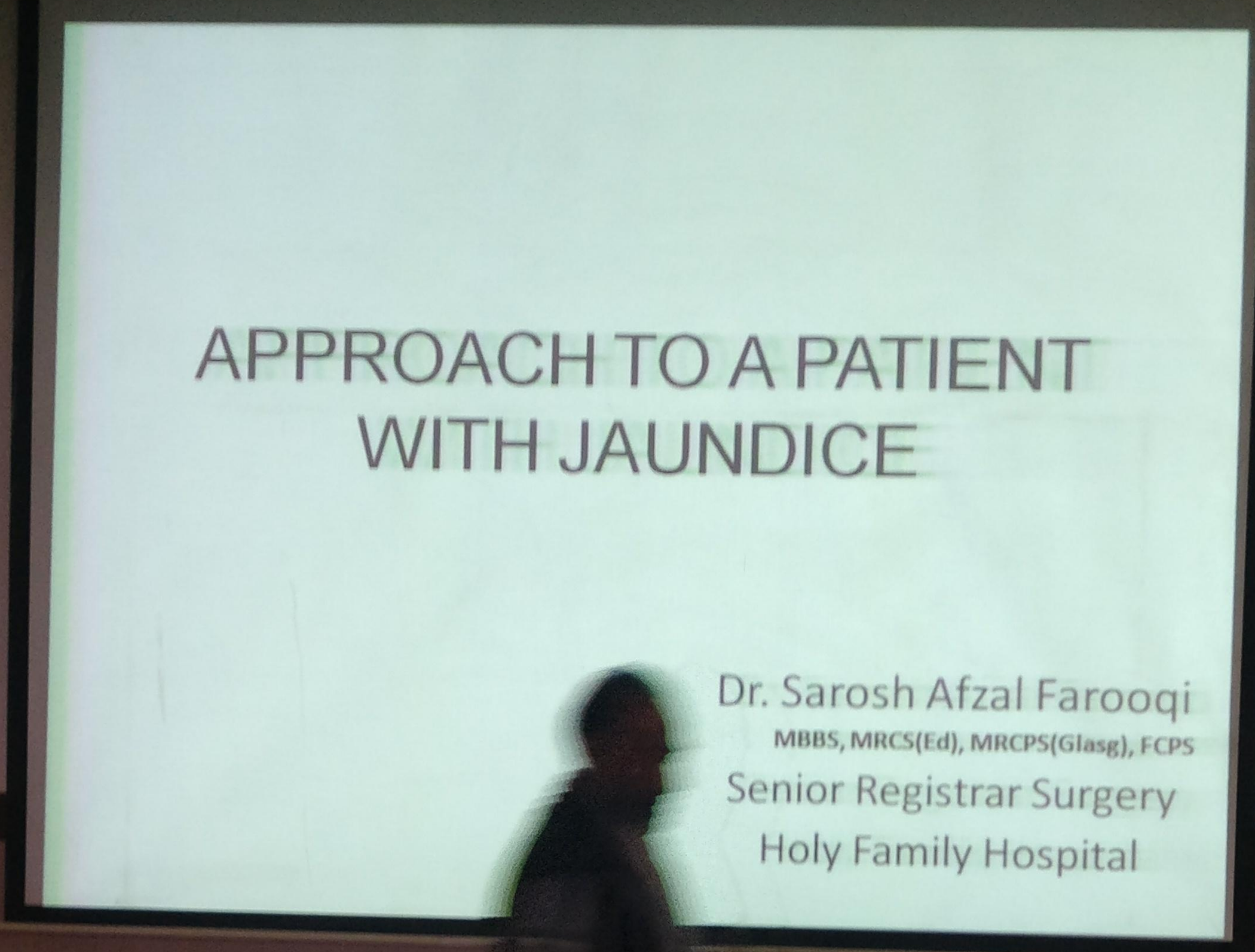
APPROACH TO A PATIENT
WITH JAUNDICE
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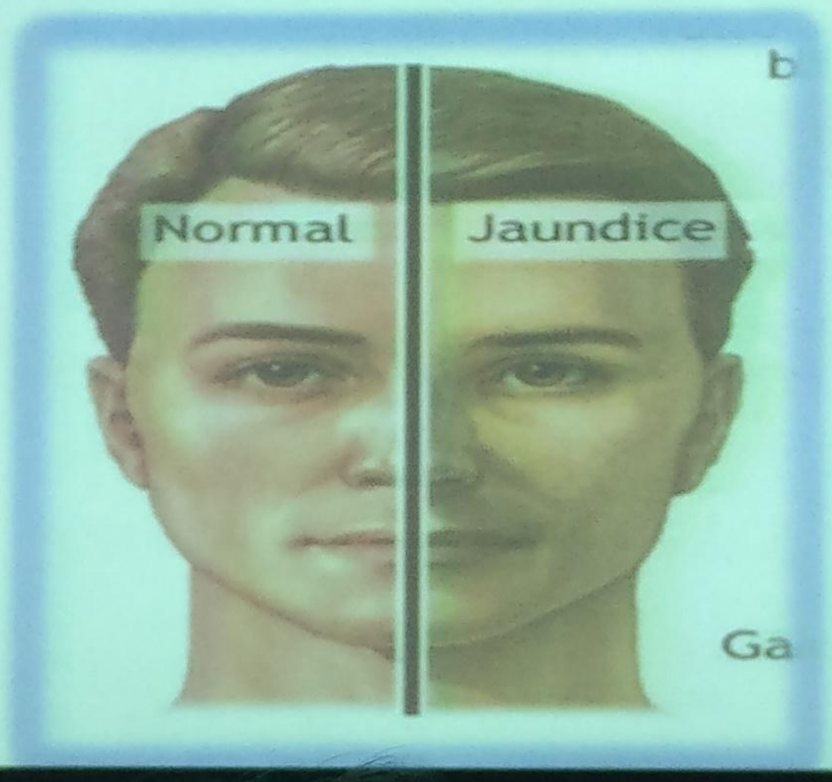
What is jaundice?

- Yellowish discoloration of skin, sclerae and mucus membranes due to hyperbilirubinemia
- Total bilirubin > 1.5 mg/dl



Normal Physiology

- Bilirubin is from breakdown of hemoglobin
- Unconjugated bilirubin transported to liver
  - Bound to albumin because **insoluble** in water
- Transported into hepatocyte & conjugated
  - With glucuronic acid → now water soluble
- Secreted into bile
- In ileum & colon, converted to urobilinogen
  - 10-20% reabsorbed into portal circulation and re-excreted into bile or into urine by kidneys

