have been classified by Bormann into four types
   - ✓ Types III and IV are commonly incurable.

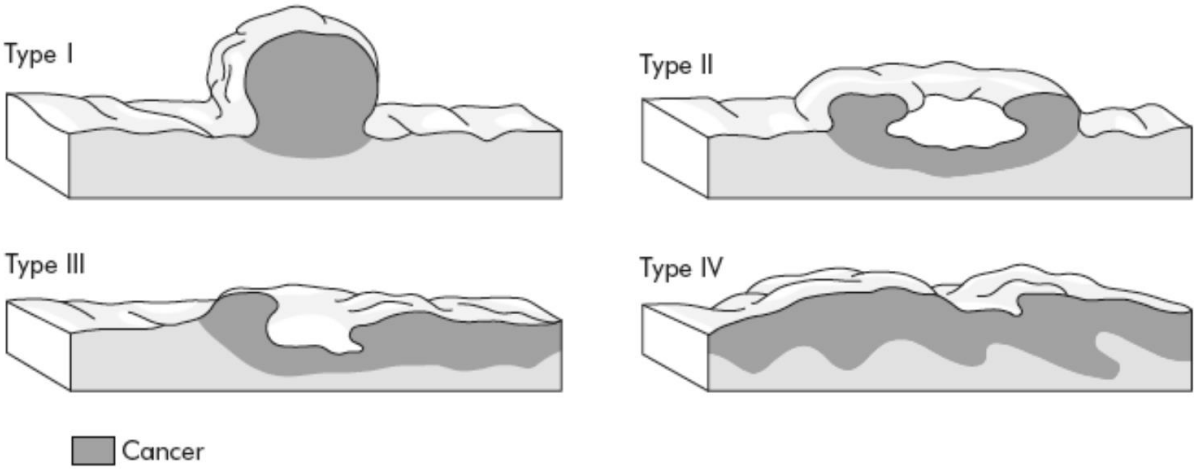


Figure: Borrmann classification of advanced gastric cancer

[Baily and Love-26th-1046-47]

Staging:

International Union Against Cancer (UICC) staging of gastric cancer:

T1: Tumour involves lamina propria, submucosa
- **T1a** lamina propria
- **T1b** submucosa

T2: Tumour invades muscularis propria

T3: Tumour involves subserosa
- **T4a** Tumour perforates serosa
- **T4b** Tumour invades adjacent organs

N0: No lymph nodes

N1: Metastasis in 1–2 regional nodes

N2: Metastasis in 3–6 regional nodes
- **N3a** Metastasis in 7–15 regional nodes
- **N3b** Metastasis in more than 15 regional nodes

M0: No distant metastasis

M1: Distant metastasis (this includes peritoneum and distant lymph nodes)

Staging: (Eta ki mone rakha shomvob!! :-P)

IA:	T1	N0	M0
IB	T1	N1	M0
	T2	N0	M0
IIA	T1	N2	M0
	T2	N1	M0
	T3	N0	M0
IIB	T1	N3	M0
	T2	N2	M0
	T3	N1	M0
	T4a	N0	M0
IIIA	T2	N3	M0
	T3	N2	M0
	T4a	N1	M0
IIIB	T3	N3	M0
	T4a	N2	M0
	T4b	N0–1	M0
IIIC	T4a	N3	M0
	T4b	N2–3	M0
IV	Any T	Any N	M1

[Baily and Love-26th-1048]

Spread of carcinoma of the stomach:

1. **Direct spread:** The tumour penetrates the muscularis, serosa and ultimately adjacent organs such as the pancreas, colon and liver.
2. **Lymphatic spread:** This is by both permeation and emboli to the affected tiers of nodes. This may be extensive, the tumour even appearing in the supraclavicular nodes (Troisier's sign).

Unlike malignancies such as breast cancer, nodal involvement does not imply systemic dissemination.

3. **Blood-borne metastases:**
   - ✓ These occur first to the liver and subsequently to other organs, including lung and bone.
   - ✓ This is uncommon in the absence of nodal disease.
4. **Transperitoneal spread:**
   - ✓ **Ascites:** Tumours can manifest anywhere in the peritoneal cavity and commonly give rise to ascites.
   - ✓ **Shelf:** Advanced peritoneal disease may be palpated either abdominally or rectally as a tumour 'shelf'.
   - ✓ **Krukenberg's tumours:** The ovaries may sometimes be the sole site of transcoelomic spread called 'Krukenberg's tumours'.
   - ✓ **Sister Joseph's nodule:** Tumour may spread via the abdominal cavity to the umbilicus called 'Sister Joseph's nodule'.

[Baily and Love-26th-1048-49]

Management:

Symptoms:

In early case:

1. New dyspepsia in patient over 40 years
2. Anorexia
3. Vague post prandial abdominal heaviness
4. Malaise

In advanced cancer:

1. Early satiety
2. Bloating
3. Distension
4. **Dysphagia, epigastric fullness or vomiting:** Due to obstruction
5. **Pain:** In epigstrium, constant, not relieved by food or PPI.
6. **Vomiting:**
   - ✓ Persistent
   - ✓ Fresh food particles
   - ✓ No foul smelling
7. **General features of Ca:** Generalized weakness, weight loss
8. **Feature of metastasis:** Jaundice, lymphadenopathy, ascities

Signs:

General examination:

General examination:

Appearance: Anxious/ill looking/normal
Body built: Emaciated
Nutritional status: Below average
Jaundice: Absent
Anaemia: Present. The tumour frequently bleeds, resulting in **iron deficiency anaemia**.
Dehydration: Present
Lymph node: Enlarged supraclavicular lymph node

Abdominal examination:

Inspection :

Shape: Scaphoid or may be distended due to ascities
Fullness in upper abdomen
Visible lump in epigastrium moving with respiration
Visible peristalsis: May be present if obstruction present
Movement with respiration: Abdomino thoracic (Male)/ Thoraco abdominal (Female)
Umbilicus: Centrally placed, inverted and vertically slitted. Everted and transversely slitted if acities present.
No scar mark, scratch mark engorged vein,

Palpation:

Temperature: Not raised
Tenderness: Tender in epigastrium
Palpable mass: Irregular, tender, hard
No muscle guard or hyperesthesia
Liver: May be enlarged due to metastasis
Spleen, kidney, UB: Not palpable
Succussion splash: Present/absent

Percussion:

- ✓ Tympanic
- ✓ Dull on the mass
- ✓ Fluid thrill and shifting dullness: Absent. Present if ascities present.

Auscultation: Bowel sound present
Auscultopercussion: Stomach is distended
DRE: Metastaic nodule may be present in recto-vesical pouch.
P/V examination: Enlarged ovary

Respiratory system examination: Pleural effusion may be present due to matastasis.

Investigation:

For diagnosis/specific:

Endoscopy of upper GIT & biopsy: At least **10 biopsy bits** from different sites covering all the quadrants.

- ✓ The lesion can be seen, photographed and biopsy may be taken
- ✓ Gastric juice may be aspirated, centrifuged and examined for malignant cells by Papanicolaou stain
- ✓ If facility is available endoscopic ultrasonography (USG) may be done, which may clearly show the depth of invasion of the tumor in the stomach wall.

For staging:

1. **Liver function tests:**
   - ✓ SGPT, ALP

- ✓ PT
- ✓ S.bilirubin

2. **USG of WA:**
   - ✓ Detects liver deposits and also pre- and para-aortic lymph node enlargement. However, it is very difficult to evaluate the stomach growth by ultrasonography
   - ✓ Endoscopic USG may detect the wall invasion by the growth and also can pick up liver and lymph node metastasis.
3. **CXR PA view:**
   - ✓ Pleural effusion
   - ✓ Metastasis to lung

Routine:

1. CBC: Anaemia
2. S. electrolyte (Must & mandatory): Low in Na, K^4, Cl^-
3. Urine RME
4. RBS
5. S. Creatinine: May be increased due to vomiting or dehydration
6. ECG
7. HBs Ag

Treatment:

A. Correction of deficiency factors [See pyloric stenosis chapter for details]

Dehydration

Electrolyte imbalance

Anaemia

Nutrition

B. Prepare the stomach for surgery [See pyloric stenosis chapter for details]

C. Surgery:

If curative resection possible:

- ✓ Lower partial gastrectomy with gastrojejunostomy or
- ✓ Total gastrectomy with oesophago-jejunostomy

If curative resection not possible: Palliative procedures are done to relieve outlet obstructive symptoms and make the patient to have food until he lives.

Palliative procedures:

- ✓ High gastro-enterostomy
- ✓ Gastric exclusion and oesophago jejunostomy
- ✓ Palliative intubation or stenting

D. Chemotherapy:

First line regimen:

Combination of

- ✓ Epirubacin
- ✓ Cis-platinum (oxaliplatin is being substituted for *cis*-platinum as it has fewer side effects)

- ✓ Infusional 5-FU or an oral analogue such as capecitabine.

Second-line treatment: using combinations which include taxotere.

Newer biological agents:

Trastuzumab (Herceptin®): With *HER2*-positive gastric cancer.

E. Radiotherapy: Radiotherapy has a role in the palliative treatment of painful bony metastases**.**

[Baily and Love-26th-1046-53+Lecture of MMC]

Operability:

It is important that patients with incurable disease are not subjected to radical surgery that cannot help them, hence the value of CT/PET and preoperative laparoscopy.

Evidence of incurability:

1. Haematogenous metastases
2. Involvement of the distant peritoneum
3. N4 nodal disease and disease beyond the N4 nodes,
4. Fixation to structures that cannot be removed.
5. Involvement of another organ: Does not imply incurability, provided that it can be removed.

Most operable patients should have neoadjuvant chemotherapy as this improves survival.

[Baily and Love-26th-1050]

Total gastrectomy: Best performed through a long upper midline incision.

The stomach is removed en bloc, including the tissues of the entire greater omentum and lesser omentum.

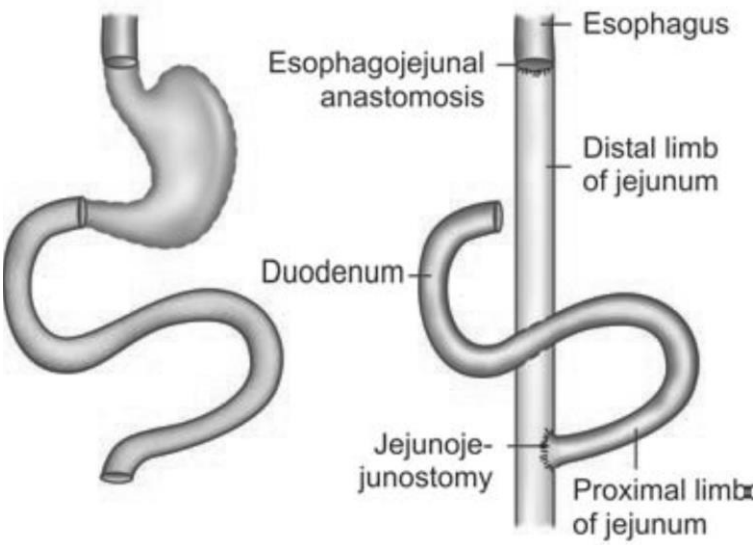
Indications of total gastrectomy in carcinoma of stomach:

- ✓ Proximal gastric cancer involving the cardia
- ✓ Diffuse gastric cancer (borrman's type 4)
- ✓ Growth involving two or all three sectors of the stomach
- ✓ Generalized linitis plastica.

How will you establish continuity following total gastrectomy?

By a Roux-en-Y esophagojejunostomy.

- ✓ Roux loop should be at least 50 cm long to avoid bile reflux.
- ✓ Jejunojejunostomy is done at a distance of 50 cm from esophagojejunal anastomosis.



[Baily and Love-26th-1053+ Bedside Clinics in Surgery-2nd-102]

Postoperative complications of gastrectomy:

1. **Leakage of the oesophagojejunostomy:**
   - ✓ Should be uncommon in experienced hands.
   - ✓ When it occurs it can often be managed conservatively as the Roux-en-Y reconstruction means that it is mainly saliva and ingested food that leaks.
2. **Leakage from the duodenal stump:** This is usually due to a degree of distal obstruction.
3. **Billiary peritonitis**
4. **Secondary haemorrhage:** From the exposed or divided blood vessels.
5. **Long-term complications of surgery:**
   - ✓ **Dumping and diarrhea**
   - ✓ **Nutritional deficiencies:** The loss of the parietal mass leads to vitamin B12 deficiency and replacement should be given routinely.

[Baily and Love-26th-1053]

Disease caused by *Helicobacter:*

1. Gastritis
2. Gastric atrophy
3. Intestinal metaplasia
4. Ca stomach

[Baily and Love-26th-1046]

Why Ca stomach metastasize to ovary during reproductive period?

During ovuolation surface of ovary becomes raw and malignant cells can be deposited on ovary and cause Krukenberg tumour.

Related Viva Questions:

Vomitus:
Coffee ground: Gastric ulcer, Ca stomach due to slow hemorrhage.
Acidic vomiting: Duodenal ulcer
Bilious vomiting: Cholecystitis and intestinal obstruction.

Projectile copious vomiting: Pyloric stenosis (GOO)

Pain:

Periodicity of pain:
- ✓ Interval of freedom from pain for past 2–6 months.
- ✓ Seen in peptic ulcer
- ✓ Pain is common in autumn and winter due to absence of drinking of water more (water is alkaline hence reduces pain).

Site of pain:
Gastric ulcer: Midepigastrium or slightly to left
Duodenal ulcer: Pain is seen one inch to the right of midline of transpyloric plane (duodenal point).
Radiation of pain:
Pain radiates to the back in conditions of peptic ulcer penetrating the pancreas.
Relief of pain:
Gastric ulcer: vomitus reduces pain
Duodenal ulcer: food intake reduces pain.

Bloomer's shelf: Malignant deposits in the rectovesical pouch.

Clue to diagnosis:
Gastric outlet obstruction with a palpable epigastric mass is due to carcinoma stomach and without a palpable mass is due to chronic cicatrizing duodenal ulcer

Salient features of Gastric Outlet Obstruction:
- ✓ Visible gastric peristalsis (VGP)
- ✓ Succussion splash
- ✓ Distended stomach on auscultoscrapping.

What should you do before sending the GOO patient to Upper GI endoscopy?
Gastric lavage should be done using wide bore tube and saline.

Barium Meal:
1. Endoscopy is preferred first (because biopsy can be taken).
2. Barium meal in GOO shows:
3. Dilatation of stomach
4. Deformed duodenal cap (Trifoliate deformity)
5. Stasis ulcer
6. Distal duodenal normality
7. **Delayed emptying time:**
   - ✓ Normal stomach empties in 3 to 4 hours
   - ✓ >6 hours Hypotonia, pylorospasm
   - ✓ >24 hours Organic pyloric stenosis

Serological Marker:
The only reliable marker in patients with carcinoma stomach is CA 72-4.
Most common clinical presentation is recent dyspepsia in a patient aged 45 years and above.

[R Rajamahendran-1st-]

Head rising or leg rising test (Carnett's test):

Ask the patient to keep his hands over his chest and ask him to lift his head and shoulder off the pillow.

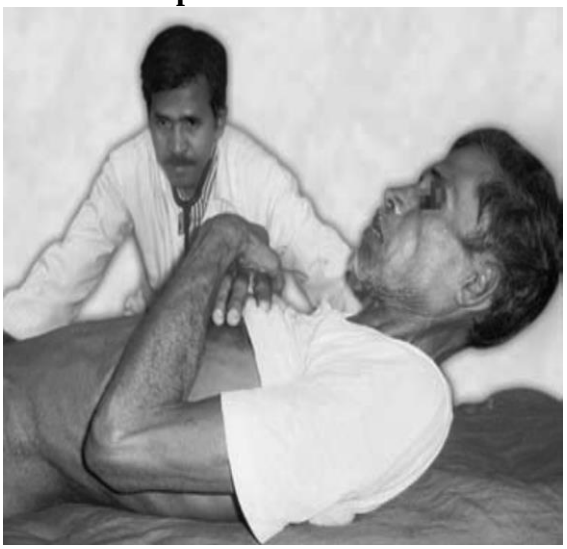
Interpretation:

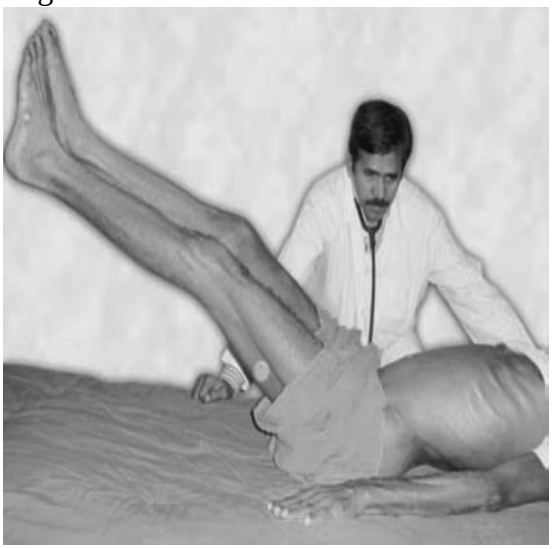
Swelling disappears or becomes less prominent: Swelling is intra abdominal.

Swelling becomes more prominent or remains the same: Swelling is Parietal.

For lower abdominal swelling this can be ascertained by leg rising test. Patient lies supineand is asked to lift both the legs from the bed.

Interpretation: Same as for head rising test.





What are the consequences of gastric outlet obstruction?

Anatomical effect:

Because of obstruction there is hyperperistalsis of the stomach leading to hypertrophy of the musculature of the stomach and later on there is huge dilatation of the stomach.

Metabolic effect:

1. Because of vomiting there is chronic dehydration, prerenal azotemia and there is loss of H+, Cl– and K+ ion leading to hypochloremic, hypokalemic metabolic alkalosis.
2. **In early stage:** Loss of H+ and Cl– ion leading to hypochloremic alkalosis. Sodium may be normal and hypokalemia may not be obvious.
3. Kidney tries to compensate metabolic alkalosis by excreting low chloride and more bicarbonate. While excreting bicarbonate sodium is also lost in urine.
4. If vomiting continues patient becomes more dehydrated and hyponatremia develops.
5. To conserve circulatory volume kidney reabsorbs water and sodium due to aldosterone effect.

6. Sodium is retained by the distal renal tubule in exchange of H+, K+ ions. To conserve Na+ ions H+ and K+ ions are excreted in urine.
7. At this late stage of metabolic alkalosis, the kidney passes acidic urine due to passage of H+ ion in urine in exchange of sodium ion.
8. This is called paradoxical aciduria as on the background of metabolic alkalosis kidney should have excreted alkaline urine.

Why there is paradoxical aciduria in metabolic alkalosis due to gastric outlet obstruction?

1. Due to vomiting there is hypochloremic metabolic alkalosis.
2. As a compensatory mechanism to metabolic alkalosis kidney excretes low chloride with bicarbonate. Sodium is lost along with bicarbonate.
3. With time patient becomes progressively dehydrated and hyponatremic. Because of dehydration a phase of sodium retention follows.
4. Sodium is conserved in exchange of H+ ion and K+ ion leading to paradoxical aciduria and hypokalemia.

What is the cause of tetany in patient with gastric outlet obstruction?

Due to alkalosis plasma ionized calcium level may fall, and this may lead to mental confusion and tetany due to hypocalcemia.

[Bedside Clinics in Surgery-2nd-96-97]

For more curiosity:

How will you treat refractory metabolic alkalosis?

- ✓ Earlier ammonium chloride or arginine hydrochloride infusion was used, but ammonium chloride infusion may cause ammonia toxicity
- ✓ Use of 0. 1 N–0. 2 N HCl is a safe and effective therapy for correction of severe resistant metabolic alkalosis. 1–2 liters of solution infused over a period of 24 hours. Monitor pH,
- ✓ PaCO2 and serum electrolyte every 4 hours
- ✓ Underlying cause should be corrected.

How endoscopic USG may help in diagnosis of carcinoma of stomach?

- ✓ Clearly show the different layers of stomach
- ✓ Can show the relative depth of tumor invasion in stomach wall
- ✓ This is also helpful for assessing the lymph node status (N staging).

What do you expect in LFT?

- ✓ Low serum albumin, high serum enzymes
- ✓ Increased alkaline phosphatase is an important marker for metastasis to liver
- ✓ Until metastasis impair at least 75% of liver function, liver function test (LFT) is not

What should be the extent of gastric resection?

- ✓ In early gastric cancer a 2 cm margin is acceptable
- ✓ In advanced gastric cancer a proximal 6 cm margin is essential, as lateral spread may occur upto 5 cm
- ✓ Distal margin is usually 2 cm beyond the pylorus.

Prognostic factors in carcinoma of stomach:

The important prognostic factors are:

- ✓ **Tumor:** Depth of invasion
- ✓ **Metastasis:** Metastasis to the lymph nodes or distant metastasis
- ✓ **Histological type and grading** of tumor.

How nitrates are related to development of gastric cancer?

- ✓ Nitrates are converted into n nitroso compounds in the stomach which have been proved to be carcinogenic in animals.
- ✓ Reduction of nitrates to nitrite and combination of nitrite with amines to form nitrosoamines are influenced by bacteria Escherichia coli.

[Bedside Clinics in Surgery-2nd-96-105]

GOO DUE TO PYLORIC STENOSIS

Particulars of the patient:

Name: Mahmudullah Riad
Age: 40 years
Sex: Male
Religion: Islam
Marital status: Married
Occupation: Businessman
Address: Dhopakhola, Mymensingh
Date and time of admission: 08.03.17; 09.00am
Date and time of examination: 09.03.17;08.30am

Chief complaints:

1. Pain in upper abdomen for 5 years.
2. Vomiting for 6 months.

History of present illness:

According to the statement of the patient, he was reasonably well 6 years back. Then he developed recurrent attacks of pain in upper abdomen which is burning in nature, non-radiating, aggravated in empty and relieved by eating. Patient had similar attacks of pain initially for 2-3 months with pain free interval about of 3-4 months. Then he took some milky medication and tablets from local pharmacist. But for last 6 months patient is having constant pain. Pain is associated with vomiting for last 6 months. He used to vomit 2-3 times daily, usually during evening, sometimes after taking meal, projectile in nature, copious in amount, vomitus containing partially digested foods even contents of 2-3 days before, yellowish (not bile stained), foul smelling & frothy, sour in taste, causing considerable relief and becomes hungry again and there was H/O induced vomiting. He has no history of loss of appetite, lump in abdomen (To exclude Ca stomach), pain radiating to back (To exclude chronic pancretitis) or to shoulder (To exclude cholecystitis. His bowel and bladder habit is normal.

History of past illness:

She has no H/O DM, HTN, heart disease, asthma, tuberculosis.

Personal history:

Patient is non- smoker, non alcoholic (To exclude chronic pancreatitis)

Immunization history:

She is immunized as per EPI schedule. He is not immunized against HBV. (For surgeon's safety)

Socioeconomic history:

She belongs to a middle class family, lives in semi-pakka house and drinks tube-well water, uses sanitary latrine.

Family history:

All other members of his family are enjoying good health.

Menstrual history: If Female

Age of menarche: 12 years
Menstrual cycle: 28+_2 days
Menstrual period: 4-5 days
LMP: 02.02.17
Menstrual flow: Average
Age of last child: 12 years

Drug history:

She took some tablets from local quack but could not mention the names.

General examination:

Appearance: Anxious/ill looking/normal
Body built: Average
Cooperation: Cooperative
Decubitus: On choice
Nutritional status: Below average
Jaundice: Absent
Anaemia: +
Cyanosis: Absent
Pulse: 78/min
BP: 130/80 mm of Hg
Temperature: 98^0 F
Respiratory rate: 14/min
Skin condition: Normal
Clubbing: Absent
Leuconychia: Absent
Koilonychia: Absent
Dehydration: Present
Oedema: Absent
Thyromegaly: Absent
Neck vein: Not engorged
Lymph node: Not palpable
Hernial orifice: Intact
IV cannula, NG tube, catheter: In situ, If present (Usually present)

Abdominal examination:

Inspection :

Shape: Scaphoid
Fullness in upper abdomen
Visible peristalsis: May be present
Movement with respiration: Abdomino thoracic (Male)/ Thoraco abdominal (Female)
Umbilicus: Centrally placed, inverted and vertically slitted

No scar mark, scratch mark engorged vein,

Palpation:

Temperature: Not raised

Tenderness: Tender in epigastrium

No palpable mass, muscle guard or hyperesthesia

Liver, spleen, kidney, UB: Not palpable
Succussion splash: Present/absent

Percussion:

- ✓ Tympanic
- ✓ Fluid thrill and shifting dullness absent

Auscultation: Bowel sound present
Auscultopercussion: Stomach is distended
DRE: Revealed no abnormality

Nervous system examination: Revealed no abnormality
Respiratory system examination: Revealed no abnormality
CVS examination: Revealed no abnormality

Salient feature:

Mr. Mahmudullah Riad, 40 years old married, muslim, non-smoker, non-alcoholic, non diabetic, normotensive businessman, hailing from Dhopakhola, Mymensingh admitted to SU-III, MMCH with the complaints of recurrent attacks of pain in upper abdomen which is burning in nature, non-radiating, aggravated in empty and relieved by eating. Patient had similar attacks of pain initially for 2-3 months with pain free interval about of 3-4 months. Then he took some milky medication and tablets from local pharmacist. But for last 6 months patient is having constant pain. Pain is associated with vomiting for last 6 months. He used to vomit 2-3 times daily, usually during evening, sometimes after taking meal, projectile in nature, copious in amount, vomitus containing partially digested foods even contents of 2-3 days before, yellowish, foul smelling & frothy, sour in taste, causing considerable relief and becomes hungry again and there was H/O induced vomiting. He has no history of loss of appetite, lump in abdomen, pain radiating to back or to shoulder. His bowel and bladder habit is normal.

On general examination, he is anxious, ill looking, co-operative, below average body built and poor nutritional status. Pulse 78/min, BP 130/80, RR 14/min, temperature normal, dehydrated and no oedema. He is non-anaemic, non-ecteric, no cyanosis, no lymphadenopathy, thyromegaly, engorged vein.

On abdominal examination, abdomen is scaphoid shaped, fullness of epigastrium, umbilicus is centrally placed, no scar mark, engorged vein, no scratch mark. On palpation, temperature normal, tenderness present in epigastrium, no palpable mass, no organomegaly, succussion splash present/absent. Tympanic on percussion and bowel sound present. Stomach is

hugely distended on auscultopercussion. Digital rectal examination reveals no abnormality. Other system examination reveals normal.

Provisional diagnosis: Gastric outlet obstruction due to pyloric stenosis
Differential diagnoses: Gastric outlet obstruction due to Ca stomach

Investigation:
Investigation:
For diagnosis/specific: Endoscopy of upper GIT & biopsy
Routine:

1. CBC
2. S. electrolyte
3. Urine RME
4. RBS
5. S. Creatinine
6. CXR
7. ECG
8. HBs Ag

Treament:
Conservative:

1. NPO
2. NG suction
3. IV fluid: NS
4. Antibiotic: Ceftriaxone, metronidazole

Surgery: Bilateral truncal vagotomy (TV) with gastrojejunostomy.

Present your case: Tell the 'salient feature'
What is your D_x?

Gastric outlet obstruction due to pyloric stenosis

Why do you say that?

1. Long history
2. H/O PUD
3. Projectile vomiting
4. Visible peristalsis: Present
5. Succussion splash: Present

What is your differential diagnosis?
Carcinoma of the stomach
Points in fevour: Vomiting after taking meal
Points against:

1. H/O PUD
2. Long history

3. No anorexia
4. No abdominal lump
5. Past H/O typical periodic hunger pain

PYLORIC STENOSIS

Common causes of GOO:

1. Ca stomach
2. Pyloric stenosis
3. Adult pyloric stenosis
4. Pyloric mucosal diaphragm

[Baily and Love-26th-1044-45]

Definition:

- ✓ It is a misnomer.
- ✓ The stenosis is actually at the **first part** of duodenum resulting from maltreatment or no treatment of chronic duodenal ulcer causing gradual increase in thickening of duodenal wall.

Causes of GOO in pyloric stenosis in chronic duodenal ulcer:

1. Chronic fibrosis & stricture in long standing cases
2. Inflammation & oedema during acute exacerbation
3. Pyloric spasm (very rare)

Management:

Symptoms:

1. H/O chronic duodenal ulcer for 10-15 years
2. **Vomiting**:
    a. **Time:** Usually occurs during evening, may occur after taking meal
    b. **Projectile** in nature
    c. **Amount:** Copious
    d. **Contents:** Undigested food particle, even it may contain food materials taken one or two days previously
    e. **Smell**: Foul smelling & frothy
    f. **Taste:** Usually sour.
    Cause: Due to acid contents of stomach not-bitter as it is free from bile.
    g. Vomiting usually gives considerable relief and patient becomes hungry again (In Ca stomach patient is not hungry again after vomiting)
    h. **Induced vomiting:** There may be H/0 induced vomiting (Patient puts his finger into his throat to stimulate vomiting) as vomiting reliefs patients discomfort but it may be spontaneous.
3. **Pain:**
    - ✓ In the epigastrium

- ✓ Continuous pain with loss of periodicity & no relation with food. Periodicity lost due to fibrosis.

  Pain is due to:
  - ➢ Pylorospasm
  - ➢ Gastric distension

4. **Fullness**
5. **Weight loss:** Due to vomiting & starvation
6. Patient may give a H/0 visible peristalsis in upper abdomen

Signs:

General examination:

Appearance: Anxious/ill looking/normal
Body built: Emaciated
Nutritional status: Below average
Jaundice: Absent
Anaemia: +
Dehydration: Present
Lymph node: Not palpable

Abdominal examination:

Inspection :

Shape: Scaphoid
Fullness in upper abdomen
Visible peristalsis: May be present

Visible peristalsis in different conditions:

In pyloric stenosis:
- ✓ Moves from left to right starting from under the left costal margin
- ✓ Cross the midline, end in duodenal point.
- ✓ Stomach shaped

In obstruction of colon: Right to left

In small gut obstruction:
- ✓ Multiple visible peristalsis
- ✓ Step ladder pattern
- ✓ Moves hapazardly i.e. from Lt to right or right left

How to inspect for visible peristalsis:
- ✓ 1st try to see on inspection
- ✓ If not, then stroke the abdomen with fingers (it will stimulate contraction) over the stomach
- ✓ If not, ask the patient to eat something or to drink a glass of water

Movement with respiration: Abdomino thoracic (Male)/ Thoraco abdominal (Female)
Umbilicus: Centrally placed, inverted and vertically slitted
No scar mark, scratch mark, engorged vein

Palpation:

Temperature: Not raised

Tenderness: Tender in epigastrium

No palpable mass, muscle guard or hyperesthesia

Liver, spleen, kidney, UB: Not palpable

Succussion splash: It is said to be present when shaking of patients abdomen, elicits a splashing sound after 4 hours of taking last meal.

Percussion:

- ✓ Tympanic
- ✓ Fluid thrill and shifting dullness absent

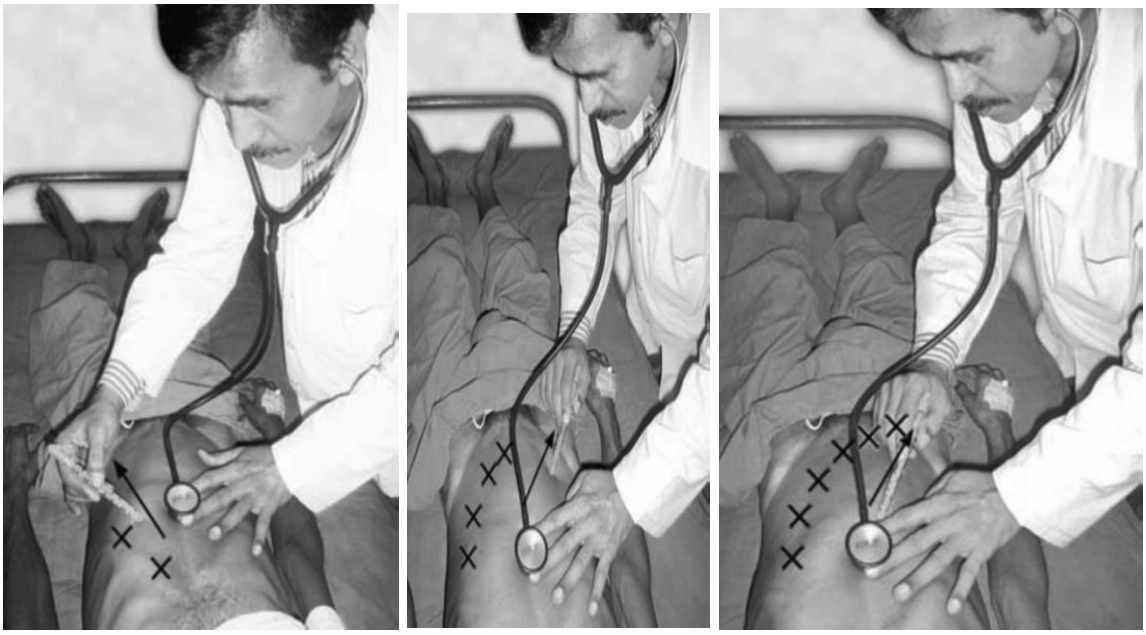
Auscultation: Bowel sound present

Auscultopercussion: Auscultopercussion outlines the greater curvature of the stomach.

Procedure:

- ✓ The bell of the stethoscope is placed in the mid epigastrium.
- ✓ With the back of a pencil, abdominal wall is scratched radially from the edge of the bell of
- ✓ stethoscope starting from below the left costal margin up to the right hypochondriac region.
- ✓ When the scratch is made over the stomach region, scratch sound is easily audible.
- ✓ When scratch goes out of stomach outline no sound is audible.
- ✓ A point is marked at the junction of sound being audible and not audible. The line joining these points marks the greater curvature of stomach.
- ✓ In gastric outlet obstruction the greater curvature usually lies below the level of umbilicus

Interpretation: Stomach is hugely distended



DRE: Revealed no abnormality

Investigation:

For diagnosis/specific:

1. **Endoscopy of upper GIT & biopsy:**
   Objective:
   - ✓ For diagnosis of pyloric stenosis
   - ✓ To exclude Ca stomach
2. **Ba meal X-ray:**
   Findings:
   - ✓ Stomach is hugely dilated & low down reaches to the pelvic cavity
   - ✓ Soap bubble appearance of stomach/multiple negative shadow in the stomach indicates -Residual food particle
   - ✓ No dye pass beyond the pylorus

Routine:

1. CBC: Anaemia
2. S. electrolyte (Must & mandatory): Low in Na, K^4, Cl^-
3. Urine RME
4. RBS
5. S. Creatinine: May be increased due to vomiting or dehydration
6. CXR
7. ECG
8. HBs Ag

Treatment:

A. Correction of deficiency factors

Dehydration
Electrolyte imbalance
Anaemia
Nutrition

B. Prepare the stomach for surgery

C. Surgery

Correction of deficiency factors

Dehydration: IV fluid (Isotonic) (NS)

Electrolyte imbalance: NS with potassium. (Some will prefer Hartman/cholera saline)

Anaemia: Blood transfusion

Nutrition: IV nutrition

Prepare the stomach for surgery:

Preparation of the stomach:

1. **NPO**

2. **Gastric lavage:** To aspirate the stomach content & to wash it with Normal saline.