Pathophysiology

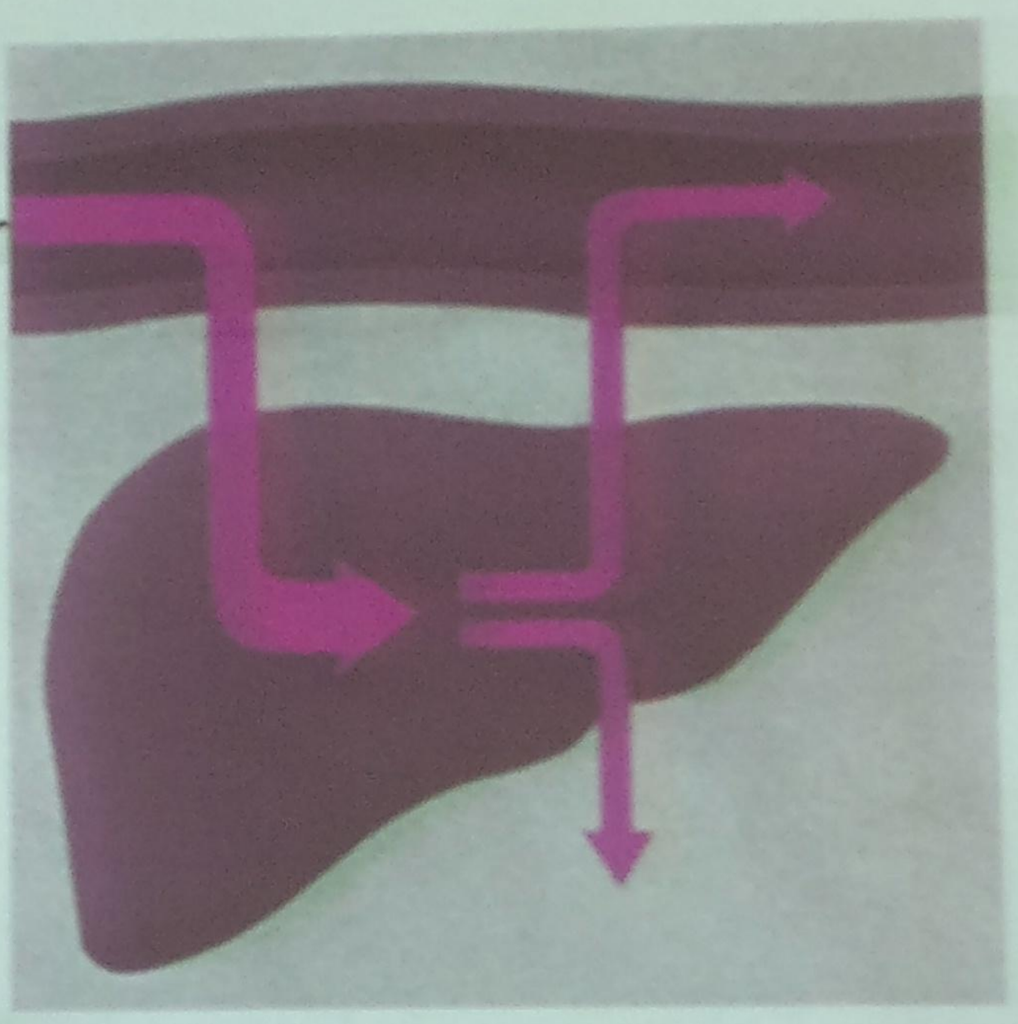
- Jaundice = bilirubin staining of tissue
- Mechanisms:
  - ↑ production of bilirubin
  - ↓ hepatocyte transport or conjugation
  - Impaired excretion of bilirubin
  - **Impaired delivery of bilirubin into intestine**
    - "surgically relevant jaundice" or obstructive jaundice
  - "Cholestasis" refers to the latter two, impaired excretion and obstructive jaundice

Types of jaundice

- Prehepatic / Hemolytic jaundice
- Hepatic jaundice
- Posthepatic / Obstructive/ Surgical jaundice

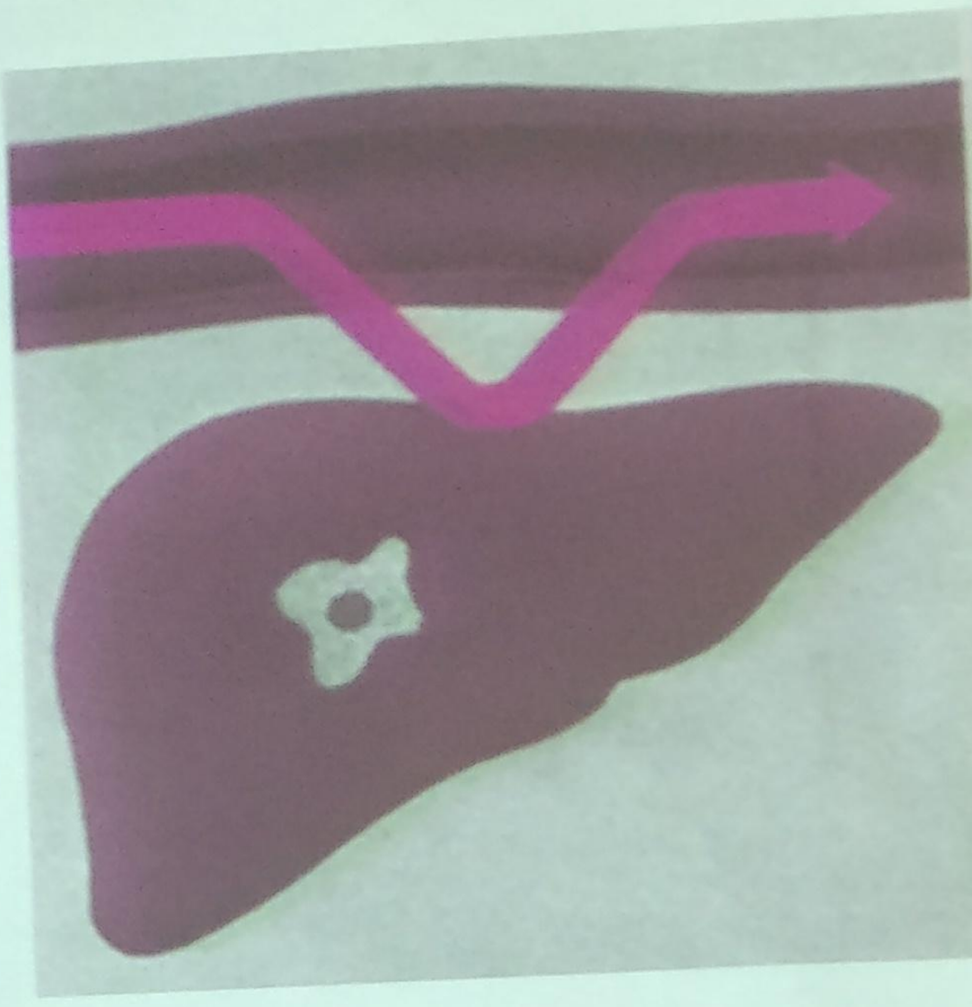
Hemolytic Jaundice

- Excess production of bilirubin due to excess breakdown of hemoglobin
- Indirect bilirubin (insoluble in water since unconjugated)
- E.g.
  - Hemolytic anemia
  - Malaria
  - Glucose-6-phosphate dehydrogenase deficiency