Objective of gastric lavage:

- ✓ Removes the food residue
- ✓ Decreases the mucosal edema
- ✓ Brings back the gastric tonicity.

Procedure:

- ✓ Gastric lavage is done before each feed 4–5 days before surgery.
- ✓ A 16 or 18 Fr. Ryles tube is inserted into the stomach and the gastric juice is aspirated. Normal saline is allowed to run through the Ryles tube and then aspirated back.
- ✓ This is repeated till the return is clear.
- ✓ This requires lavage with about 1–2 liters of normal saline.

Result if the stomach is not adequately prepared:

- ✓ If the size of the stomach did not brings to normal before operation, after operation (gastrojejunostomy) the size of the stomach will be reduced
- ✓ So stomal opening will also be reduced i.e. from 6 cm to 3 cm.
- ✓ In this condition food particles accumulate within/the stomach due to small stomal opening and will increase intragastric pressure resulting in
  - ➢ Stomal obstruction
  - ➢ Rupture of anastomosis
  - ➢ Haemorrhage from anastomotic site

Surgery: Bilateral truncal vagotomy (TV) with gastrojejunostomy.

Procedure:

- ✓ Anterior and posterior trunks of vagus are divided just below the diaphragm
- ✓ Followed by a drainage procedure like a gastrojejunostomy
- ✓ Criminal nerve of grassi should be cut

[Baily and Love-26th-1044-45+Bedside Clinics in Surgery-2nd-94-105+Lecture of MMC]

Why should you do gastrojejunostomy after truncal vagotomy?

- ✓ Vagus is secretomotor to stomach.
- ✓ So, after vagotomy the motility of stomach is lost and gastric stasis occurs.
- ✓ Hence, drainage procedure is a must.

Is there any other drainage procedure other than posterior GJ?

Yes, pyloroplasty which is making the pyloric canal opened always.

Why should you prefer posterior GJ?

Posterior GJ is preferred because it gives a dependent drainage by gravity.

Disadvantages: As the hepatic branches are cut leading to bile stasis in gallbladder and stone formation.

1. Bile stasis
2. Gall stones

VAGOTOMY

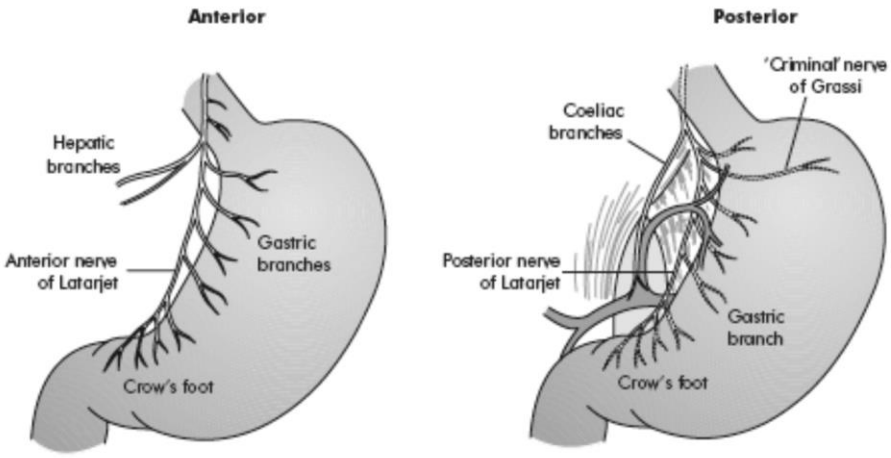


Figure: Anatomy of vagus nerve

Branches of vagus nerve:

1. **Anterior vagus:**
   - ✓ Hepatic branch: In selective vagotomy, it remains unaffected.
   - ✓ Gastric branch: Main branches are called 'Nerve of Laterjet' lying along lesser curve.
2. **Posterior vagus:**
   - ✓ Main gastric branch
   - ✓ Coeliac branch

Function of vagus nerve on stomach: Parasympathetic

1. Secretomotor: Increases secretion of HCl , pepsin
2. Increases motility of stomach

[Baily and Love-26th-1044]

Types of vagotomy:

1. **Truncal:** Resection of main trunk (Anterior and posterior vagus)
2. **Selective:** Only gastric branches are cut off. Hepatic branch and coeliac branch are preserved.
3. **Highly selective:** In this procedure only the terminal branches (Parietal cell) of nerve of Laterjet of antrum are cut; preserving the nerve of Laterjet (Crow's foot) supplying the pylorus.

   Advantages of highly selective vagotomy (HSV):

   1. More physiological with minimal disturbances
   2. No drainage procedure is required because pyloric function is preserved
   3. Nerve supply to gallbladder and liver are not disturbed
   4. No diarrhea which occurs in 5.8 percent of cases of truncal vagotomy.

   Disadvantage: High incidence of recurrence (20%).

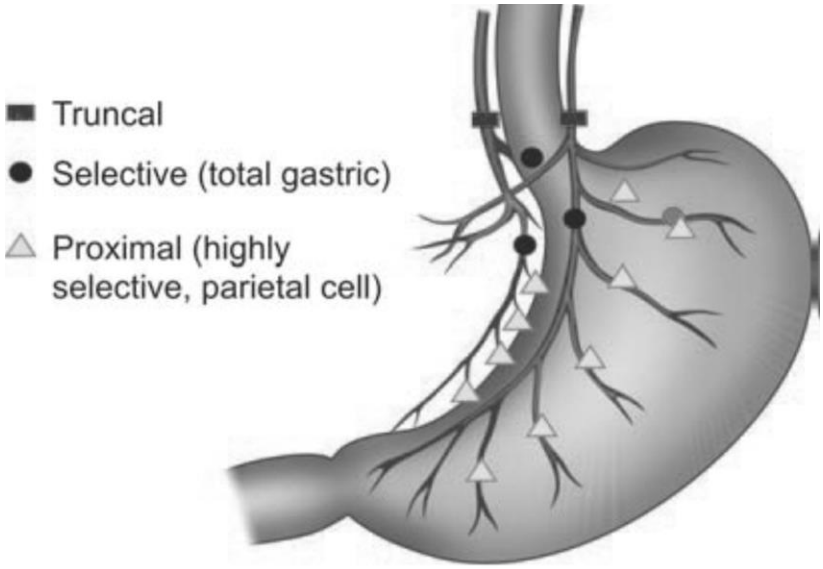


Fig: Types of Vagotomy

Is it possible to do a pyloroplasty?

In gastric outlet obstruction due to complication of chronic duodenal ulcer there is gross scarring of pyloric region so pyloroplasty is not feasible.

Is there any nonoperative means of correcting pyloric stenosis?

- ✓ Pyloric stenosis is a manifestation of burnt out duodenal ulcer disease. A nonoperative treatment has been tried particularly in elderly patient unfit for surgery.
- ✓ Balloon dilatation of stenosed area via an endoscope may be helpful and may need repeated dilatation at an interval of few weeks.
- ✓ Patient also needs treatment with proton pump inhibitors.

Sequelae of peptic ulcer surgery:

1. **Recurrent ulceration:** Just as all peptic ulcers will heal with potent antisecretory agents, so will ulcers that are recurrent after ulcer surgery.
2. **Small stomach syndrome:**
   - ✓ Early satiety follows most ulcer operations to some degree, including highly selective vagotomy.
   - ✓ In this latter circumstance, although there is no anatomical disturbance of the stomach there is loss of receptive relaxation.
3. **Bilious vomiting**
4. **Early dumping (Post-cibal syndrome):**
   Mechanism:

- ✓ The small bowel is filled with foodstuffs from the stomach, which have a high osmotic load, and this leads to the sequestration of fluid from the circulation into the gastrointestinal tract.
- ✓ This can be observed by the rise in the packed cell volume while the symptoms are present.

Features:

Incidence: 5–10%

Relation to meals: Almost immediate

Durations of attack: 30–40 minutes

Relief: Lying down

Aggravated by: More food

Precipitating factor: Food, especially carbohydrate-rich and wet

Major symptoms:

- ✓ Epigastric fullness
- ✓ Sweating
- ✓ Lightheadedness
- ✓ Tachycardia
- ✓ Colic
- ✓ Sometimes diarrhea

Treatment:

- ✓ Small, dry meals are best, and avoiding fluids with a high carbohydrate content also helps.
- ✓ **Somatostatin analogue octreotide**: Given before meals.
  Side effect: Development of gallstones

5. **Late dumping(Post-cibal syndrome):**

Mechanism:

- ✓ This is reactive hypoglycaemia.
- ✓ The carbohydrate load in the small bowel causes a rise in the plasma glucose, which, in turn, causes insulin levels to rise, causing a secondary hypoglycaemia. This can be easily demonstrated by serial measurements of blood glucose in a patient following a test meal.

  Incidence: 5%

  Relation to meals: Second hour after meal

  Durations of attack: 30–40 minutes

  Relief: Food

  Aggravated by: Exercise

  Precipitating factor: Food, especially carbohydrate-rich and wet

  Major symptoms:

  - ✓ Tremor
  - ✓ Faintness
  - ✓ Prostration

Treatment: Same as for early dumping.

6. **Postvagotomy diarrhea:**

Aetiology: Uncertain.

- ✓ It is related, to some degree, to rapid gastric emptying.
- ✓ In all probability, the denervation of the upper gastrointestinal tract as a result of the vagotomy is also important.
- ✓ Exaggerated gastrointestinal peptide responses may also aggravate the condition.

7. **Malignant transformation:** Hypoacidity leads to bacterial proliferation and nitrates production.
8. **Nutritional consequences:** Nutritional disorders are more common after gastrectomy than after vagotomy and drainage.

Weight loss: Common after gastrectomy

Anaemia: May be due to either iron or vitamin B12 deficiency.

- ✓ **Reduced iron absorption** (Due to Diminished splitting of Fe2+ protein complex due to reduced pepsin activity and Loss of gastric juice for iron absorption) (most important factor), **and loss of blood from the gastric mucosa**.
- ✓ Vitamin B12 deficiency is prone to occur after total gastrectomy.
- ✓ In such patients the cause is probably a combination of reduced intrinsic factor production and also the fact that some patients have bacterial colonisation, which results in the destruction of the vitamin B12 in the gut.

Bone disease:

Cause: Duodenum is the main site for calcium absorption and since duodenum is excluded from food absorption.

Treatment: Dietary supplementation, calcium and vitamin D, and exercise.

Gallstones:

Following truncal vagotomy, the biliary tree, as well as the stomach, is denervated, leading to stasis and hence stone formation.

[Baily and Love-26th-1038-1040+R Rajamahendrn-1st -]

PERIPHERAL VASCULAR DISEASES (PVD)

Particulars of the patient:

Name: Rubel Hossain
Age: 30 years
Sex: Male
Religion: Islam
Marital status: Married
Occupation: Farmer
Address: Banorgati, Khulna
Date and time of admission: 29.01.17; 09.00am
Date and time of examination: 29.01.17;08.30am

Chief complaints:

1. Pain in left leg for 1 year.
2. Blackish discoloration of right great toe for 3 months.

History of present illness:

According to statement of the patient he was reasonably well 1 year back. Then he gradually developed pain in left calf region which is cramping in nature, not present in first step and brought on by walking about 1 km, and relieved after taking rest but could continue walking in spite of pain. Distance after which pain appears was decreasing steadily and had to take rest to relieve pain. For last one month, he is having continuous dull aching pain in his left foot which disturbs his sleep and is relieved by keeping leg below the bed. About 2 months back, he noticed gradual black discolouration of his left great toe which is associated with constant dull aching pain in the local site. His other limbs have no complain. He has no H/O of chest pain, blurring of vision, black out or sexual exposure. He has no HO increased frequency of micturition, increased thirst and appetite and weight loss (To exclude DM). His bowel and bladder habit is normal.

History of past illness:

He has no H/O DM, HTN, heart disease, asthma, tuberculosis.

Personal history:

Patient is a chain smoker, taking 20 sticks for 20 years but is abstained for last 3 days. He is non alcoholic. He works bare footed (A risk factor for PVD).

Immunization history:

He is not immunized against HBV. (For surgeon's safety)

Socioeconomic history:

He belongs to a middle class family, lives in semi-pakka house and drinks tube-well water, uses sanitary latrine.

Family history:

All other members of his family are enjoying good health.

Menstrual history: If Female

LMP: 12.02.16
Menstrual flow: Average

Drug history:

He took some tablets from local quack but could not mention the names.

General examination:

Appearance: Anxious/ill looking/normal
Body built: Average
Cooperation: Cooperative
Decubitus: On choice
Nutritional status: Average
Jaundice: Absent
Anaemia: Absent
Pulse: 102/min
BP: 130/80 mm of Hg
Temperature: 100^0 F
Respiratory rate: 14/min
Skin condition: Normal
Clubbing: Absent
Leuconychia: Absent
Koilonychia: Absent
Dehydration: Present
Oedema: Absent
Thyromegaly: Absent
Neck vein: Not engorged
Lymph node: Not palpable
Hernial orifice: Intact
IV cannula, NG tube, catheter: In situ, If present

Local examination:

Inspection:
Right leg: Normal
Left leg:

- ✓ Skin is shiny
- ✓ Loss of hair distribution up to the level of ankle
- ✓ Blackish discolouration of right great toe measuring about 3cmX2cm
- ✓ Demarcation line is clear between gangrenous area and normal area
- ✓ Brittle nail and transverse ridge of nails
- ✓ Slight muscle wasting present

Palpation:
Right leg: Normal
Left leg:

Temperature: Lower in left leg up to mid calf region
Tenderness: Mild
Arterial pulsation:

- ✓ Arteria dorsalis pedis, anterior tibial and posterior tibial: Absent
- ✓ Popliteal and femoral: Present [Mentioning only popliteal is enough]
- ✓ Radio-femoral delay: Absent

Pain and touch sensation: Normal
Jerks: Normal

Lymphadenopathy: Absent

Systemic examination:
CVS examination:
CARDIVASCULAR SYSTEM

Pulse:
102/min
Regular, normal in volume & character, all the peripheral pulses are normal.
BP: 130/80 mm of Hg
JVP: Not raised
Precordium:
Inspection: Normal
Palpation:
Apex beat in left 5th intercostal space 9 cm from midline.
No para-sternal heave and no palpable P2
Auscultation:
S1&S2 audible in all auscultatory area
No added sound and no murmur

Nervous system examination:
Motor system examination
Wasting and fasciculation: Absent
Bulk of the muscle: Normal
Tone of muscle: Normal
Power of the muscle: Normal
Reflex: Normal
Jerks: Normal
Joint movement: Normal
Gait: Normal
Sensory examination: Pain and touch sensation is normal.

Abdominal examination:
Inspection :
Shape: Scaphoid
Movement with respiration: Abdomino thoracic (Male)/ Thoraco abdominal (Female)
Umbilicus: Centrally placed, inverted and vertically slitted
Scratch mark: Absent
No scar mark, engorged vein, visible peristalsis, fullness in right hypochondrium (due to distended gallbladder: Can be seen in very thin patients)

Palpation:

Temperature: Not raised

Tenderness: Non-tender

No palpable mass, muscle guard or hyperesthesia

Liver, spleen, kidney, UB: Not palpable

Percussion:

- ✓ Tympanic
- ✓ Fluid thrill and shifting dullness absent

Auscultation: Bowel sound present
DRE: Revealed no abnormality

Respiratory system examination: Revealed no abnormality

Salient Features:

Mr. Rubel Hossain, 30 years old married, muslim, non-alcoholic, non diabetic, normotensive farmer, hailing from Banorgati, Khulna admitted to SU-III, MMCH with the complaints of pain in left calf region which is cramping in nature, not present in first step and brought on by walking about 1 km, and relieved after taking rest but could continue walking in spite of pain. Distance after which pain appears was decreasing steadily and had to take rest to relieve pain. For last one month, he is having continuous dull aching pain in his left foot which disturbs his sleep and is relieved by keeping leg below the bed. About 2 months back, he noticed gradual black discolouration of his left great toe which is associated with constant dull aching pain in the local site. His other limbs have no complain. He has no H/O of chest pain, blurring of vision, black out or sexual exposure. He has no HO increased frequency of micturition, increased thirst and appetite and weight loss. His bowel and bladder habit is normal. Patient is a chain smoker, taking 20 sticks for 20 years but is abstained for last 3 days. He works bare footed.

On general examination, he is anxious, ill looking, co-operative, average body built and nutritional status. Pulse 102/min, BP 130/80, RR 14/min, temperature normal, no dehydration and oedema. He is non-anaemic, non-ecteric, no cyanosis, no lymphadenopathy, thyromegaly, engorged vein.