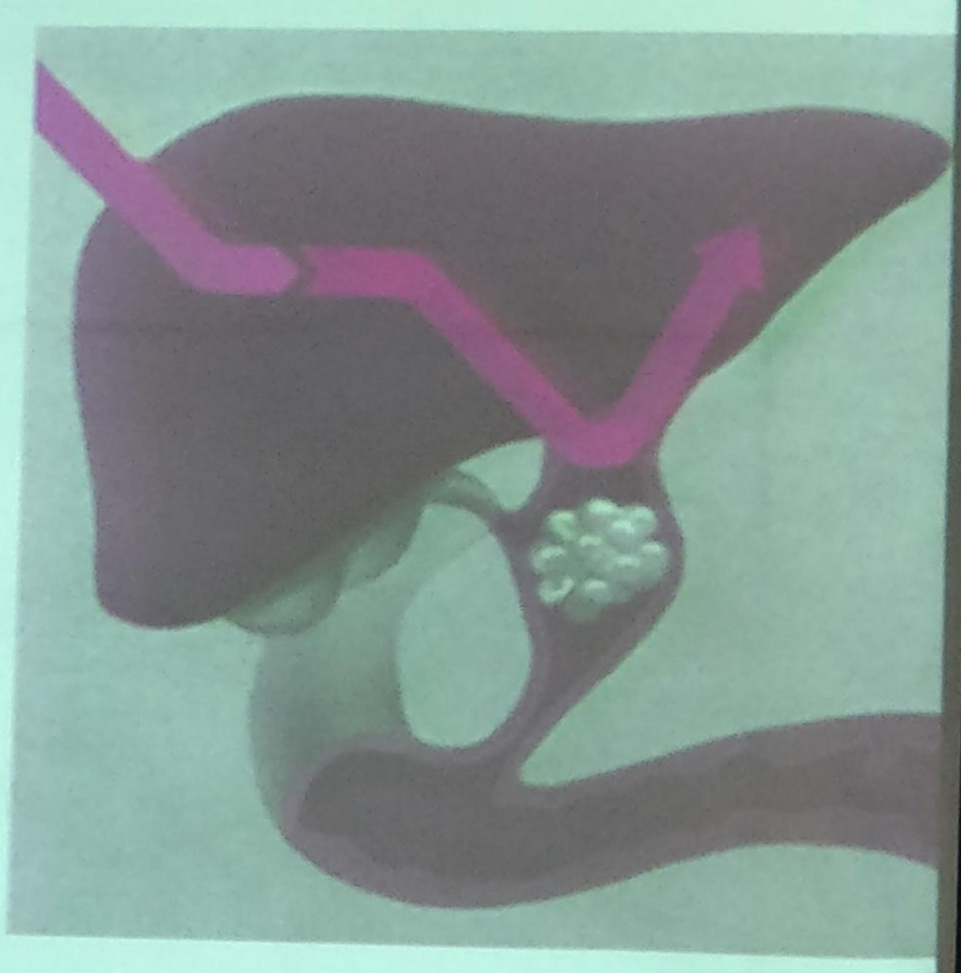
Hepatic Jaundice

- Liver's ability to conjugate or excrete bilirubin is affected
- Increased level of conjugated and unconjugated bilirubin
- E.g.:
  - Hepatitis, cirrhosis, hepatocellular carcinoma, prolonged use of drugs metabolized by liver
  - Genetic disorders:
    - Gilbert's syndrome
    - Criggler-Neijer Syndrome



Obstructive Jaundice

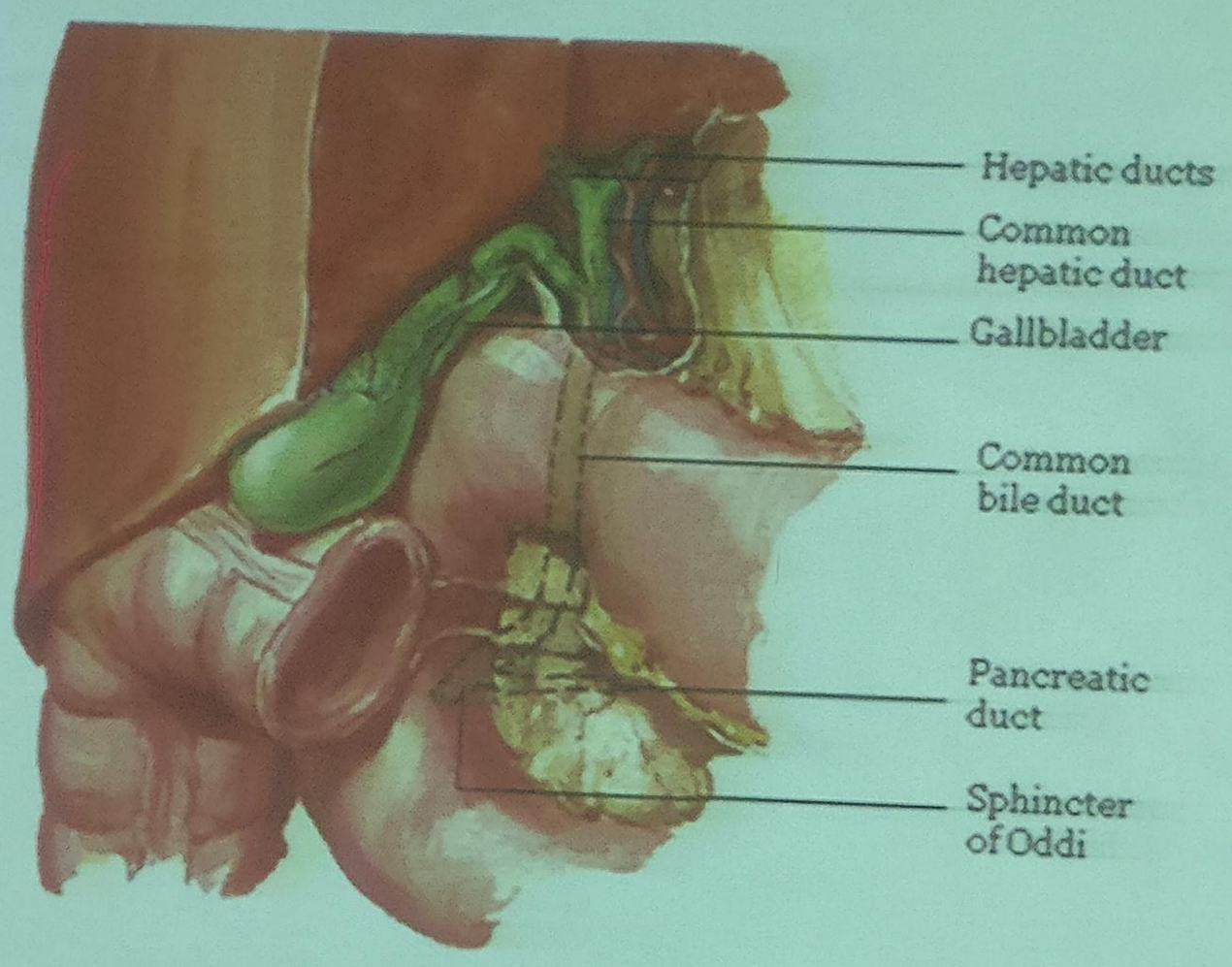
- Bilirubin formation rate is normal
- Conjugation is normal = direct bilirubin
- Obstruction of bile duct so exit is blocked



How to differentiate the types of jaundice?

- **Hemolytic :**
  - Increased unconjugated (indirect) more than direct (conjugated) bilirubin
  - Hemoglobin level low
  - Anemia
- **Hepatic :**
  - Increased amount of both indirect and direct
  - Increase in AST and ALT more than increase in ALP
- **Obstructive :**
  - Increased amount of direct (conjugated)
  - Significant increase in ALP more than AST and ALT

Obstructive jaundice



D/D

Etiology

Common

1. Choledocholithiasis
2. Carcinoma of the head of pancreas
3. Malignant lymph nodes at the porta hepatis

Uncommon

1. Carcinoma of the Ampulla of Vater
2. Chronic Pancreatitis
3. Liver secondaries, cysts and abscesses

D/D

Rare

1. Benign strictures : 95% iatrogenic, rarely trauma
2. Recurrent cholangitis
3. Mirrizi's syndrome
4. Primary sclerosing cholangitis
5. Cholangiocarcinoma
6. Biliary atresia (neonates)
7. Infestations

Management Of a case Of Obstructive Jaundice

* Good HISTORY TAKING drives the rest of management !