On local examination, there are signs of ischemia in left leg evidenced by loss of hair on dorsum of the foot, up to the level of ankle, skin is shiny, nails are brittle and transverse ridges in nails. Temperature of left foot is lower than right foot and temperature in calf region of both limb is same. There is a dry gangrenous area in tip of left great toe measuring about 3cmX2cm, demarcation line is clear between gangrenous area and normal area, tender. On examination of peripheral pulses, absence of left arteria dorsalis pedis, anterior tibial and posterior tibial. Other peripheral pulses are normal.
Other system examination reveals no abnormality.

Provisional diagnosis: Peripheral vascular disease affecting left lower limb with dry gangrene of left great toe probably due to Buerger's disease.

Differential diagnoses: Diabetic gangrene

Investigations: [Answer of the question 'How will you proceed?']

A. **For diagnosis:**
   Color Doppler study: Detection of blood velocity using ultrasonography
B. **Routine:**
   1. CBC
   2. Urine RME
   3. RBS
   4. S. Creatinine
   5. S. calcium
   6. Fasting lipid profile
   7. ECG
   8. HBs Ag
   9. CXR

Confirmatory diagnosis: Peripheral vascular disease affecting left lower limb with dry gangrene of left great toe due to Buerger's disease.

Why do you say that it's a case of Buerger's disease?

A. **Presence of some risk factors:**
   1. Male
   2. Smoker
   3. 30 years
   4. Works bare footed
B. **Symptoms:**
   1. Intermittent claudication followed by rest pain
   2. Dry gangrene in great toe
C. **Signs:** Absence of left arteria dorsalis paedis, anterior tibial and posterior tibial.

What are your DDs? Why?

Diabetic gangrene: Presence of gangrene

Why not?

- ✓ It's a case of dry gangrene, in DM there is moist gangrene
- ✓ No HO DM was reported

What could be the other DDs?

Atherosclerotic gangrene:

Points in favor: Presence of gangrene

Points against: Intermittent claudication present, Arterial in not thickened, CVS examination is normal

Infective gangrene:

Points in favor: Presence of gangrene

Points against: No HO trauma, dry, Intermittent claudication present, no HO fever.

Treatment:

Medical management: RULE OF D's

1. **DON'T :** Smoke, walk bare footed, injure foot
2. **DOES:** Wear shoe, raise heel, exercise
3. **Diet:**

   Reduced fat, cholesterol , sweets .
   - ✓ Increased amounts of fruits & veg.
   - ✓ Wt. reduction – maintains a healthy wt.
   - ✓ Moderation in alcohol intake.
4. **Drug:**
   a. **Antiplatelat drug:** Aspirin – 75 to 325mg/day orally, Clopidrogrel 75mg/ day orally Ticlopidine – 500mg/day orally
   b. Lipid lowering agent: Atova(atorvastatin)
   c. Ca++ antagonist :Nifedipine :10mg 3times daily orally.
   d. Antihistamine :Cinnarizine – 75mg 3 times daily orally.
   e. Vitamin E 300 to 600 mg daily orally.
   f. Dilator methods:
      - ✓ Buerger's position
      - ✓ Buerger's exercise: The patient alternately elevates the limb above the bed and depresses it below the level of the bed. The explanation for relief of rest pain is not clear.
      - ✓ Sympathetic block: Chemical

Surgery: Bilateral lumber sympathectomy with amputation of great toe

PERIPHERAL VASCULAR DISEASES (PVD)

Classification:

A. Arterial disease:
- ✓ Buerger's disease
- ✓ Stenosis
- ✓ Dilatations
- ✓ Arteritis
- ✓ Small vessel abnormalities

B. Venous:
- ✓ Varicose vein
- ✓ Venous thrombosis

C. **Combined:** Arterio-venous fistula

[Lecture of MMC]

Causes of lower limb ischemia:

Chronic:

- ✓ Atherosclerosis
- ✓ Thrombo Angitis Obliterans(TAO)
- ✓ Diabetes
- ✓ Collagen Vascular Disease

Acute:

- ✓ Embolism
- ✓ Trauma
- ✓ Aneurysm

Signs of acute ischemia: 5 P's

1. Pain
2. Pallor
3. Paraesthesia
4. Pulselesness
5. Paralysis

Features of chronic lower limb ischemia: CLAUDICATION

1. **C**old & numbness
2. **L**imb elevation
3. **A**ltered sensation
4. Ulceration
5. **D**ead toe
6. **I**ntractable pain
7. **C**racks & fissures
8. **A**rterial pulsation
9. **T**hrill
10. **I**ntermittent claudication
11. **O**edema
12. **N**arrow calf muscle Girth

[Lecture of MMC]

Intermittent claudication:

Intermittent claudication is a cramp-like pain felt in the muscles that is:

- ✓ Brought on by walking
- ✓ Not present on taking the first step (unlike osteoarthritis)
- ✓ Relieved by standing still (unlike nerve compression from a lumbar intervertebral disc prolapse or osteoarthritis of the spine or spinal stenosis).

The pain of claudication is usually felt in **the calf** because the **superficial femoral artery** is the most commonly affected (70 per cent of cases).

[Baily and love-26th-877]

Substance responsible: Substance P, Lactic acid

Neurogenic claudication:

This is pain in the legs during walking due to some neurological cause and is usually due to nerve compression.

How will you differentiate a neurogenic and vascular claudication?

VASCULAR CLAUDICATION	NEUROGENIC CLAUDICATION
Patient usually has pain after walking for some distance	After standing or walking
Patient gets relief by simply taking rest	Immediately after stopping walk or on assuming some posture so as to relieve compression of nerve
All peripheral pulses are not palpable	All peripheral pulses are palpable
Other signs of ischemic changes are present	No ischemic change

Grades of intermittent claudication BOYD's classification:

GRADE I:

- ✓ After walking for sometimes patient has pain, however the pain disappears when the patient continues to walk.
- ✓ The pain producing substances are washed off by the adequate collateral supply.

GRADE II: Patient has pain after walking but he can continue to walk in spite of slight pain.

GRADE III: Patient has pain after walking for sometime with continued walking the pain aggravates and patient has to take rest to get relief from pain.

Rest pain:

Continuous pain throughout day and night in the limb due to severe ischaemia.

Cause: Due to ischaemia of the nerves **("cry of dying nerves")**

Why rest pain is more severe at night?

- ✓ During sleep there is diminution of heart rate and blood pressure may be lower
- ✓ This result in further hypoperfusion and may aggravate the ischaemic pain

Fontaine classification of limb ischemia:

Stage 1: No clinical symptoms
Stage 2: Intermittent claudication
2a: well compensated
2b: poorly compensated
Stage 3: Rest pain
Stage 4: Gangrene, ulcer

What is pregangrene?

The comination of rest pain, color change, oedema and hyperasthesia with or without ischemic ulceration called pregangrene.

BUERGER'S DISEASE

Definition:

This condition is characterized by-

1. Occlusive disease of small and medium sized arteries (plantar, tibial , radial) ,
2. Thrombophlebitis of superficial and deep veins and

3. Reynaud's syndrome

[Baily and love-26th-877]

Don't confuse:

Buerger's disease

Berger's disease: IgA nephropathy

Why also called thromboangitis obliterans?

- ✓ There is inflammation of all layers of arteries=Panarteritis
- ✓ Formation of thrombus= Obliteration of lumen

Causes:

Smoking (if ask for only cause tell it)

Other causes:

- ✓ Low socioeconomic status (disease of poor)
- ✓ Recurrent minor foot injury
- ✓ Poor hygiene: Bare footed walking persons suffer more
- ✓ Hormonal
- ✓ Familial

NB: Civilized people suffer from IHD, poor people suffer from BD

Pathology : Cell mediated hypersensitivity to Type I & Type III collagen

Common sites:

Limb: Lower limb (almost always)

Vessel: Small and medium sized

Characters:

- ✓ Segmental
- ✓ Progressive
- ✓ Occlusive
- ✓ Inflammatory

[Lecture of MMC]

Management:

History:

Sex: Usually male

Age: <30 years

Personal history: Detail history of smoking, pack years index

Symptoms:

1. **Pain:**
   - ✓ **Site of pain:** Foot, calf or thigh (idea about blockage)
   - ✓ **Claudication distance and grade**
   - ✓ **Rest pain present or not:** If rest pain is present – site of rest pain in the toes / foot / calf /over the ulcer or gangrenous area.
2. **Ulceration:** Onset, any history of trauma, progress, any pain over the site
3. **Gangrene:** Onset, any history of trauma, progress, any pain over the site
   - ✓ Ulceration and gangrene usually starts from great toe
   - ✓ Gangrene is dry

- ✓ Gangrenous part is usually dry, shriveled mummified and black (Black is due to disintegration of Hb and formation of iron sulphide)

4. **Coldness, numbness or paresthesia**
   - ✓ **Numbness:** Diminished sensation
   - ✓ **Paresthesia:** Abnormal sensation

Signs:

General examination:

Decubitus: Patient may be comfortable with the affected legs hanging below the level of bed.

Pulse: Absence of a pulse signifies arterial obstruction proximal to the area palpated.

Local examination:

Examination of both lower limbs:

Inspection: Keep both lower limbs side by side. Look for signs of peripheral ischaemia.

- ✓ Gangrene
- ✓ Loss of toe
- ✓ Muscle wasting

Palpation:

- ✓ Skin temperature
- ✓ Gangrene
- ✓ Ulceration

Special tests for assessment of circulatory insufficiency:

Buerger's postural test:

- ✓ Keeping the patient supine in bed, raise the legs gradually and keep the leg at angle of 20 degree to the bed for 2 minutes and observe for appearance of pallor or any discomfort (pain)
- ✓ If no pallor appears at 20 degrees, elevate the leg to 30 degree/45 degrees/60 degrees and 90 degrees and look for appearance of pallor or discomfort at a particular angle.
- ✓ Mention the angle at which pallor appears or patient complains of discomfort (pain). This angle is called Buerger's angle of circulatory insufficiency.

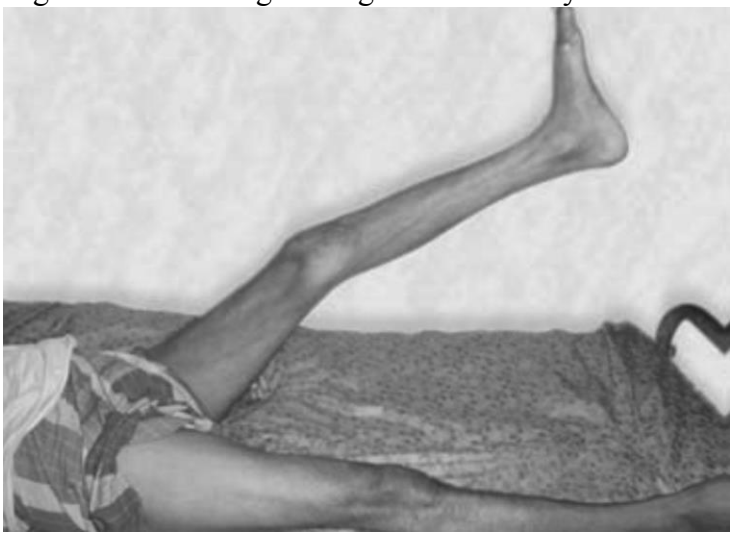


Figure: Buerger's test

Capillary filling time:

- ✓ After estimating the vascular angle by noting the level at which pallor appears, patient is asked to sit up and hang his leg below the bed
- ✓ A normal leg will maintain the pink colour. An ischaemic leg will show change of colour from pallor to pink and red purple colour.
- ✓ The time taken for the appearance of pink colour is called the capillary filling time and this depends upon the degree of arterial obstruction.
- ✓ A capillary filling time more than 30 seconds suggests severe ischaemia.
- ✓ Appearance of the bed purple colour in the dependant leg also suggests severe ischaemia.

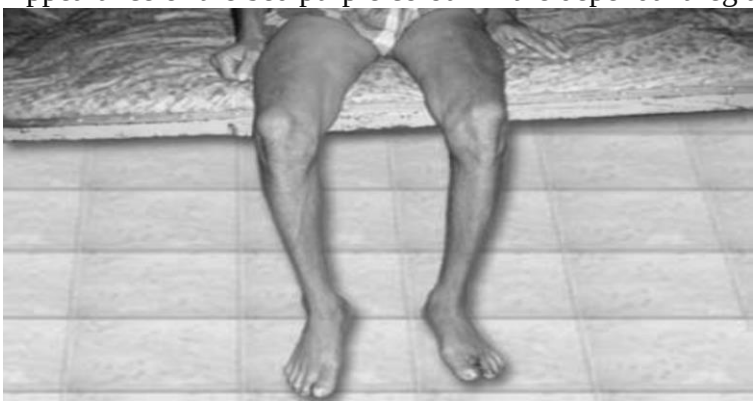


Figure: Capillary filling time

Venous refill:

- ✓ Empty a segment of vein by milking with two index fingers and the distal finger is released
- ✓ Note the time of venous refilling

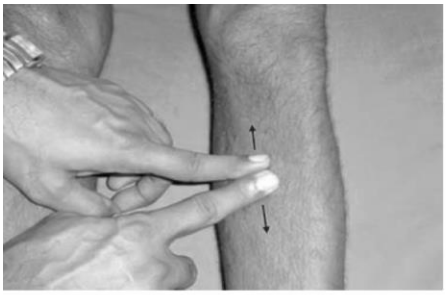


Figure 8.9A: Place two index fingers side by side

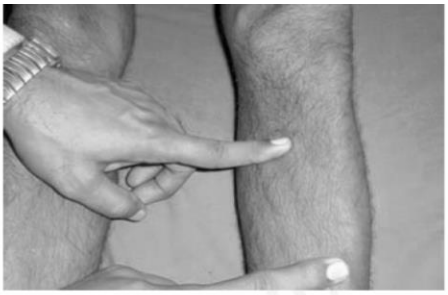


Figure 8.9B: Empty the segment of vein by milking with the two index fingers

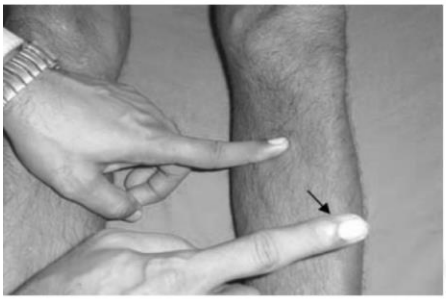


Figure 8.9C: Release the distal finger and note the time required for venous refilling

Figure: Venous refill

Crossed leg test or Fuchsig's test:

- ✓ Method: Patient sits on a chair with the legs crossed one knee resting on the other. Divert attention and look for oscillatory movement of upper leg.
- ✓ If oscillatory movement is seen – then popliteal pulse is present, if oscillatory movement is absent – then popliteal pulse is absent.

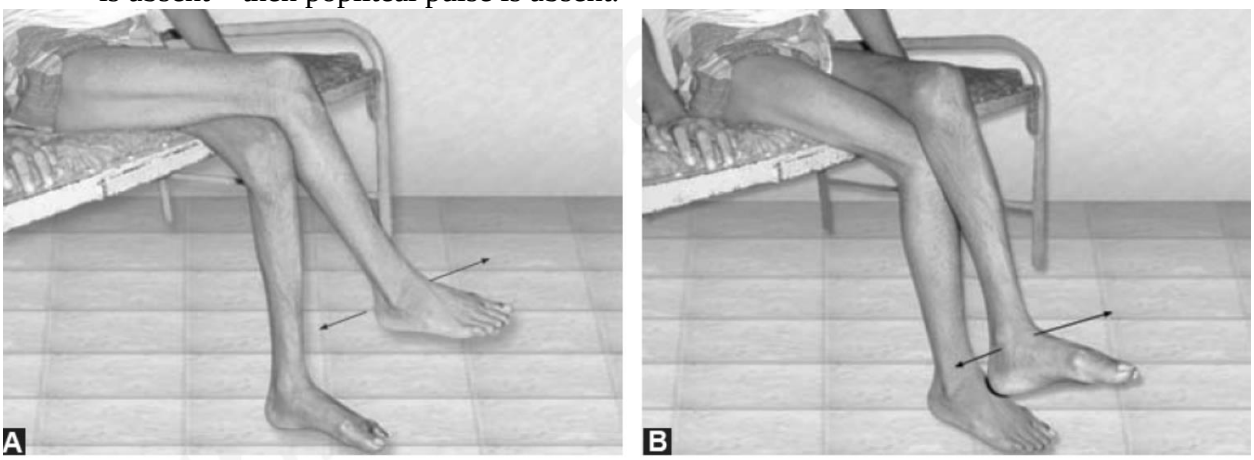


Figure: Crossed leg test or Fuchsig's test

Reactive hyperaemia test:

- ✓ Inflate the sphygmomanometer cuff around the limb and inflate the cuff to about 250 mmHg and keep for 5 minutes
- ✓ A pallor will appear release the pressure in the cuff
- ✓ Record the time interval between the release of cuff and appearance of red flush in the skin
- ✓ In presence of normal circulation the red flush appear within 12 seconds
- ✓ In a severely ischaemic limb the red flush may not appear at all

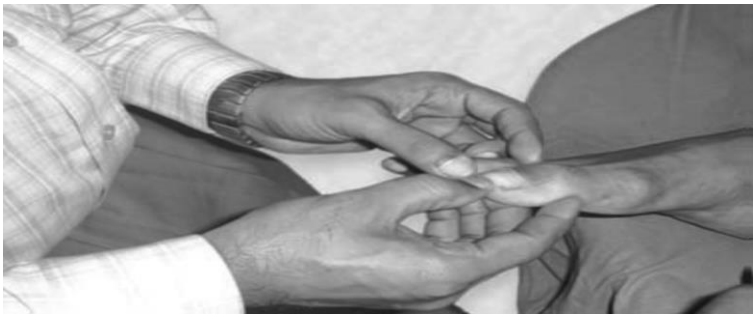
Guttering of veins:

- ✓ In a normal person the veins on the legs are full, when the legs are raised above the level of heart the veins collapse
- ✓ However if the circulation is normal the veins do not empty completely
- ✓ In ischaemic limbs the veins may remain collapsed
- ✓ In case of severe ischaemia on raising the limb to 10 to 15 degree pale blue gutters may appear along the course of veins.

Disappearing pulse: When peripheral pulses are apparently normal, exercise the patient to point of claudication. Then previously apparently pulse disappear.

Explanation: exercise produce vasodilation below obstruction and arterial flow is reduced by obstruction. So, arterial pressure is decreased and pulse disappear.

Capillary refilling: Press the nail bed/or the pulp/and then release. Look for the rapidity of capillary refilling.



Auscultation: Systolic bruit

Examination of peripheral pulse:

- ✓ **Arteria dorsalis pedis pulse:** On the dorsum of the foot lateral to the tendon of extensor hallucis longus at the proximal intermetatarsus space.
- ✓ **Anterior tibial artery pulse:** in front of the ankle midway between the two malleoli and just lateral to the extensor hallucis longus tendon.
- ✓ **Posterior tibial pulse:** at a point one third of the way between the tip of medial malleolus and the point of the heel, slightly inverting the foot to relax the flexor retinaculum.
- ✓ **Popliteal pulse:** Patient supine, flex the knee to 135 degrees, the popliteal artery is palpated
- ✓ against the tibia in between the medial and lateral condyles of tibia by placing the thumbs over
- ✓ the tibial tuberosity and palpating fingers kept in the intercondylar area of the tibia.
- ✓ **Femoral pulse:** Midway between the anterior superior iliac spine and the symphysis pubis.
- ✓ **Radial pulse:** just above the wrist joint in between the tendon of flexormcarpi radialis and the lateral border of the lower end of the radius.
- ✓ **Brachial pulse:** In front of the elbow medial to the tendon of biceps brachialis.
- ✓ **Axillary pulse:** In the lateral wall of the axilla against the shaft of humerus in between the two axillary folds.

SYSTEMIC EXAMINATION:

Examination of abdomen: Buerger's disease can cause intestinal ischemia.

Examination of cardiovascular system: So may be misdiagnosed as buergers disease if CVS overlooked.

- ✓ Mitral stenosis(young age)
- ✓ Embolism
- ✓ Ischemia in limb

INVESTIGATIONS:

Routine:

1. CBC, Hb% : To exclude anaemia or polycythaemia
2. RBS: To exclude DM
3. lipid profile: To exclude atherosclerosis due to hyperlipidemia

4. S. Creatinine
5. ECG: To exclude IHD
6. CXR
7. Urine RME

Specific:

1. **Color Doppler study:** Detection of blood velocity using ultrasonography
2. Duplex scan
3. ABPI
4. Angiography : Appropriate for arterial disease
5. DSA(Digital Subtraction Angiography)
6. CT Angiogram / MR Angiogram

Treatment:

Principles of management:

1. To relieve pain
2. To arrest the progression
3. To improve patients physical condition,mobility,functional condition.
4. Prevention of complication.
5. Prevention of sensory / motor impairment.
6. Prevention of skin.
7. Prevention of amputation
8. Prevention of risk factor[smoking,diabetes,hyperlipidemia]

Medical management: RULE OF D's

1. **DON'T :** Smoke, walk bare footed, injure foot
2. **DOES:** Wear shoe, raise heel, exercise
3. **Diet:**
   Reduced fat, cholesterol , sweets .
   - ✓ Increased amounts of fruits & veg.
   - ✓ Wt. reduction – maintains a healthy wt.
   - ✓ Moderation in alcohol intake.
4. **Drug:**
   a. **Antiplatelat drug:** Aspirin – 75 to 325mg/day orally, Clopidrogrel 75mg/ day orally Ticlopidine – 500mg/day orally
   b. Lipid lowering agent: Atova(atorvastatin)
   c. Ca++ antagonist :Nifedipine :10mg 3times daily orally.
   d. Antihistamine :Cinnarizine – 75mg 3 times daily orally.
   e. Vitamin E 300 to 600 mg daily orally.
   f. **Dilator methods:**
      - ✓ Buerger's position
      - ✓ Buerger's exercise: The patient alternately elevates the limb above the bed and depresses it below the level of the bed. The explanation for relief of rest pain is not clear.
      - ✓ Sympathetic block: Chemical

g. Surgery:

A. Indirect:

- ✓ Sympathectomy
- ✓ Chemical
- ✓ Lumbar

B. Direct:

- ✓ Omentoplasty
- ✓ Profundoplasty
- ✓ PTCA
- ✓ PABG
- ✓ Amputaion

Indication of surgery:

Absolute:

- ✓ Rest pain
- ✓ Ulceration
- ✓ Gangrene

Relative:

- ✓ Intermittent claudication in respect to patient age & work

[Lecture of MMC+ Bedside clinics in surgery-2nd-302-322]

How does lumbar sympathectomy help in these patients?

- ✓ Lumbar sympathectomy results in cutaneous vasodilatation and may improve cutaneous circulation. Rest pain may be relieved.
- ✓ If an amputation is required, the level of amputation may be lowered following sympathectomy.

Which sympathetic ganglia will you remove in lumbar sympathectomy?

- ✓ If unilateral sympathectomy is done L1, L2, L3 and L4 ganglia needs removal for sympathetic denervation of lower limb
- ✓ If bilateral sympathectomy is done on one side L1 ganglion is to be preserved otherwise patient will develop impotence.

[Bedside clinics in surgery-2nd-319]

What is chemical sympathectomy?

Lumbar sympathetic trunk may be blocked by injecting phenol into the lumbar sympathetic ganglion under fluoroscopic control. about 5 mL of phenol in water (1:16) is injected into the lumbar sympathetic trunk besides the bodies of the second and fourth lumbar vertebra taking care not to inject the chemical into the aorta or the inferior vena cava.

How will you assess whether a proper sympathectomy has been done or not?

There is increase in skin temperature and the limbs become warm after sympathectomy and the rest pain disappears after a good lumbar sympathectomy.

[Bedside clinics in surgery-2nd-320]

What are the pathological changes in the vessels?

Buerger's disease is a condition of panvasculitis, involving all the layers of the arteries and the veins, and leads to thrombotic occlusion of these vessels.

There are inflammatory changes in all the layers of the vessels:

- ✓ Tunica adventitia: There is proliferation of vasa vasorum with lymphocytic infiltration and abundance of fibroblasts in this layer
- ✓ Tunica media: There is lymphocytic infiltration
- ✓ Tunica intima: There is intimal proliferation leading to intimal cushion formation and narrowing of lumen of the artery and there is lymphocytic infiltration

[Bedside clinics in surgery-2nd-320]

What is Raynaud's phenomenon?

These are sequences of changes in the limbs on exposure to cold.

1. **Stage I (Stage of pallor or local syncope or hypoxia):** When exposed to cold, the arterioles undergo spasm. This results in pallor of the fingers.
2. **Stage II (Stage of local cyanosis):** With accumulation of metabolite, there is dilatation of the capillaries and the capillaries become filled with deoxygenated blood; the digits therefore become blue.
3. **Stage III (Stage of red engorgement):** as the attack passes off the precapillary sphincter relaxes but the post capillary sphincter remains in spasm. The capillary bed now gets filled up with oxygenated blood and there is congestion of the local area with red blood, the digits become swollen and appear dusky red. afterwards the post capillary sphincter relaxes and the blood returns from the local site and the attack passes off.
4. **Stage IV (Stage of ischemic gangrene):** Repeated such attacks may lead to ischemic changes in the limbs and there maybe resorption of the terminal phalanx.

[Bedside clinics in surgery-2nd-321]

ABPI: By measuring the ankle blood pressure and blood pressure at the arm (brachial blood pressure) it is possible to find the ratio of ankle and brachial blood pressure (ABPI).

ABPI = ankle blood pressure/Brachial blood pressure

Interpretation:

- ✓ In a normal person the ABPI is more than 1
- ✓ ABPI = between 0.9 and 0.5 suggest mild occlusive disease usually presents with claudication
- ✓ ABPI= between 0.5 and 0.3 suggest severe ischemia presents with rest pain
- ✓ ABPI= less than 0.3 suggest critical ischemia and incipient necrosis

ABPI may be normal at rest with mild ischemia. after exercise in normal person aBPI will increase but in patient with occlusive arterial disease the aBPI will drop

[Bedside clinics in surgery-2nd-317]

Chronic CLI is defined as **>2 weeks** of rest pain, ulcer or tissue loss and characterized by

- ✓ Ankle–brachial index ≤ 0.4
- ✓ Ankle systolic pressure ≤ 50 mmHg
- ✓ Toe systolic pressure ≤ 30 mmHg

[Lecture of MMC]

Leriche's syndrome:

When there is aorto-iliac obstruction, there are claudication in both buttocks, thighs, calf muscles and impotency present.

[Lecture of MMC]

Amputation:

Indications:

- ✓ Severe symptoms not amenable to or failed revascularization
- ✓ Gangrenous tissue/ nonfunctional
- ✓ Life threatening infection
- ✓ 25% patient of CLI require amputation/yr and 25% die within 1 yr due to cardiovascular involvement

[Lecture of MMC]

Latest mode of treatment:

Therapeutic angiogenesis

- ✓ Gene transfer by use of 4000mg naked plasmid DNA encoding VEGF injected directly in ischemic limbs
- ✓ Stem cells
- ✓ Autologous progenitor cells
- ✓ Growth factors such as basic fibroblast growth factor (bFGF), and
- ✓ Transcription factors such as hypoxiainducible factor1
- ✓ Spinal cord stimulation

[Lecture of MMC]

RENAL STONE

Particulars of the patient:

Name: Sakib Al Hasan
Age: 30 years
Sex: Male
Religion: Islam
Marital status: Married
Occupation: Farmer
Address: Muktagancha, Mymensingh
Date and time of admission: 25.01.17; 10.00am
Date and time of examination: 26.01.17; 11.00am.

Chief complaints:

1. Pain in left loin for 1 year.
2. Occasional fever for 6 month.
3. Passage blood mixed urine for 1 month.

History of present illness:

According to the statement of the patient, he was reasonably well 1 year back. Then he gradually developed pain in right loin which is dull, fixed with no radiation and aggravated by jolting specially during climbing stairs and relieved by medications, sometimes it comes with sudden sharp pain, no association with nausea and vomiting and taking food and the pain has become more severe in last 3 days. He also complained of occasional fever for last 6 months which is associated with chills and rigor, relieved after taking medication and evening rise of temperature was not reported (Exclude TB). He has also complained of passing blood mixed with urine which is painful, scanty in amount. He has no other bladder and bowel complain. He has no history of trauma (Exclude traumatic haematuria). He has no history of blood transfusion. He has no cough, chest pain, haemoptysis, jaundice, haematemesis, malena and contact with TB patient (Exclude renal TB and Ca). With the above complaints he got herself admitted in Surgery Unit III of MMCH for better management.

History of past illness:

No H/O DM, HTN, TB, IHD.

Treatment history:

He took some medications suggested by local pharmacist but could not mention the name.

Personal history:

Non-smoker, non-alcoholic.

Family history:

All other members of his family enjoy good health.

Socio-economic History:

She belongs to a low middle class family.

Immunization history:

She is fully immunized as per EPI schedule.

History of allergy:

He has no known allergy to any drug.

General Examination:

Appearance: Anxious, ill looking
Body Built: Average
Co-operation: Co-operative
Decubitus: On choice
Nutrition: Average
Anemia: (-)
Jaundice: Absent
Cyanosis: Absent
Clubbing: Absent
Koilonychia: Absent
Leuconychia: Absent
Dehydration: Absent
Oedema: Absent
Engorged vein: Absent
Pigmentation: Absent
Thyroid Gland: Not palpable
Hair distribution: Normal
Pulse: 84/min
Blood pressure: 130/70 mm of Hg
Respiratory Rate: 14/min
Temperature: Normal
Bony tenderness: Absent
Lymph Nodes: Not palpable.

Systemic Examination:

Abdomen:

Inspection: Abdomen is normal in size and shape, umbilicus-inverted. There are no visible veins or scar mark. Hernial orifice intact.

Palpation: No organomegaly

Percussion: Tympanic

Auscultation: Bowel sound present

DRE: Reveals no abnormality

Genitourinary system:

Testes: Normal

Penis, external urethral meatus, floor of anterior urethra: Normal

No suprapubic fullness or tenderness

Kidney:

Not palpable or ballotable

Right renal angle tenderness: Present

Other systems: No abnormality

Salient Features:

Mr. Sakib Al Hasan, 30 years old married, muslim, non-smoker, non-alcoholic, non diabetic, normotensive farmer, hailing from Muktagancha, Mymensingh admitted to SU-III, MMCH with the complaints of pain in right loin for 1 year which is dull, fixed with no radiation and aggravated by jolting specially during climbing stairs and relieved by medications, sometimes it comes with sudden sharp pain, no association with nausea and vomiting and taking food and the pain has become more severe in last 3 days. He also complained of occasional fever for last 6 months which is associated with chills and rigor, relieved after taking medication and evening rise of temperature was not reported. He has also complained of haematuria which is painful, scanty in amount. He has no other bladder and bowel complain. He has no history of trauma. He has no history of blood transfusion, cough, chest pain, haemoptysis, jaundice, haematemesis, malena and contact with TB patient.

On general examination, he is anxious, ill looking, co-operative, average body built and nutritional status. Pulse 84/min, BP 130/80, RR 14/min, temperature normal, no dehydration and oedema. He is non-anaemic, non-ecteric, no cyanosis, no lymphadenopathy, thyromegaly, engorged vein.

On genitourinary and alimentary system, everything is normal except right renal angle tenderness present. Other system examination reveals no abnormality.

Provisional diagnosis: Right sided renal stone

Differential diagnoses: Renal TB

Investigations: [Answer of the question 'How will you proceed?']

For diagnosis:

1. X-ray 'KUB'
2. IVU
3. Ultrasound
4. Contrast-enhanced CT (Don't tell except asked for it)

Routine:

1. CBC
2. Urine RME
3. RBS
4. S. Creatinine
5. S. calcium
6. CXR
7. ECG
8. HBs Ag

Confirmatory diagnosis: Right sided renal stone

Treatment:

A. Conservative: If calculi smaller than 0.5 cm.

- ✓ Plenty of water intake
- ✓ Physical exercise: Jolting
- ✓ Antibiotic: To prevent infection
- ✓ Analgesic: NSAIDs(diclofenac and indomethacin), antispasmotic (propantheline)

B. **Surgical treatment:**

Modern methods:

1. Percutaneous nephrolithotomy(PCNL):
2. Extracorporeal shock wave lithotripsy(ESWL):
3. PCNL+ESWL

Open surgery:

1. Pyelolithotomy
2. Extended pyelolithotomy
3. Nephrolithotomy
4. Partial nephrectomy

Why do you say that it is nephrolithisiasis?

1. Pain in left loin for 1 year.
2. Occasional fever for 6 month.
3. Passage blood mixed urine for 1 month.
4. Renal angle tenderness present in right side.
5. No H/O contact with TB patient was reported.

Why do you say that it is renal TB?

- ✓ Renal pain
- ✓ Haematuria

Why not renal TB?

- ✓ No H/O contact with TB patient was reported.
- ✓ Normal urinary frequency
- ✓ No H/O weight loss, evening rise of temperature

RENAL CALCULI

Renal calculi are common.

Aetiology:

1. **Dietetic:** Deficiency of vitamin A causes desquamation of epithelium forming a nidus on which a stone is deposited. (This mechanism is probably active in the formation of bladder calculi.)
2. **Altered urinary solutes and colloids:**
   - ✓ Dehydration concentrates urinary solutes until they precipitate.
   - ✓ Reduction of urinary colloids, which adsorb solutes, or mucoproteins, which chelate calcium, might tend to crystal and stone formation.
3. **Decreased urinary citrate:** The presence of citrate in urine as citric acid, keeps relatively insoluble calcium phosphate and citrate in solution.
4. **Renal infection:**

- ✓ Infection favours the formation of urinary calculi.
- ✓ Clinical and experimental stone formation are common when urine is infected with urea-splitting *streptococci, staphylococci* and especially *Proteus* spp.

5. **Inadequate urinary drainage and urinary stasis:** Stones are liable to form when urine is static.
6. **Prolonged immobilization:**
   - ✓ Immobilisation is liable to result in skeletal decalcification.
   - ✓ An increase in urinary calcium favouring the formation of calcium phosphate calculi.
7. **Hyperparathyroidism:** Hyperparathyroidism leading to hypercalcaemia and hypercalciuria.