* EXAMINATION !

* INVESTIGATIONS !

Management Of a case Of Obstructive Jaundice

* Good HISTORY TAKING drives the rest of management !

* EXAMINATION !

* INVESTIGATIONS !

* Evaluation and management of OJ involve the combined expertise of the gastroenterologists, radiologists, and surgeons !

DURATION:

Short + intermittent course → calcular OJ

Relatively long + progressive → pancreatic head cancer

relatively long + flutuant → periampullary carcinoma

CLINICAL FEATURES

- Jaundice : Onset- Sudden - Gall-stone obstruction
  Gradual - Carcinoma
  Progress - Relentless- Carcinoma,
  Fluctuating - Stones, Ca Papilla

- Pain : Present- Gall stone. Usually colicky
  Ca: Moderate midepigastric, deep seated, radiating to back
  Absent - Ca Bile duct, Ca Ampulla of Vater, Ca Head Pancreas (Early)

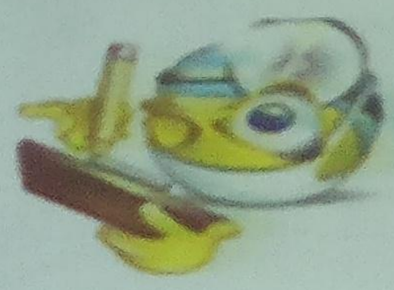
- Fever & Chills: Cholangitis due to obstruction usually due to calculus

- Pruritis: All forms of cholestatic jaundice

- Weight Loss: Progressive loss in Ca Head pancreas

- Stool: Pale, clay-coloured due to excess fat and absence of stercobilin

HISTORY TAKING



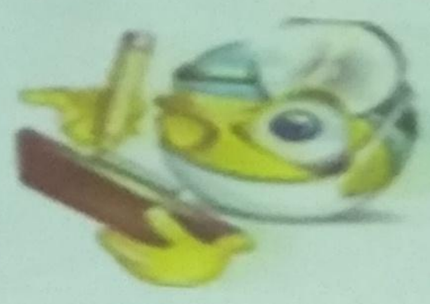
- **AGE & Gender :**

- **COMPLAINT :**

JAUNDICE +
pale stool +
dark urine

HISTORY TAKING

- **AGE & Gender :**

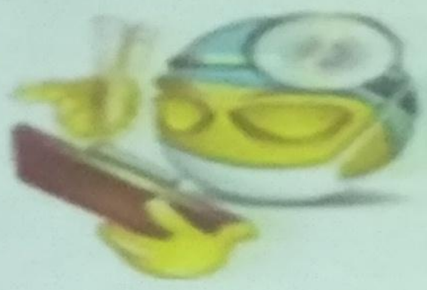


- **COMPLAINT :**

JAUNDICE +
pale stool +
dark urine

→ PAIN → cal. or late cancer

HISTORY TAKING



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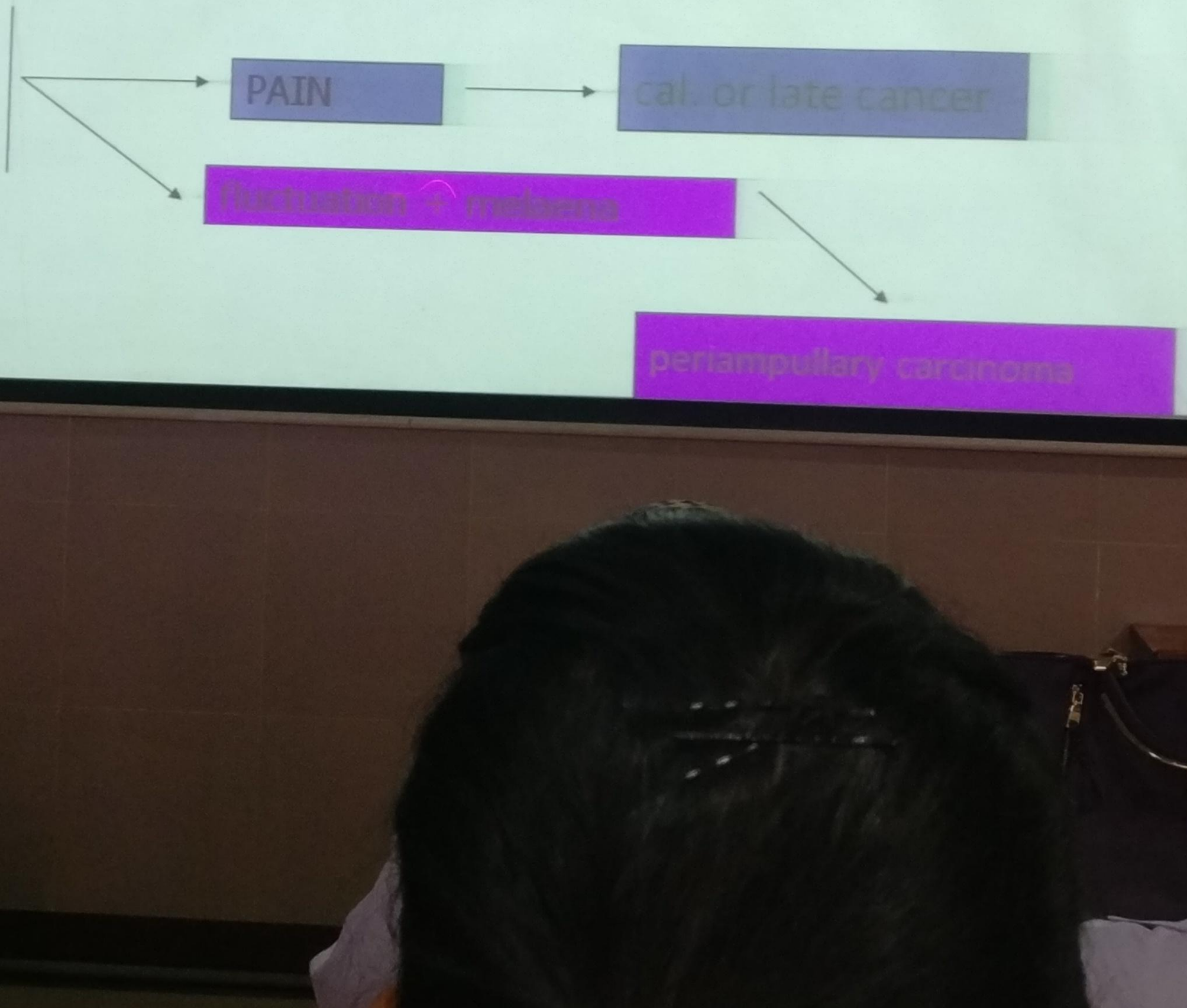


CLINICAL FEATURES

- Urine: Dark due to excess bilirubin
- Hemorrhage: Failure of absorption of Vit. K with impaired coagulation
- Supraclavicular node: Virchow's node indicates malignancy
- Abdominal Scar: Previous surgery may suggest operative injury to bile duct
- Gall Bladder: May be palpable with Ca Head of pancreas
  Non palpable with gall-stone obstruction (Courvoisier's Law)
- Hepatomegaly: Hard, nodular in metastases and hepatoma
- Abdominal Mass: Suggests malignancy and may be associated with ascites
- Diabetes: Sometimes precedes jaundice

PHYSICAL EXAMINATION

I- General:

TEMP & PULSE

low-grade fever, cachexia & bradycardia

MOJ

high-grade fever & tachycardia

Cholangitis

Courvoisier's law

- "A palpable non-tender gallbladder in the presence of jaundice is unlikely to be due to gallstones."