[Baily and Love-26th-1292]

Types of renal calculus:

1. **Oxalate calculus (calcium oxalate):** Early manifestation i.e. haematuria due to its projection leading to early diagnosis and good prognosis.
   Criteria:
   - ✓ Oxalate stones are irregular with sharp projections.
   - ✓ A calcium oxalate monohydrate stone is hard and radiodense.
2. **Phosphate calculus:** Late detection and worse prognosis.
   Composition: Calcium phosphate often with ammonium magnesium phosphate (struvite).
   Criteria:
   - ✓ Smooth and dirty white.
   - ✓ Grows in alkaline urine, especially when urea-splitting Proteus organisms are present.
   - ✓ May enlarge to fill most of the collecting system, forming a stag-horn calculus.
   - ✓ Even a large stag-horn calculus may be asymptomatic for years until it presents with haematuria, urinary infection or renal failure.
3. **Uric acid and urate calculi:**
   - ✓ Hard, smooth and often multiple and multifaceted.
   - ✓ Pure uric acid stones are radiolucent. (Usually diagnosed in IVU as filling defect).
   - ✓ Most uric acid stones contain some calcium, so they cast a faint radiological shadow.
4. **Cystine calculus:**
   - ✓ An uncommon congenital error of metabolism leads to cystinuria.
   - ✓ Cystine stones are often multiple and may grow to form a cast of the collecting system.
   - ✓ Cystine stones are radio-opaque and very hard.

[Baily and Love-26th-1292+Lecture of MMC]

Management:

Clinical features:

- ✓ Ages: 30 and 50 years (Approximately 50 % of patients)
- ✓ Male:female= 4:3

Symptoms:

1. **Asymptomatic**
2. **Pain:**

Site: Renal angle, the hypochondrium, or in both
Character: Fixed renal pain
Radiation: No
Duration: Rarely lasts more than 8 hours in the absence of infection
Exacerbating factor: worse on movement
Association: No pyrexia

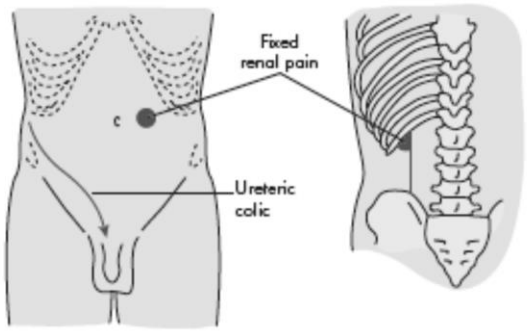


Figure 75.23 The usual distribution of renal pain.

3. **Haematuria:** Due to irritation by the stone.
   - ✓ Usually small in amount.
   - ✓ Common and sometimes is the only symptom of stone disease.
4. **Pyuria:**
   - ✓ Infection is particularly dangerous when the kidney is obstructed.
   - ✓ Pressure builds in the system, organisms are forced into the circulation and a septicaemia can quickly develop.
   - ✓ Stones may cause pyuria by irritating the urothelium even in the absence of infection.

Sign:

General examination:

Pulse: Rises because of the severe pain

Abdominal examination:

- ✓ Tenderness and rigidity in renal angle: Renal angle tenderness positive
- ✓ Percussion over the kidney produces a stab of pain. (Murphy's Kidney punch test)
- ✓ Palpable loin swelling (rare): In hydronephrosis or pyonephrosis

Investigation:

Routine:

1. CBC: Neutrophilic leukocytosis in presence of infection
3. Urine RME:
   - ✓ Pus cell if associated with infection
   - ✓ RBC due to haematuria
   - ✓ Crystal of stones (Spiky= oxalate, Envelop shaped=Phosphate, Hexagonal =Cystine)

2. RBS
3. S. Creatinine
4. S. calcium
5. CXR
6. ECG

Specific:

1. **X-ray 'KUB'**(= kidney, ureters and bladder):Shows radiaopaque paravertebral shadow.
2. **IVU**: Will establish the presence and position of a calculus and the function of the other kidney.
3. **Ultrasound scanning:** Is of most value in locating stones for treatment by extracorporeal shock wave lithotripsy (ESWL)
4. **Contrast-enhanced CT**

Treatment:

A. Conservative: Calculi smaller than 0.5 cm pass spontaneously unless they are impacted. Infection in an upper urinary tract obstructed by stone is dangerous and needs urgent surgical intervention.

- ✓ Plenty of water intake
- ✓ Physical exercise: Jolting
- ✓ Antibiotic: To prevent infection
- ✓ Analgesic: NSAIDs(diclofenac and indomethacin), antispasmotic (propantheline)

B. **Surgical treatment:**

- ✓ Antibiotic treatment starts before surgery and continues afterwards.
- ✓ Open operations are still needed when appropriate expertise is not available or newer techniques have failed.

Modern methods:

1. **Percutaneous nephrolithotomy(PCNL):**
   - ✓ Small stones may be grasped under vision and extracted whole.
   - ✓ Larger stones are fragmented by an ultrasound, laser or electrohydraulic probe and removed in pieces.
   - ✓ A nephrostomy drain is left in the system when the procedure is complete. This decompresses the kidney and allows repeated access if necessary.

   Complications:

   - ➢ Haemorrhage: From the punctured renal parenchyma
   - ➢ Perforation of the collecting system with extravasation of saline irrigant
   - ➢ Perforation of the colon or pleural cavity during placement of the percutaneous track.
2. **Extracorporeal shock wave lithotripsy(ESWL):**

Procedure:

- ✓ Crystalline stones disintegrate under the impact of shock waves produced by the ESWL machine.
- ✓ The shocks may be aimed by ultrasound or x-ray imaging.

Complications:

a. Infection (Principal complication**):**

- ✓ Many calculi contain bacteria, which are released from the broken stone.
- ✓ It is wise to give prophylactic antibiotics before ESWL, and an obstructed system should be decompressed by a ureteric stent or percutaneous nephrostomy before treatment.

b. Ureteric colic (common): The patient needs analgesia, usually in the form of a NSAIDs.

3. **PCNL+ESWL:** In the treatment of complex (stag-horn) calculi.

Open surgery for renal calculi: Operations for kidney stone are usually performed via a loin or lumbar approach.

1. **Pyelolithotomy:** Is indicated for stones in the renal pelvis.
2. **Extended pyelolithotomy**
3. **Nephrolithotomy**
4. **Partial nephrectomy:** sometimes preferable for a stone in the lowermost calyx with infective damage to the adjacent parenchyma.

[Baily and Love-26th-1293-95+Lecture of MMC]

Open surgeries of kidney:

- ✓ Lateral decubitus with site to be operated up
- ✓ Done through incision on flank

Treatment of bilateral renal stones:

- ✓ Usually the kidney with better function is treated first.
- ✓ If the other kidney is more painful or there is pyonephrosi: Treat it first.
- ✓ Operation of other kidney: 2-3 months later

[Baily and Love-26th-1295+Lecture of MMC]

Prognosis: Recurrence rate may be as high as 40%.

Opacities on a plain abdominal radiograph that may be confused with renal calculus:

1. **Calcified mesenteric lymph node:** Calcified mesenteric nodes and opacities within the gut will be anterior to the vertebral bodies on a lateral x-ray and thus outside the urinary tract.
2. Gallstones or concretion in the appendix
3. Tablets or foreign bodies in the alimentary canal (e.g. cyclopenthiazide (Navidrex-K))
4. Phleboliths – calcification in the walls of veins, especially in the pelvis
5. Ossified tip of the 12th rib
6. Calcified tuberculous lesion in the kidney
7. Calcified adrenal gland

[Baily and Love-26th-1293]

How will you differentiate renal stone from gall stone?

1. I will take X-ray lateral view:
   - ✓ Gall stone: Anterior to the vertebral body
   - ✓ Kidney stone: Posterior to the vertebral body or overlaps the vertebral body
2. Ultrasonography

Why do phosphate stones become very large before they produce any symptoms?

- ✓ The phosphate calculi has smooth surface and grows in alkaline urine.
- ✓ The bacteria in urine (Proteus sp) splits urea into ammonia and renders the urine alkaline allowing further increase in size of this stone due to deposition of calcium phosphate.

Why are oxalate stones commonly associated with hematuria?

- ✓ Oxalate stones are irregular in shape and covered with sharp projections, which may cause recurrent bleeding.
- ✓ The stones get discolored by the pigments of altered blood.

[Bedside Clinics in surgery-2nd-691]

Prevention of recurrence:
Ideally, stone formers should be investigated to exclude metabolic factors, although the diagnostic yield is low in patients with a single small stone.

A. **Investigations** in bilateral and recurrent stone formers:
   - ✓ Urine RME: Screening for infection
   - ✓ Serum calcium: measured fasting on three occasions to exclude hyperparathyroidism;
   - ✓ Serum uric acid
   - ✓ urinary urate, calcium and phosphate in a 24-hour collection; the urine should also be screened for cystine;
   - ✓ Analysis of any stone passed.

B. **Dietary advice:**
   - ✓ Those who consume excessive amounts of milk products (calcium stones), rhubarb, strawberries, plums, spinach and asparagus (calcium oxalate stones) should be advised to be more moderate.
   - ✓ Patients with hyperuricaemia should avoid red meats, offal and fish, which are rich in purines, and should be treated with allopurinol.
   - ✓ Eggs, meat and fish are high in sulphur-containing proteins and should be restricted in cystinuria.
   - ✓ Stone sufferers should drink plenty to keep their urine dilute.

C. **Drug treatment:** Is largely ineffective except in those few patients who are shown to have idiopathic hypercalciuria. Bendroflumethiazide (5 mg) and a calcium-restricted diet reduce urinary calcium.

[Baily and Love-26th-1293]

Complications of renal calculi:

1. Increased possibility of infection
2. Recurrence
3. Hydronephrosis
4. Pyenephrosis

What is nephrocalcinosis?

Precipitation of calcium in tubules, parenchyma and glomeruli (Occasionally). It always cause severe functional impairment of kidney.

Causes:

- ✓ Hyperparathyroidism (Primary or secondary)
- ✓ Excessive milk-alkali or vitamin D intake

URETERIC CALCULUS

A stone in the ureter usually comes from the kidney. Most pass spontaneously.

Management:
Clinical features:
Symptoms:

1. **Pain (Ureteric colic)**:
   Site: Loin
   Character: Intermittent, agonising
   Radiation:

- ✓ Typically referred to the groin, external genitalia and the anterior surface of the thigh
- ✓ As the stone enters the bladder, the pain can be referred to the tip of the penis

2. **Impaction:** There are five sites of narrowing where the stone may be arrested.
   - ✓ More consistent dull pain, often in the iliac fossa and increased by exercise and lessened by rest.
   - ✓ Distension of the renal pelvis due to obstruction may cause loin pain.
   - ✓ Severe renal pain subsiding after a day or so suggests complete ureteric obstruction.
3. **Haematuria:** Very common
   - ✓ Transient microscopic haematuria
   - ✓ Serious bleeding is uncommon and should suggest clot colic

Signs:

Abdominal examination:

- ✓ Tenderness and some rigidity over some part of the course of the ureter.
- ✓ Kidney may be palpable: In case of hydronephrosis and pyonephrosis

Investigation:

Routine:

1. CBC: Neutrophilic leukocytosis in presence of infection
2. Urine RME:
   - ✓ Pus cell if associated with infection
   - ✓ RBC due to haematuria
   - ✓ Crystal of stones (Spiky= oxalate, Envelop shaped=Phosphate, Hexagonal =Cystine)
3. RBS
4. S. Creatinine
5. S. calcium
6. CXR
7. ECG

Specific:

1. **X-ray 'KUB'**(= kidney, ureters and bladder):Shows radiaopaque shadow.
2. **IVU**: Shows
   - ✓ Filling defect
   - ✓ Dilatation of renal pelvis and ureter proximal to stone
3. **Ultrasound scanning**
4. Spiral CT
5. Cystoscopy: Not indicated routinely but may reveal oedema around the ureteric orifice when the stone is nearby.
6. Retrograde ureterography: An immediate preliminary to an endoscopic operation to remove a calculus.

Treatment:

A. **Conservative:** Calculi smaller than 0.5 cm pass spontaneously unless they are impacted. Infection in an upper urinary tract obstructed by stone is dangerous and needs urgent surgical intervention.

- ✓ Plenty of water intake
- ✓ Physical exercise: Jolting
- ✓ Antibiotic: To prevent infection
- ✓ Analgesic: NSAIDs(diclofenac and indomethacin), antispasmotic (propantheline)

Expectant treatment is appropriate for small stones likely to pass naturally. If the patient is not disabled by recurrent attacks of colic, progress can be followed by x rays every 6–8 weeks.

B. Surgical treatment:

Indications:

1. Repeated attacks of pain and the stone is not moving
2. Stone is enlarging
3. Complete obstruction of the kidney
4. Urine is infected
5. Stone is too large to pass
6. Stone is obstructing solitary kidney or there is bilateral Obstruction

Methods:

Endoscopic stone removal:

1. Dormia basket:

- ✓ Used for small stones that are within 5-6cm of ureteric orifice.
- ✓ Danger of ureteric injury

2. Ureteric meatotomy:

- ✓ For stones in the intramural part of ureter
- ✓ The consequent urinary reflux rarely causes problems

3. Ureteroscopic stone removal:

- ✓ A ureteroscope is introduced transurethrally across the bladder into the ureter to remove stones impacted in the ureter.
- ✓ Stones that cannot be caught in baskets or endoscopic forceps under direct vision are fragmented using an electrohydraulic, percussive or laser lithotripter.

4. Push bang:

- ✓ A stone in the middle or upper part of the ureter can often be flushed back into the kidney using a ureteric catheter.
- ✓ A J-stent secures the calculus in the kidney for subsequent treatment with ESWL.

5. Lithotripsy in situ:

- ✓ Identified by the imaging system of the lithotripter and be fragmented in situ.
- ✓ Not appropriate in case of complete obstruction or impaction for a long time.

Open surgery: Ureterolithotomy

[Baily and Love-26th-1296-98+Lecture of MMC]

Five sites of narrowing where the stone may be arrested:

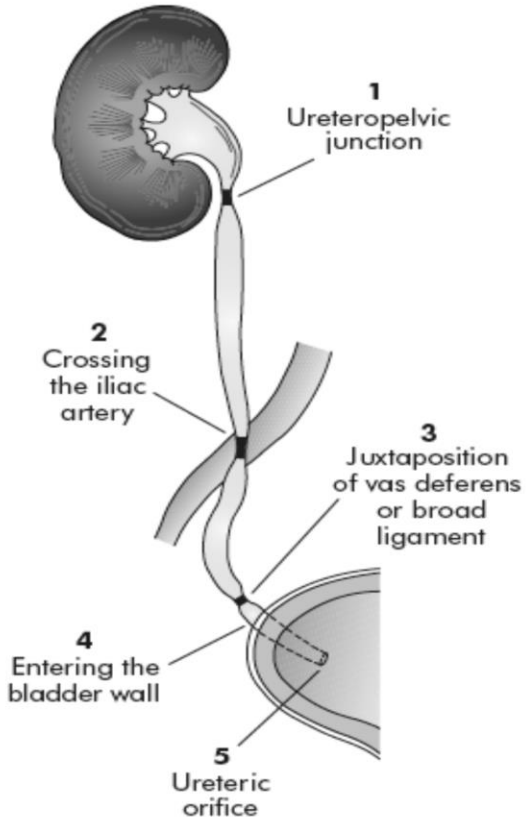


Figure: Narrowings of ureter

[Baily and Love-26th-1297]

Radiation of pain: If obstruction is in

1. Upper ureter: Pain radiates to testes (Supplied by T_{10}-T_{11})
2. Middle ureter: Referred to McBurney's point.
3. Lower ureter: Radiates to inner aspect of thigh (Supplied by genitofemoral nerve)

The presence of haematuria does not rule out appendicitis because an inflamed appendix can give rise to a local ureteritis leaking some red cells into the urine. The patient with acute ureteric colic is usually in greater pain and less ill than one with appendicitis or acute cholecystitis.

IVU

What are the indications of this investigation?

- ✓ Renal/ureteric stone
- ✓ PUJ obstruction
- ✓ Vesicoureteric reflux
- ✓ Obstruction due to retro peritoneal tumor

What is the prerequisite for IVU?

Normal serum Creatinine.

How will you prepare patient for intravenous urography study?

1. No fluid restriction is required.
2. Solid food 6 hours before the procedure.
3. Oral purgative (Tab. Laxena) and antiflatulent tablet (Tab. Ultracarbon)—the night before the procedure.

What contrast agents are used for IVU?

Iodine containing contrast agent:

- ✓ **Ionic contrast:** Sodium diatrizoate or meglumine iothalamate.
- ✓ **Non-ionic contrast:** Omnipaque

The dose required is 300 mg of iodine per kg of body weight. In well hydrated patient the, dose may be increased to 600 mg Iodine per kg body weight.

How intravenous urography is done?

1. At first a control X-ray of the KUB region is done to exclude any radiopaque calculi or any calcification in the KUB region.
2. About 50 mL of contrast agent 76% urograffin (sodium diatrizoate) is injected slowly intravenously and then serial radiographs are taken:
   - ✓ 1 minute film will give a nephrogram phase.
   - ✓ 5 minutes film will show early filling of the pelvicalyceal system and the ureter may be visualized and any filling in the lower ureter may be seen well.
   - ✓ In the delayed film, the lower ureter will be overlapped by the full bladder.
3. If there is no obstruction an abdominal compression is applied with a belt and exposure of renal area is taken at 10 minutes—the pelvicalyceal system is well visualized.
4. Once the bladder gets filled in 10–15 miutes time the oblique views are taken to look for any irregularity in the blader wall.
5. If an urethrogram is required, patient is asked to pass urine and a micturating cystourethrogram may be obtained in an oblique view.

Phages of IVU: 3 phages-

1. Nephrographic phase
2. Pyelographic phase
3. Cystographic phase

How will you understand that patient has developed anaphylaxis?