- Explanation :

Courvoisier's law

- "A palpable non-tender gallbladder in the presence of jaundice is unlikely to be due to gallstones."

- Explanation :

Gall stones → Recurrent cholecystitis → Shrunken, fibrosed gall bladder

II-Abdominal:

GB

Palpable

in 98% of cases of malignant obstructive jaundice

Impalpable

in 80% of cases of calcular obstructive jaundice

INVESTIGATION OF OBSTRUCTIVE JAUNDICE

1. **LFTs**

- ✓ Conjugated hyperbilirubinemia > 50% of total bilirubin
- ✓ Increase in ALP / GGT >> Enzymes AST / ALT
- ✓ Prolonged PT and PTT

2. **Urinalysis**

- ✓ Bilirubin in urine; urobilinogen absent in total obstruction

3. **Stool:** Pale, clay colored, absence of stercobilin, ?O/B +ve

4. **Ultrasound Scan**

- ✓ Initial and most useful investigation
- ✓ Demonstrates dilated ducts (Normal CBD <8 mm diameter)
- ✓ Sensitivity 70 - 95% and specificity 80 - 100%

5. **CT and MRI Scan**

- ✓ Sensitivity and specificity similar to good quality ultrasound
- ✓ Useful in obese or excessive bowel gas
- ✓ Better at imaging lower end of common bile duct
- ✓ Stages and assesses operability of tumors

6. Radionuclide scanning

- ✓ ^{99} technetium iminodiacetic acid (HIDA)
- ✓ Taken up by hepatocytes and actively excreted into bile
- ✓ Allows imaging of biliary tree
- ✓ Failure to fill gallbladder = acute cholecytitis
- ✓ Delay or absence of flow into duodenum = biliary obstruction

7. (ERCP)

- ✓ Visualization of papilla, biliary and pancreatic ducts
- ✓ Allows biopsy or brush cytology
- ✓ Stone extraction or stenting
- ✓ Complications include hemorrhage, pancreatitis ,sepsis

8. Percutaneous transhepatic cholangiogram (PTC)

- ✓ 90% successful in patients with dilated ducts
- ✓ Performed with 22G Skinny/Chiba Needle
- ✓ Contraindicated with coagulopathy (>PT) , ascitis, sepsis

CONSEQUENCES OF OBSTRUCTIVE JAUNDICE

Ascending cholangitis

Charcot's triad is classical clinical picture

Intermittent pain, jaundice and fever

- Cholangitis can lead to hepatic abscesses
- Need parenteral antibiotics and biliary decompression
- Operative mortality in elderly of up to 20%

Clotting disorders (Prolonged PT)

1. Vitamin K required for gamma-carboxylation of Factors II, VII, IX, X
2. Vitamin K is fat soluble and not absorbed.
3. Needs to be given parenterally (Vit K 10 mg IM/IV x 3days)
4. Urgent correction will need Fresh Frozen Plasma (FFP)
5. Also endotoxin activation of complement system

CONSEQUENCES OF OBSTRUCTIVE JAUNDICE

Hepato-renal syndrome (oliguria with >creatinine)

1. Poorly understood
2. Renal failure postoperative
3. Due to gram negative endotoxemia from gut
4. Vasoconstrictors and albumin may improve outcome

- Drug Metabolism

1. Half life of some drugs prolonged. e.g. opioids

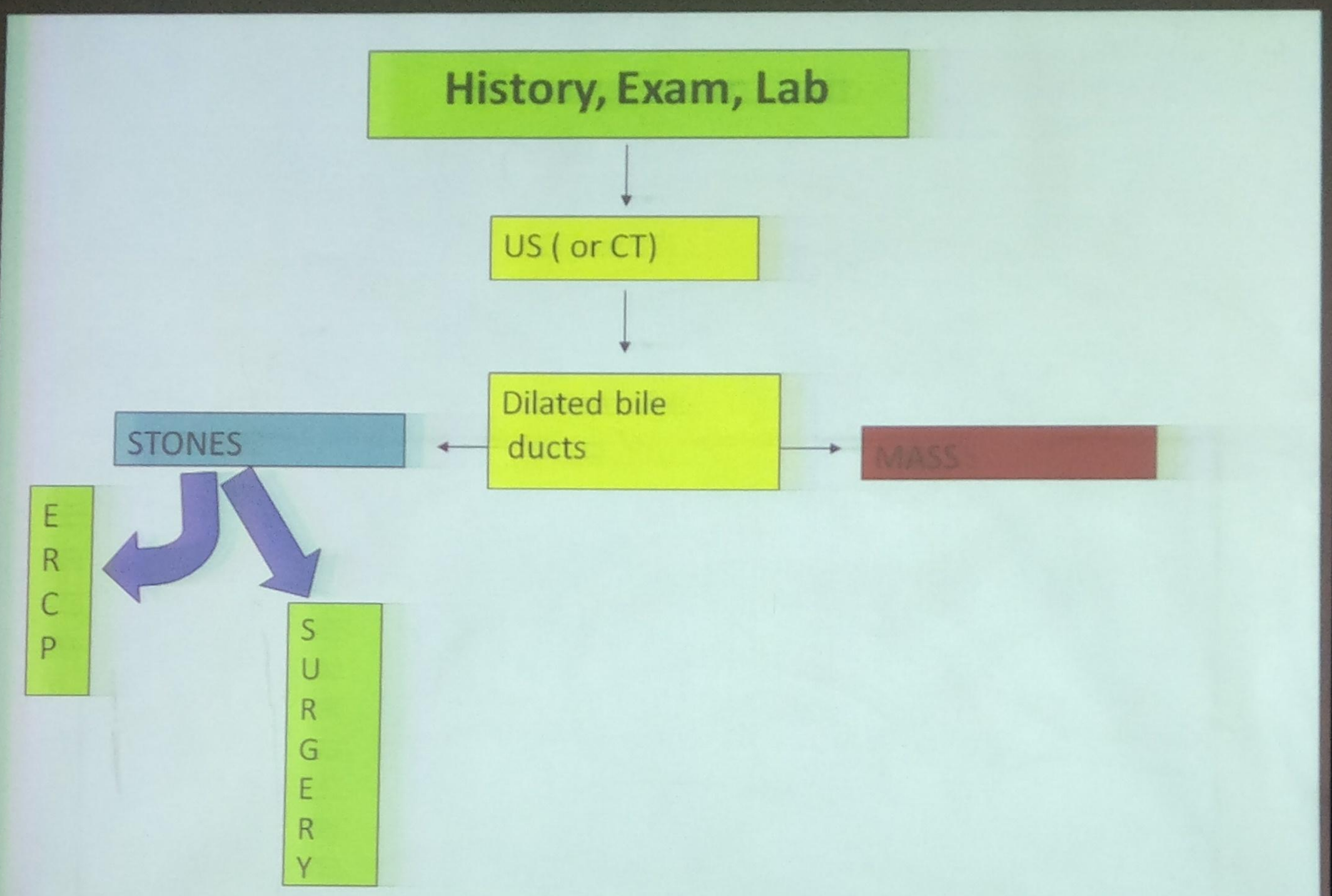
- Impaired wound healing

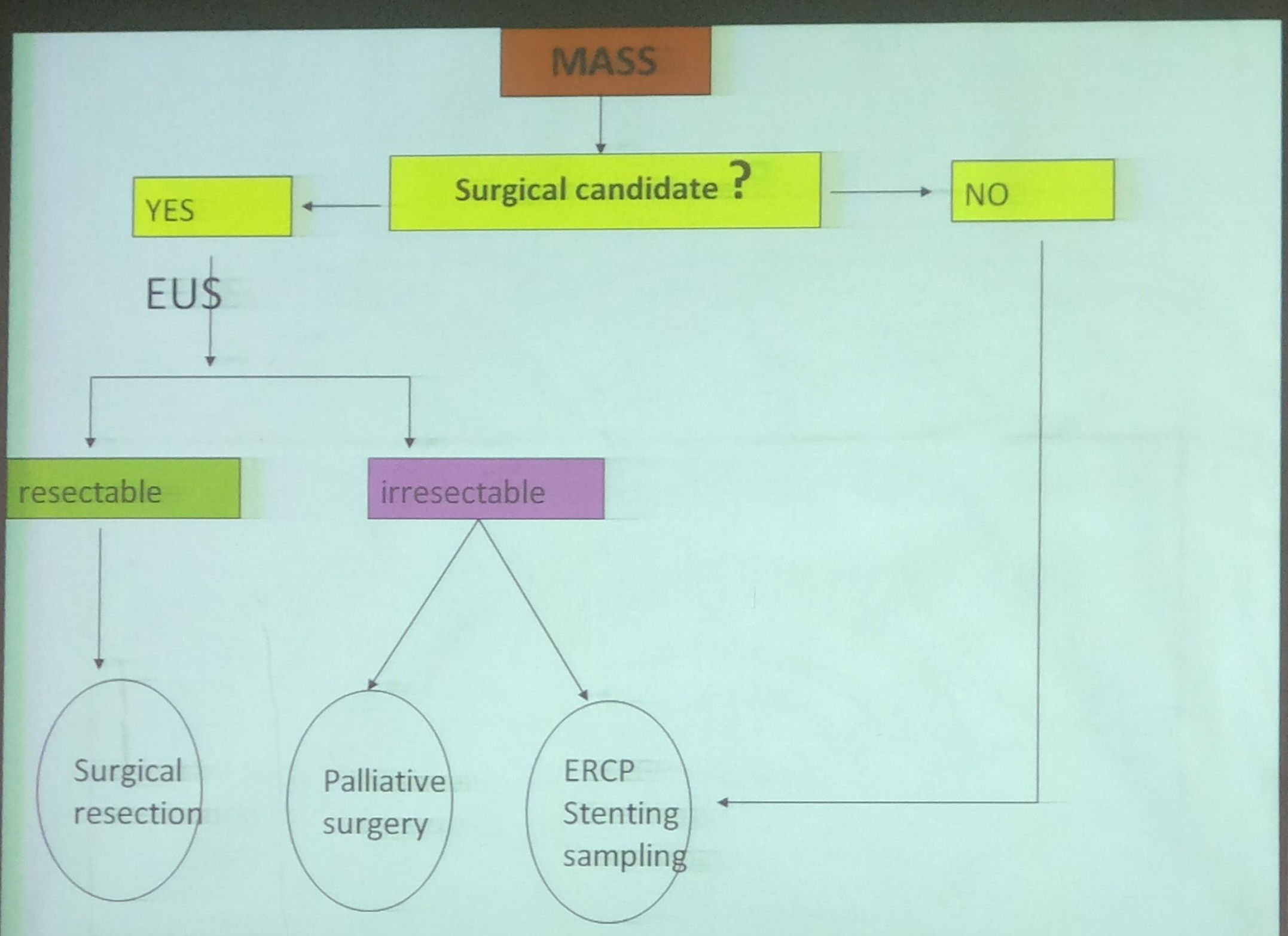
Treatment

- Choledocholithiasis
  - Open / laparoscopic CBD exploration with stone extraction and T tube placement.
  - Endoscopic papillotomy and extraction

- Periampulary carcinoma
  - Curative – whipple's procedure
  - Palliative –
    - endoscopic stenting of ampulla
    - bypass prcodures for

a. Food e.g. gastrojejunostomy
b. Bile e.g. choledochojejunostomy


History, Exam, Lab
US (or CT)
Dilated bile ducts
STONES
MASS
ERCP
SURGERY


MASS
Surgical candidate ?
YES
NO
EUS
resectable
irresectable
Surgical resection
Palliative surgery
ERCP Stenting sampling

Common Bile Duct Stones

1. Accurate prediction of common bile duct stones can be difficult
2. If **elevated bilirubin, ALP & CBD > 12 mm** risk of CBD stones is 90%
3. If normal bilirubin, ALP & CBD diameter risk of CBD stones 0.2%

A. ERCP and endoscopic sphincterotomy is investigation of choice

1. Stones extracted at endoscopy (ERCP) with balloon or Dormia basket
2. 90% successful
3. Complication rate 8%
•
1. Alternatives include:
2. Open cholecystectomy & exploration of CBD + T- tube drainage
3. Choledochoduodenostomy- markedly dialated CBD, impacted stone
4. Laparoscopic exploration of CBD