Patient will develop-

- ✓ Respiratory distress
- ✓ Urticaria
- ✓ Muscle cramp

Treatment: Inj. Hydrocortison

Contraindications of IVU:

1. **Absolute:**

- ✓ Drug hypersensitivity (এটা বলে চুপ করে থাকবে, আরো জানতে চাইলে তবে পরেরটা বলবে)
- ✓ Multiple myeloma

2. **Relative:**
   - ✓ Real failure
   - ✓ Increased Creatinine and urea level

Indication of emergency IVU:

1. Suspected kidney injury
2. Gunshot or stab injury to kidney
3. Blow in kidney

BEP

Particulars of the patient:

Name: Khaled Mahmud
Age: 60 years
Sex: Male
Religion: Islam
Marital status: Married
Occupation: Rickshaw-puller
Address: Ambagan, Rajshahi
Date and time of admission: 25.02.17; 10.00am
Date and time of examination: 26.02.17; 11.00am.

Chief complaints:

1. Increased frequency and urgency of micturition for 1 year.
2. Difficulty in micturition for 9 months.
3. Acute retention of urine 5 days back.

History of present illness:

According to the statement of the patient, he was reasonably well 1 year back. Then he gradually developed increased frequency and urgency of micturition both in day and night time. Initially about 6-7 times in a day and 4-5 times in a night but for last two month10-12 times a day and 6-7 times a night associated with urgency and occasional passage of few drops before reaching to toilet. He had to wake up from sleep for micturition several times. He also noticed difficulties in micturition for last 9 months as a form of poor stream, not improved by straining rather stop, associated with hesitancy, intermittency and terminal dribbling, with sense of incomplete evacuation. 5 days back, he suddenly felt that he is unable to micturate and catheterization was done to relieve the retention. His bowel habit is normal. He has no history of passage of pus or blood with urine (To exclude complication), weight loss, cough, coughing out of blood, chest pain, bone pain or yellow colouration of eye or skin (To exclude Ca prostate). He has no H/O pain in bladder region (To exclude bladder stone or bladder neoplasm), and no H/O urethral instrumentation (to exclude stricture urethra). With the above complaints he got himself admitted in Surgery Unit III of MMCH for better management.

History of past illness:

No H/O DM (Which may cause nocturia), HTN, TB, IHD, CVD.

Treatment history:

He took some medications suggested by local pharmacist but could not mention the name.

Personal history:

Non-smoker, non-alcoholic.

Family history:

All other members of his family enjoy good health. No one is suffering from any prostatic disease.

Socio-economic History:

She belongs to a low middle class family.

Immunization history:

She is fully immunized as per EPI schedule.

History of allergy:

He has no known allergy to any drug.

General Examination:

Appearance: Anxious, ill looking
Body Built: Average
Co-operation: Co-operative
Decubitus: On choice
Nutrition: Average
Anemia: (-)
Jaundice: Absent
Cyanosis: Absent
Clubbing: Absent
Koilonychia: Absent
Leuconychia: Absent
Dehydration: Absent
Oedema: Absent
Engorged vein: Absent
Pigmentation: Absent
Thyroid Gland: Not palpable
Hair distribution: Normal
Pulse: 84/min
Blood pressure: 130/70 mm of Hg
Respiratory Rate: 14/min
Temperature: Normal
Bony tenderness: Absent
Lymph Nodes: Not palpable.
Catheter in situ.

Systemic Examination:

Genitourinary system:

Testes: Normal

Penis, external urethral meatus, floor of anterior urethra: Normal

No suprapubic fullness or tenderness

Catheter in situ.

Kidney:

Not palpable or ballotable

Right renal angle tenderness: Absent

Abdomen:

Inspection: Abdomen is normal in size and shape, umbilicus-inverted. There are no visible veins or scar mark. Hernial orifice intact.

Palpation: No organomegaly

Percussion: Tympanic

Auscultation: Bowel sound present

Per rectal examination:

Inspection:

- ✓ No skin rash or excoriation
- ✓ No scar or fistula or anal tag

Palpation:

- ✓ **Size:** Moderately enlarged
- ✓ **Surface:** Smooth, convex
- ✓ **Consistency:** Firm
- ✓ **Overlying mucosa:** Rectal mucosa can be made to move over the prostate
- ✓ **Midline sulcus:** Median sulcus always present, distinction between right & left lobes of the prostate is usually lost.
- ✓ **After withdrawal of finger:** Contains no blood

Other systems: No abnormality

Salient Features:

According to the statement of the patient, he was reasonably well 1 year back. Then he gradually developed increased frequency and urgency of micturition both in day and night time. Initially about 6-7 times in a day and 4-5 times in a night but for last two month10-12 times a day and 6-7 times a night associated with urgency and occasional passage of few drops before reaching to toilet. He had to wake up from sleep for micturition several times. He also noticed difficulties in micturition for last 9 months as a form of poor stream, not improved by straining rather stop, associated with hesitancy, intermittency and terminal dribbling, with sense of incomplete evacuation. 5 days back, he suddenly developed acute retention and catheterization was done to relieve the retention. His bowel habit is normal. He has no history of haematuria or pyourea , weight loss, cough, haemoptysis, chest pain, bone pain or jaundice. With the above complaints he got himself admitted in Surgery Unit III of MMCH for better management.

On general examination, he is anxious, ill looking, co-operative, average body built and nutritional status. Pulse 84/min, BP 130/80, RR 14/min, temperature normal, no dehydration and

oedema. He is non-anaemic, non-ecteric, no cyanosis, no lymphadenopathy, thyromegaly, engorged vein and Catheter in situ.

On genitourinary and alimentary system, everything is normal. On DRE prostate is moderately enlarged, Smooth, convex surface, Firm Consistency, Rectal mucosa can be made to move over the prostate, Median sulcus always present, distinction between right & left lobes of the prostate is usually lost, After withdrawal of finger Contains no blood.
Other system examination reveals no abnormality.

Provisional diagnosis: Benign enlargement of prostate with Catheter in situ.
Differential diagnoses: Ca prostate

For diagnosis:

1. **USG of KUB and prostate:**
2. **Serum PSA**

Routine:

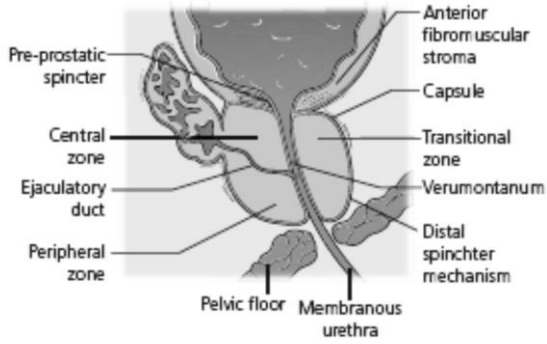
1. CBC
2. Urine RME
3. RBS
4. S. Creatinine and urea
5. CXR
6. ECG
7. HBs Ag

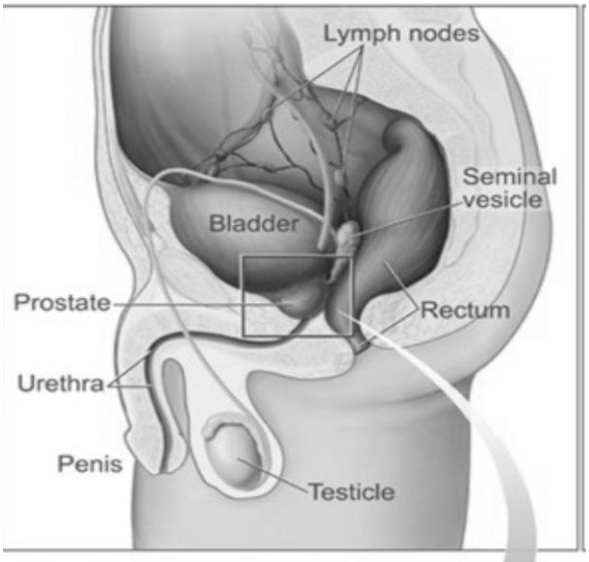
Treatment:

1. Prepare the patient for surgery
2. Surgery: TURP

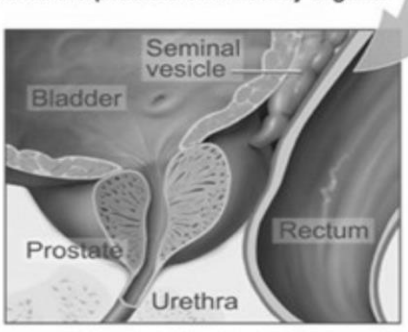
PROSTATE

Surgical anatomy:





This shows the prostate and nearby organs.



This shows the inside of the prostate, urethra, rectum, and bladder.

The prostate is an accessory gland of the male reproductive system. The secretions of this gland add bulk to the seminal fluid.

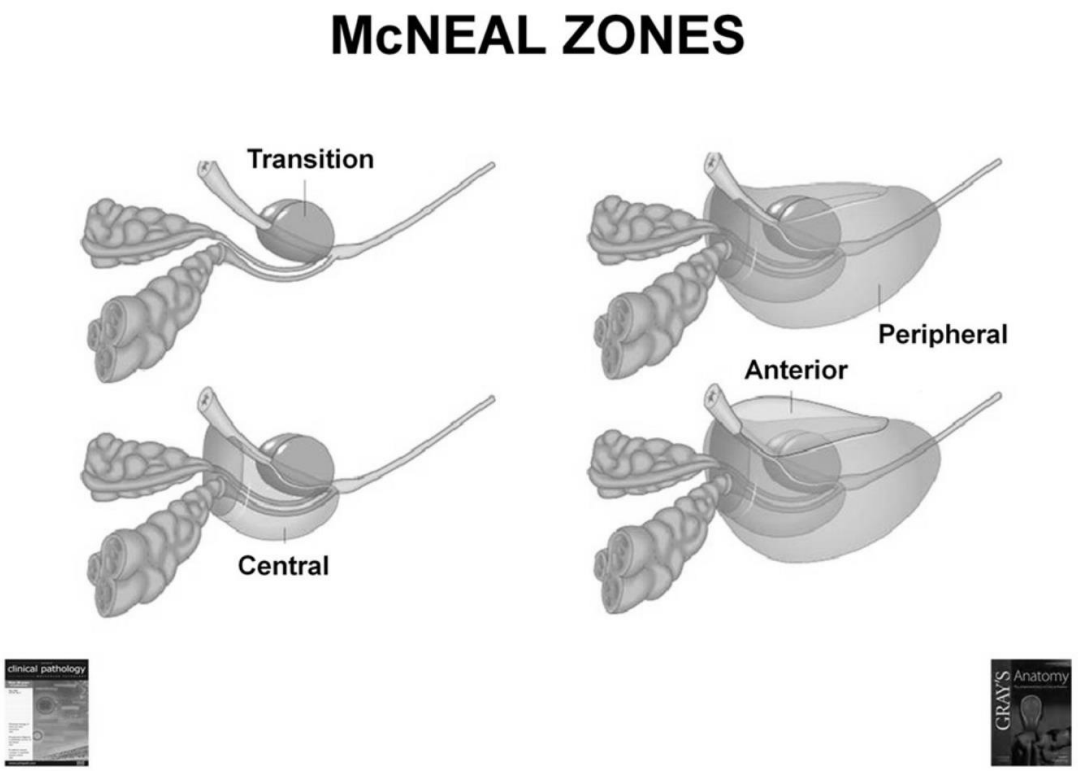
Shape: Inverted cone. Apex, base & 4 surfaces

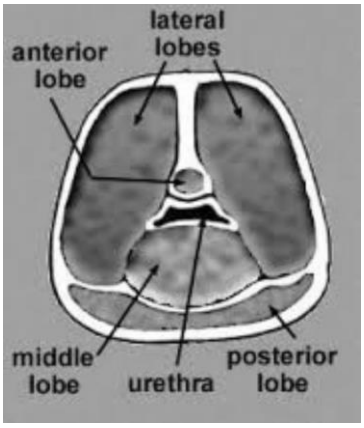
Size: 4cm X 3cm X 2cm

Consistency: Firm
Lobes: 5

Histological: 3 zones

1. **Outer /peripheral:** Lies mainly posteriorly and from which most carcinomas arise.
2. **Middle/transitional**: Periurethral transitional zone (TZ), from which most benign prostatic hyperplasia (BPH) arises.
3. **Inner/central:** Central zone (CZ) lies posterior to the urethral lumen and above the ejaculatory ducts as they pass through the prostate.





Anterior lobe (or isthmus): Roughly corresponds to part of transitional zone
Posterior lobe: Roughly corresponds to peripheral zone
Lateral lobes: Spans all zones
Median lobe (or middle lobe): Roughly corresponds to part of central zone

Capsules of prostate:
False capsule: As the BPH develops the peripheral zone of the prostate gets compressed and forms the false capsule.
Anatomical or true capsule: Fibrous sheath outside the compressed peripheral zone forms the anatomical or true capsule.
Periprostatic sheath: This is the condensation of the endopelvic fasica around the true capsule. The prostatic venous plexus lies in between the true capsule and the periprostatic sheath.

[Bedside Clinics in Surgery-2nd-805]

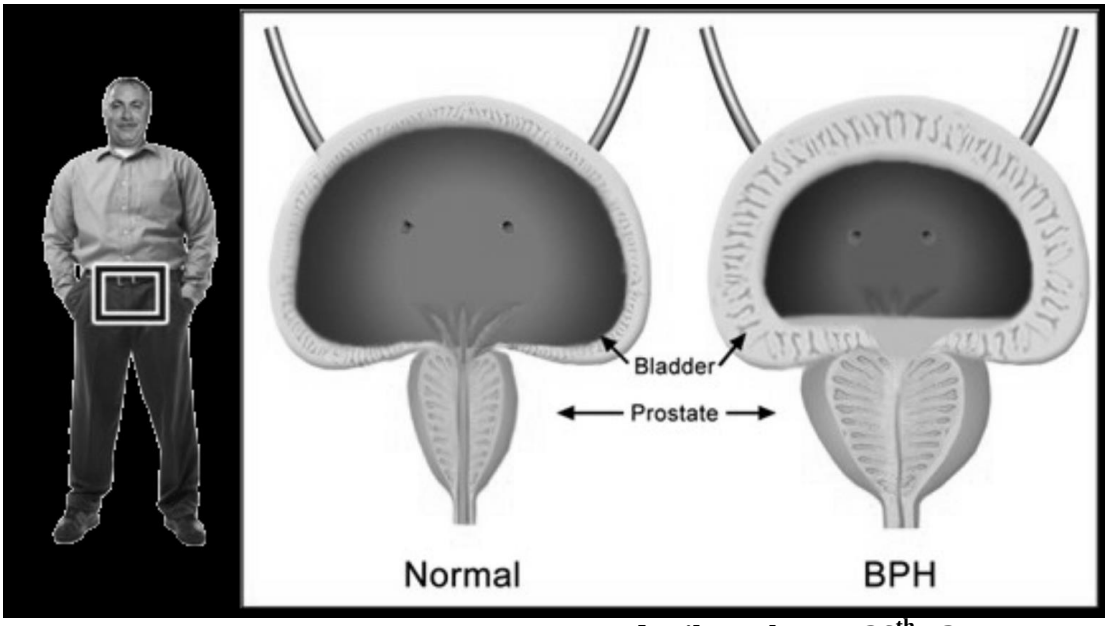
Physiology:
Androgenic hormones:

1. Androgenic hormones, which drive prostate growth, are derived from several sources
2. The majority of testosterone (90 per cent) is secreted by the Leydig cells of the testes under the control of LH, secreted from the anterior pituitary
3. Metabolised adrenal androgen accounts for the remaining 5–10 per cent of testosterone
4. Testosterone is converted to DHT by the enzyme 5a-reductase type II, which is found in high concentration in the prostate and the perigenital skin
5. DHT has five times the potency of testosterone

[Baily and Love-26th-1341]

Benign Prostate Hyperplasia

- ✓ Normal aging process
- ✓ Cannot be prevented
- ✓ It is the most common benign tumor in men and is not a precancerous condition
- ✓ Occurs in men over 50 years of age; by the age of 60 years, 50 per cent of men have histological evidence of BPH
- ✓ Is a common cause of significant lower urinary tract symptoms in men and is the most common cause of bladder outflow obstruction in men >70 years of age.



[Baily and Love-26th-1341+Lecture of MMC]

Pathology:

- ✓ BPH affects both glandular epithelium and connective tissue stroma to variable degrees. Adenosis, epitheliosis and stromal proliferation are seen in differing proportions.
- ✓ BPH typically affects the submucous group of glands in the transitional zone, forming a nodular enlargement.
- ✓ Eventually, this overgrowth compresses the PZ glands into a false capsule and causes the appearance of the typical 'lateral' lobes.
- ✓ When BPH affects the subcervical CZ glands, a 'middle' lobe develops that projects up into the bladder within the internal sphincter.

[Baily and Love-26th-1342]

Consequences of BPH:

1. No symptoms, no BOO
2. No symptoms, but urodynamic evidence of BOO
3. Lower urinary tract symptoms, no evidence of BOO
4. Lower urinary tract symptoms and BOO
5. Others (acute/chronic retention, haematuria, urinary infection and stone formation)

[Baily and Love-26th-1342]

Secondary changes due to prostate enlargement.

Urethra:

- ✓ The prostatic urethra is lengthened, sometimes to twice its normal length, but it is not narrowed anatomically.
- ✓ When only one lateral lobe is enlarged, distortion of the prostatic urethra occurs.