CHOLANGIOCARCINOMA

- 90% are extra-hepatic
- 60's and 70's
- M/F=3/2

Cholangiocarcinoma

Extra-hepatic: Distribution

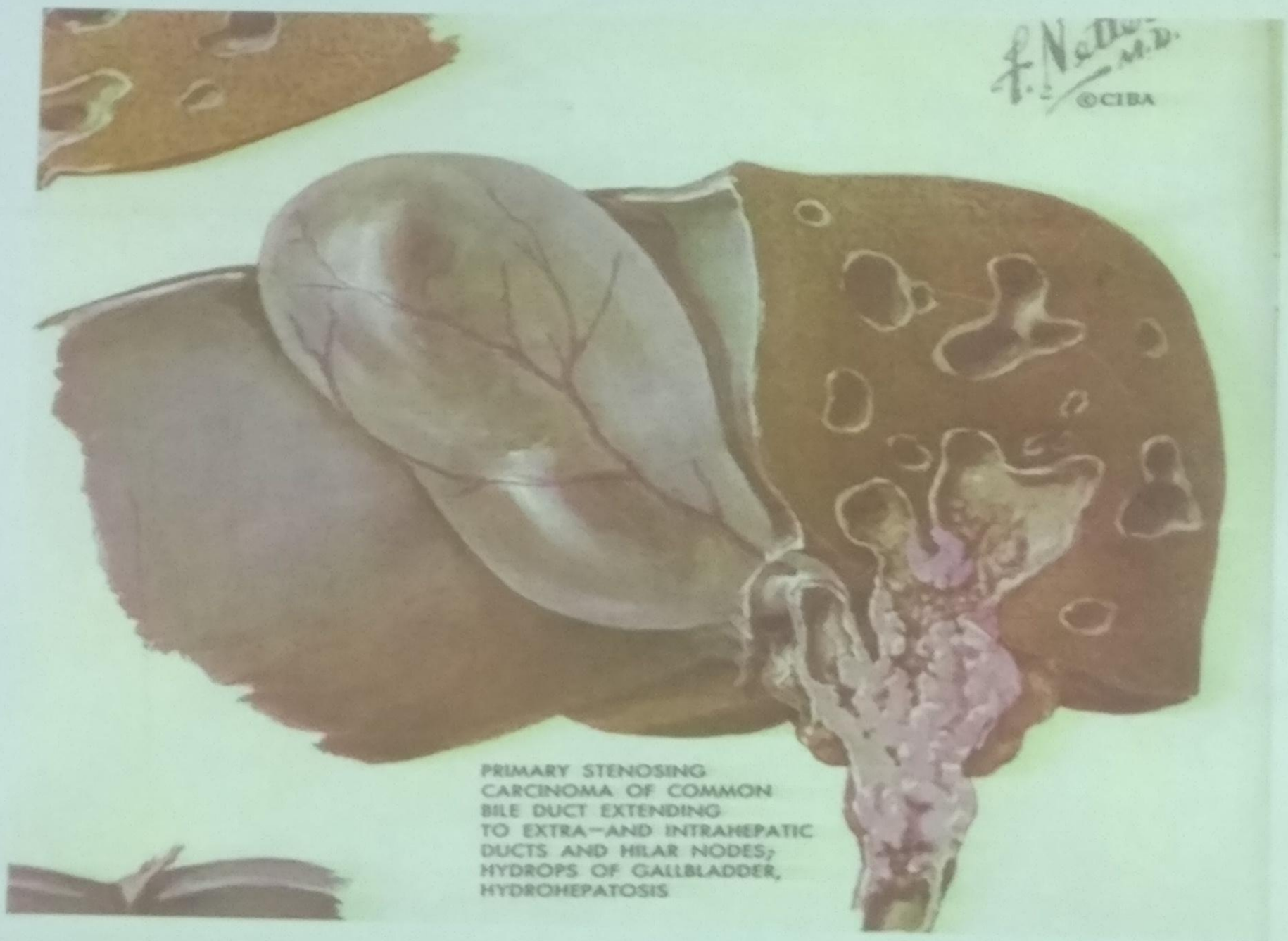
- Right or left hepatic duct = 10%
- Bifurcation = 20%
- Proximal CBD = 30%
- Distal CBD = 30%

MRCP of Extra-hepatic Cholangiocarcinoma at the Bifurcation

Klatskin tumor

ERCP: Distal CBD Cancer

Ca of CBD Bifurcation



PRIMARY STENOSING CARCINOMA OF COMMON BILE DUCT EXTENDING TO EXTRA—AND INTRAHEPATIC DUCTS AND HILAR NODES; HYDROPS OF GALLBLADDER, HYDROHEPATOSIS

Obstructive Jaundice

CBD stones (Choledocholithiasis) vs. tumor

- Clinical features favoring CBD stones:
  - Age < 45
  - Biliary colic
  - Fever
  - Transient spike in AST or amylase

- Clinical features favoring cancer:
  - Painless jaundice
  - Weight loss
  - Palpable gallbladder
  - Bilirubin > 10

Periampullary Carcinoma and The Whipple

Pathology

- Adeno carcinoma accounts for 95%

Arises from 4 different tissues of origin

- Head of pancreas
- Distal Bile duct
- Ampullary of Vater
- Periampullary duodenum

Whipple Procedure

Five basic techniques are used to resect pancreatic cancers

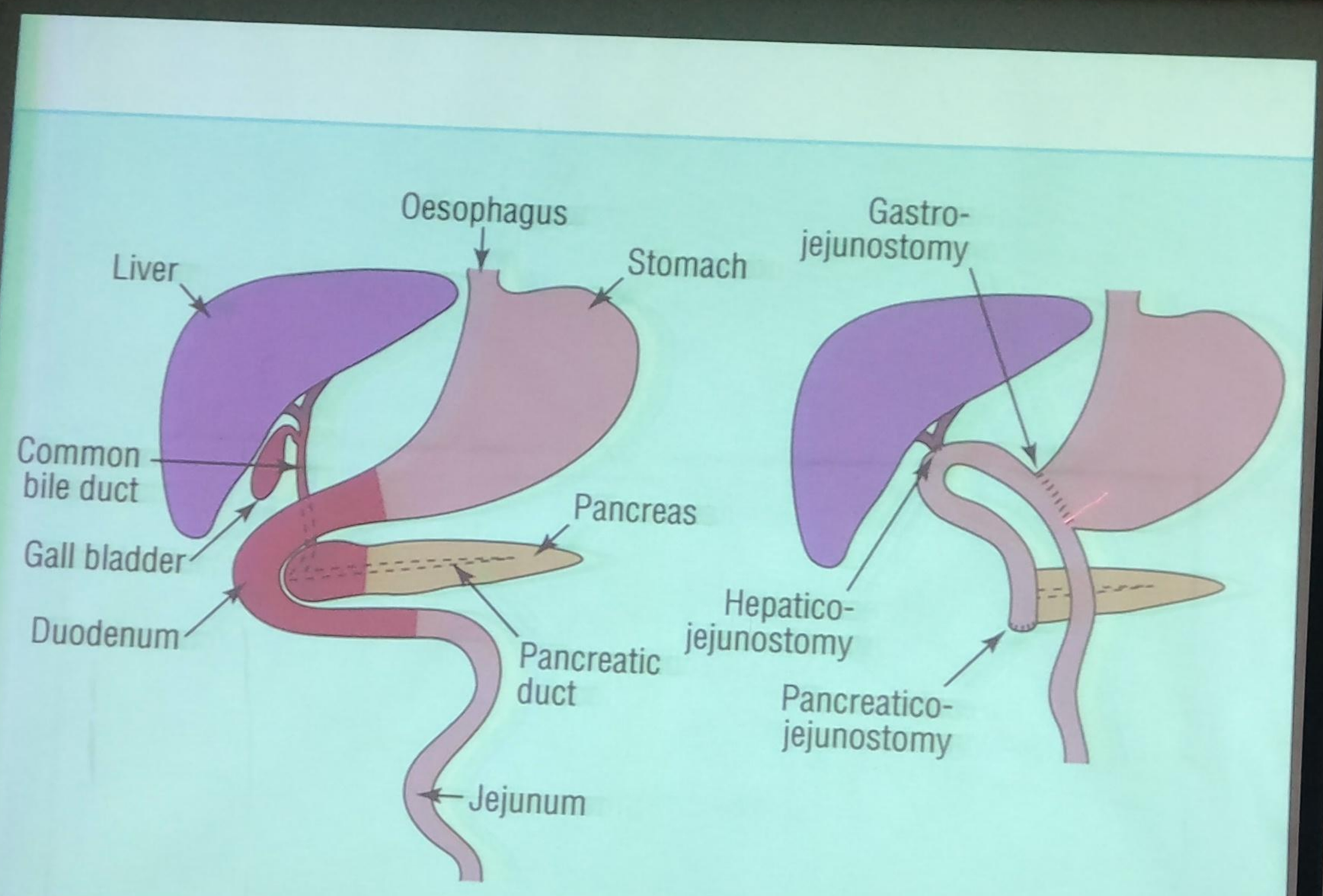
- Standard pancreaticoduodenectomy
- Pylorus preserving pancreaticoduodenectomy
- Total pancreatectomy
- Regional pancreatectomy
- Extended resection