Bladder:

- ✓ If BPH causes BOO, the musculature of the bladder hypertrophies to overcome the obstruction and appears trabeculated.
- ✓ Significant BPH is associated with increased blood flow, and the resultant veins at the base of the bladder are apt to cause haematuria.

- ✓ When viewed from within, bands of muscle fibres can be seen –trabeculation.
- ✓ Between these hypertrophied bundles, there are shallow depressions, i.e. sacculations. Sometimes, one of the saccules (rarely two or more) continues to enlarge and forms a diverticulum.
- ✓ Formation of pool of residual urine- cystitis, calculus[triple PO4].

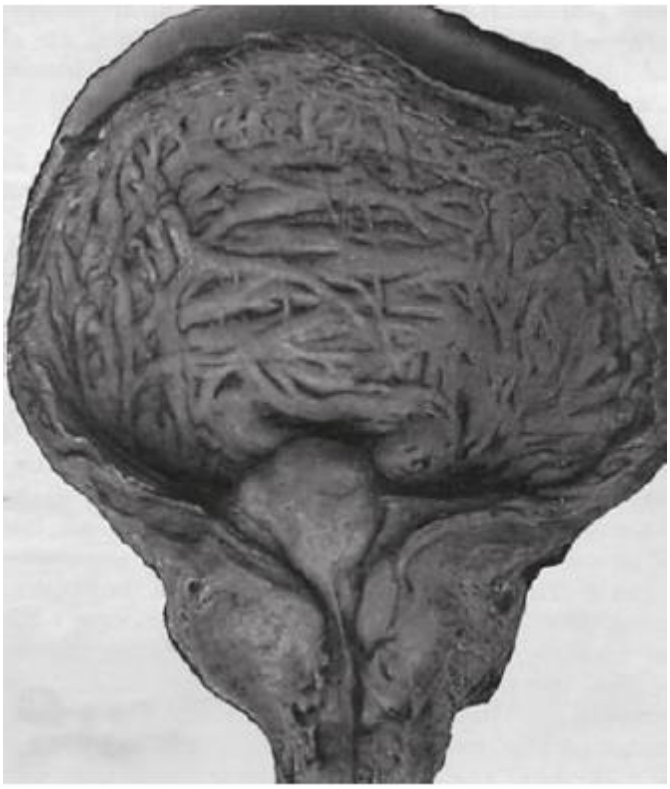


Figure: Trabeculation and sacculations

Changes in ureters and kidney:

- ✓ Hydroureter and Hydronephrosis
- ✓ Vesicoureteric reflux- Acute & Chr.
- ✓ Pyelonephritis

[Baily and Love-26th-1342-1342+Lecture of MMC]

Lower urinary tract symptoms (LUTS):

In both sexes, non-specific symptoms of bladder dysfunction become more common with age, probably owing to impairment of smooth muscle function and neurovesical coordination.

Urologists prefer the term LUTS and discourage the use of the descriptive term 'prostatism'.

Divide into obstructive and irritative symptoms:

LUTS can be described as:

Voiding:

1. Hesitancy (worsened if the bladder is very full);
2. Poor flow (unimproved by straining);

3. Intermittent stream – stops and starts;
4. Dribbling (including after micturition);
5. Sensation of poor bladder emptying;
6. Episodes of near retention;

Storage:

1. Frequency
2. Nocturia
3. Urgency
4. Urge incontinence
5. Nocturnal incontinence (enuresis)

Progressive loss of force and caliber of the urinary stream is noted as urethral resistance increases despite the generation of increased intravesical pressure.

Pathophysiology:

Obstructive (voiding) symptoms:

Hesitancy:

- ✓ Hesitancy in initiating the urinary stream is one of the early symptoms of BOO.
- ✓ It occurs because the detrusor takes a longer time to generate the initial increased pressure to overcome the urethral resistance.
- ✓ As the degree of obstruction increases, hesitancy is prolonged and the patient often strains to force urine through the obstruction.

Loss of Force and Decrease of Caliber of the Stream: Progressive loss of force and caliber of the urinary stream is noted as urethral resistance increases despite the generation of increased intravesical pressure.

Intermittency:

- ✓ Involuntary disruption of the urinary stream during voiding.
- ✓ Occurs because the detrusor is unable to sustain the increased pressure until the end of voiding.

Terminal dribbling:

- ✓ Inability to effectively terminate voiding.
- ✓ Becomes more and more noticeable as obstruction progresses and is a most distressing symptom.

Incomplete emptying:

May be accompanied by the continued desire to void or by pain or discomfort in the bladder

Irritative (Storage) symptoms:

Frequency:

- ✓ Incomplete emptying during each void results in shorter intervals between voids.
- ✓ The presence of enlarged prostate provokes the bladder to trigger a voiding response more frequently than in normal individuals, especially if the prostate is growing intravesically.

Nocturia:

- ✓ The need to void during sleeping hours more than once.
- ✓ Normal cortical inhibitors are lessened and also because the normal urethral and sphincteric tone is reduced during sleep.

Urgency incontinence: In most circumstances, the patient is able to control temporarily the sudden need to void, but loss of small amounts of urine may occur.

Systemic symptoms related to the UT:

- ✓ Vesicoureteral reflux
- ✓ Dilatation & hydronephrosis
- ✓ Renal failure & symptoms of uraemia

Symptoms unrelated to the UT:

- ✓ Hernias, hemorrhoids and vesical calculus
- ✓ Change in the caliber of bowel movements

Symptoms related to complications:

- ✓ Cystitis
- ✓ Pyelonephritis
- ✓ Bladder calculi
- ✓ Micro or gross hematuria

[Lecture of MMC]

Management:

History:

1. **History of type 2 diabetes:** Which can cause nocturia and is a risk factor for BPH.
2. **Symptoms of neurologic disease**: That would suggest a neurogenic bladder.
3. **Sexual dysfunction:** Which is correlated with LUTS.
4. **Gross hematuria or pain in the bladder region:** Suggestive of a bladder tumor or calculi
5. **History of urethral trauma, urethritis, or urethral instrumentation:** That could lead to urethral stricture
6. **Family history:** BPH and prostate cancer
7. **Treatment with drugs:** That can impair bladder function (anticholinergic drugs) or increase outflow resistance (sympathomimetic drugs)

Symptoms:

A. **LUTS:**

Voiding:

1. Hesitancy (worsened if the bladder is very full);
2. Poor flow (unimproved by straining);
3. Intermittent stream – stops and starts;
4. Dribbling (including after micturition);
5. Sensation of poor bladder emptying;
6. Episodes of near retention;

Storage:

1. Frequency
2. Nocturia
3. Urgency
4. Urge incontinence
5. Nocturnal incontinence (enuresis)

B. **Acute retention of urine**

C. **Chronic retention of urine**

D. **May present with complications:**
   1. Haematuria
   2. UTI
   3. Stone formation

Signs:

General examination: To exclude renal insufficiency-**raised BP**, **anemia**

Local examination:

1. **In retention:**
   - ✓ Distended bladder: A soft globular swelling
   - ✓ Tender on palpation
   - ✓ Smooth surface
   - ✓ Dull on percussion
2. **Enlarged kidney:** Hydronephrotic kidney.

External urethral meatus: To exclude meatal stenosis

DRE (Digital Rectal Examination):

- ✓ **Size:** Enlarged
- ✓ **Surface:** Smooth, convex
- ✓ **Consistency:** Typically elastic, but the fibrous element may give the prostate a firm consistency
- ✓ **Overlying mucosa:** Rectal mucosa can be made to move over the prostate
- ✓ **Midline sulcus:** Median sulcus always present, distinction between right & left lobes of the prostate is usually lost.
- ✓ After withdrawal of finger: Contains no blood

Investigations:

For diagnosis:

1. **USG of KUB and prostate:**
   - ✓ Size, ecotecture, Post-void residue
   - ✓ Hydronephrosis
   - ✓ Hydroureter

   Grading:

   Gr. I > 25 cm3
   Gr. II >50 cm3
   Gr. III > 75 cm3
2. **Serum PSA:**
   - ✓ Measured in men 50-69
   - ✓ <4 ng/ml is cut-off.
   - ✓ Men at risk for BPH are also at risk for prostate ca.
   - ✓ Linear rise in PSA with prostate size

   DRE + PSA = most acceptable means of excluding prostate ca.

Routine:

1. CBC
2. Urine RME
3. RBS
4. S. Creatinine and urea: To provide baseline information on renal function & metabolic status.
5. CXR

6. ECG
7. HBs Ag

Treatment:

IPSS score: (No need to memorise)

Medscape® www.medscape.com

Patient Name _____ Date of Birth_____ Date Completed _____	Not at all	Less than 1 time in 5	Less than half the time	About half the time	More than half the time	Almost always	Score
Incomplete Emptying Over the past month, how often have you had a sensation of not emptying your bladder completely after you finished urinating?	0	1	2	3	4	5	
Frequency Over the past month, how often have you had to urinate again less than 2 hours? After you finished urinating?	0	1	2	3	4	5	
Intermittency Over the past month, how often have you found you stopped and started again? Several times when you urinated?	0	1	2	3	4	5	
Urgency Over the past month, how often have you found it difficult to postpone urination?	0	1	2	3	4	5	
Weak Stream Over the past month, how often have you had to push or strain to begin urination?	0	1	2	3	4	5	
Straining Over the past month, how often have you had to push or strain to begin urination?	0	1	2	3	4	5	
	None	1-Time	2-Times	3-Times	4-Times	5-Times or more	
Nocturia Over the past month, how many times did you most typically get up to urinate from the time you went to be at night until the time you got up in the morning?	0	1	2	3	4	5	
Your Total I-PSS Score							
Quality of Life Due to Urinary Symptoms	Delighted	Pleased	Mostly Satisfied	Mixed Mostly	Dissatisfied	Unhappy	Terrible
If you were to spend the rest of your life with your urinary condition just the way it is now, how would you feel about that?	0	1	2	3	4	5	6

Source: Urol Nurs © 2004 Society of Urologic Nurses and Associates

Mildly symptomatic: 0-7
Moderately symptomatic: 8-19
Severely symptomatic: 20-35

A) Watchful Waiting: Symptom score 0-7

Treatment:

1. **Lifestyle Changes:** These strategies may help:
   - ✓ Cut down or cut out alcohol and caffeine.
   - ✓ Drink small amounts all day rather than large amounts all at once.
   - ✓ Avoid fluids at bedtime.
   - ✓ Avoid decongestants and antihistamines.
   - ✓ Go when you have the urge and when a bathroom is handy.
   - ✓ Double void: Empty your bladder, wait a moment, then try to empty it again.
   - ✓ Relax. Stress can trigger the urge to pee.
   - ✓ Exercise regularly.

B. **Medical management:**

Indications:

- ✓ Moderate-severe symptoms of LUTS (IPSS score >8)
- ✓ Bothered by symptoms

Drugs:

1. Alpha blockers
2. 5-alpha reductase inhibitors
3. Combination therapy: Alpha blockers + 5a reductase enzyme inhibitor

C. Surgical intervention:

1. Moderate-severe symptoms of LUTS (IPSS score >8)
2. Bothered by symptoms
3. Affect the quality of life
4. Complications of BPH
5. Failed medical therapy
6. Patient's choice

Methods of performing prostatectomy:

1. Transurethrally (TURP)
2. Retropubically (RPP)
3. Transvesical (TVP)
4. From the perineum

[Baily and Love-26th-1343-1349+Lecture of MMC]

Medical management:

Obstruction secondary to BPH occurs because of 2 factors:

a. Dynamic component: A result of contraction of smooth muscles of the prostate & prostatic urethra mediated mostly by adrenergic receptors.

b. Mechanical component: Related to the presence of a mass which compresses & narrows the urethral lumen.

Treatment: Drugs for Urine Flow

Alpha blockers:
What's the rationale for alpha adrenergic blockade (Alpha 1 blockers)?

1. Distribution of Alpha Receptors in the Prostate and Bladder.
2. Relaxation of both bladder neck and prostatic smooth muscle, thus decreasing pressure in the bladder and urethra improve the urinary flow.
3. Improve the obstructive symptoms than irritative symptoms.

Drugs:

Prazosin
Terazosin
Doxazosin
Alfuzosin
Tamsulosin
Silodosin

Side effects:

1. Postural Hypotension – most common
2. Dizziness
3. Nasal congestion
4. Headache
5. Ejaculatory dysfunction

Treatment: Drugs to Slow Prostate Growth

5-alpha reductase inhibitors: These are all reasons to block the DHT and shrink the prostate gland.
Adverse effects:

1. Decrease libido
2. Erectile dysfunction
3. Ejaculation disorder

Combination therapy: Alpha blockers + 5a reductase enzyme inhibitor

Finasteride + Doxasozin
Dutasteride + Tamsulosin

[Lecture of MMC]

Surgical intervention:
Absolute indications for surgery includes:

1. Refractory urine retention (failure to void after catheter removal)/Acute retention of Urine.
2. Recurrent UTI from BPH.
3. Recurrent gross hematuria from BPH.
4. Bladder stone.
5. Chronic retention and renal insufficiency.
6. Large bladder diverticulum.

Relative indications: Failure of medical RX.

Open simple prostatectomy:
Indication:
When prostate is

1. Too big (>80-100gm) to be removed endoscopically
2. Concomitant bladder diverticulum
3. Vesical stone, is present
4. If dorsal lithotomy positioning is not possible.

1. Simple suprapubic prostatectomy (transvesically)
2. Simple retropubic prostatectomy

Minimally Invasive Surgical Treatments:
TUNA (transurethral needle ablation): High freq radio waves.
TUMT (transurethral microwave therapy):

- ✓ Considerable swelling.
- ✓ Laser devices: holmium, KTP.
- ✓ Transurethral, outpt, for pt. On blood thinners.

TUIP (transurethral incision of prostate): Small prostates, pt cant tolerate

Counseling men undergoing prostatectomy:

1. Retrograde ejaculation: Occurs in about 65% of men after prostatectomy.
2. Erectile impotence: In about 5% of men.
3. Success rate: 90%
4. Risk of reoperation: About 15% after 8–10 years
5. Morbidity rate: <0.5%

[Baily and Love-26th-1347]

Why there is chance for retrograde ejaculation?

Smooth muscle cells are found throughout the prostate but, in the upper part of the prostate and bladder neck, there is a separate sphincter muscle that subserves a sexual function, closing during ejaculation. Resection of this tissue during prostatectomy is responsible for retrograde ejaculation.

[Baily and Love-26th-1340]

Why there is chance for retrograde impotency?

The neurovascular bundles supplying autonomic innervation to the corpora of the penis are in very close relationship to the posterolateral aspect of the prostatic capsule and are at risk of damage during radical cystoprostatectomy or radical prostatectomy; inadvertent diathermy in the region of these nerves may be the cause of uncommon erectile impotence after transurethral prostatectomy.

[Baily and Love-26th-1340]

Complications of prostatectomy:

Local

1. Haemorrhage
2. Sepsis
3. Incontinence
4. Retrograde ejaculation and impotence
5. Urethral stricture
6. Bladder neck contracture
7. Reoperation

General complications:

1. **Cardiovascular:** Pulmonary atelectasis, pneumonia, MI, CCF and DVT.
2. Water intoxication
3. Osteitis pubis

[Baily and Love-26th-1349-1350]

Risks of TURP include:

1. Retrograde ejaculation (75%),
2. Impotence (5-10%),
3. Incontinence (<1%).
4. Complications includes bleeding,
5. Urethral stricture, or
6. Bladder neck contracture,,
7. Perforation of prostate capsule and extravasations ,
8. TUR syndrome

TUR syndrome:

Resulting from a hypervolemic, hyponatremic state due to absorption of the hypotonic irrigating solution. The risk of the TUR syndrome increases with resection times over 90 min.

Clinical manifestations:

1. Nausea, vomiting
2. Confusion
3. Hypertension, bradycardia
4. Visual disturbances

Treatment:

1. Diuresis
2. In severe cases, hypertonic saline administration

Low fat, low red meat, high protein and vegetables may reduce incidence of symptomatic BPH.

Investigations of men with LUTS

Essential investigations:

1. Urine RME: For blood, glucose and protein
2. Urine culture: For infection
3. Serum creatinine
4. Urinary flow rate and residual volume measurement

Additional investigations:

1. PSA if indicated
2. Pressure-flow studies

[Baily and Love-26th-1345]

Digital Rectal Exam (DRE): Use index finger of dominant hand in windshield wiper movement. Each finger breath is approx 15-20g of tissue, most asymptomatic men </=2 finger breaths. Assess size, contour, anal sphincter tone.

BPH: Rubbery, uniformly enlarged.
Malignancy: Nodules, asymmetry, induration.
Prostatic abscess: Fluctuance
Prostatitis: Pain

Flow rate measurement: lowered in BEP
Volume: 150-200 ml
max >15 ml/s NORMAL
10-15 EQUIVOCAL
< 10 LOW
Voiding pressure: increased in BEP.
> 80 cm H2O HIGH
60-80 EQUIVOCAL
<60 NORMAL

[Baily and Love-26th-1345-1346]

Residual Urine:

- ✓ Estimated by U/S or catheterizations.
- ✓ Volumes >150 ml are considered significant since they constitute approximately one-third of normal bladder volume.

Complications of bladder outlet obstructions (BOO):

1. Acute retention of urine
2. Chronic retention with overflow incontinence
3. Urinary tract infection
4. Vesical stone
5. Hematuria
6. Renal failure

[Baily and Love-26th-1343-1344]