Whipple's operation

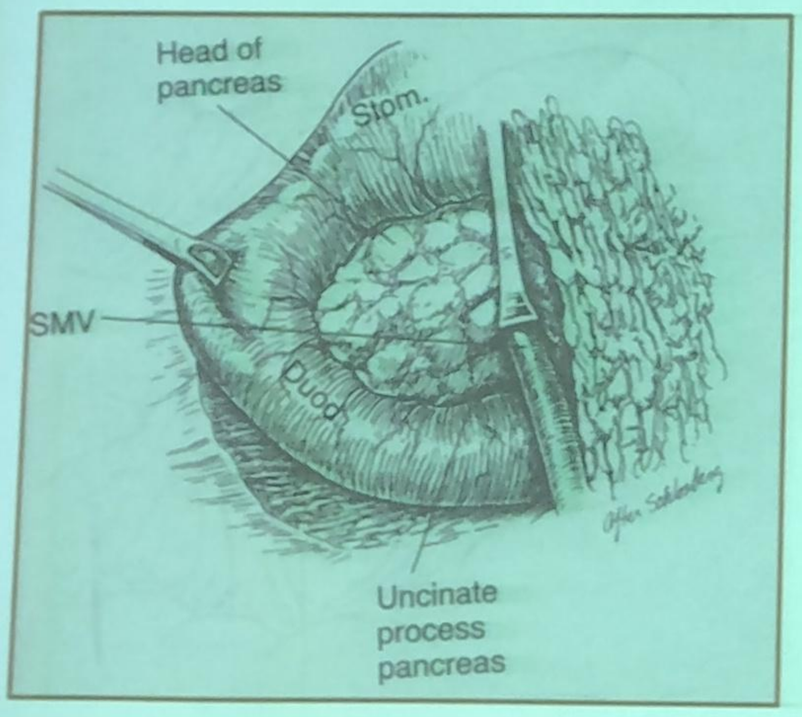
- 3 structures removed
  - C-loop of duodenum
  - Head and neck of pancreas
  - Pylorus of stomach
- 3 anastomosis are made
  - Gastro-jejunostomy
  - Choledocho-jejunostomy
  - Pancreatico-jejunostomy

Surgery and Chemotherapy

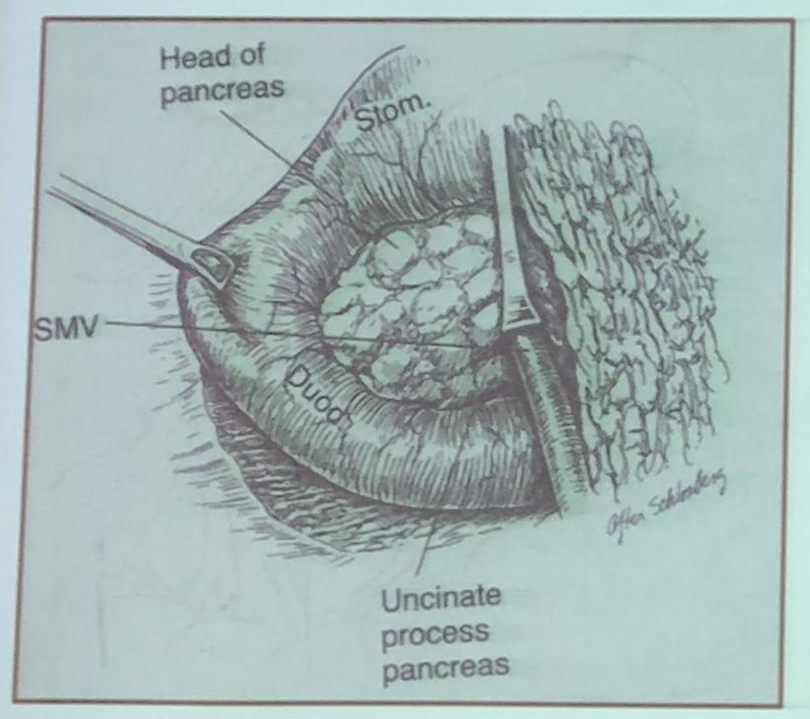
- Low risk patients had 5 year local control and survival of 100% and 80% respectively.
- High risk patients had 5 year local control and survival of 50% and 38%, respectively.
- Based on these findings, some have proposed a course of preoperative chemoradiation to improve local disease control in these high risk patients.


Oesophagus
Liver
Stomach
Common bile duct
Gall bladder
Duodenum
Pancreas
Pancreatic duct
Jejunum
Gastro-jejunostomy
Hepatico-jejunostomy
Pancreatico-jejunostomy

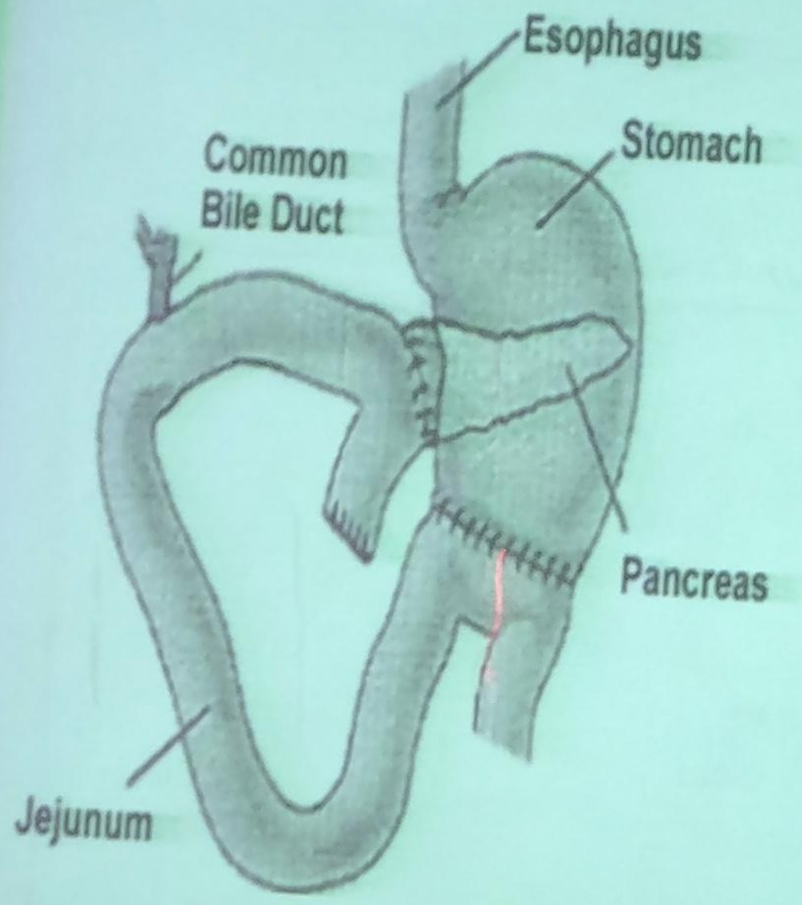
Kocherizing the Duodenum

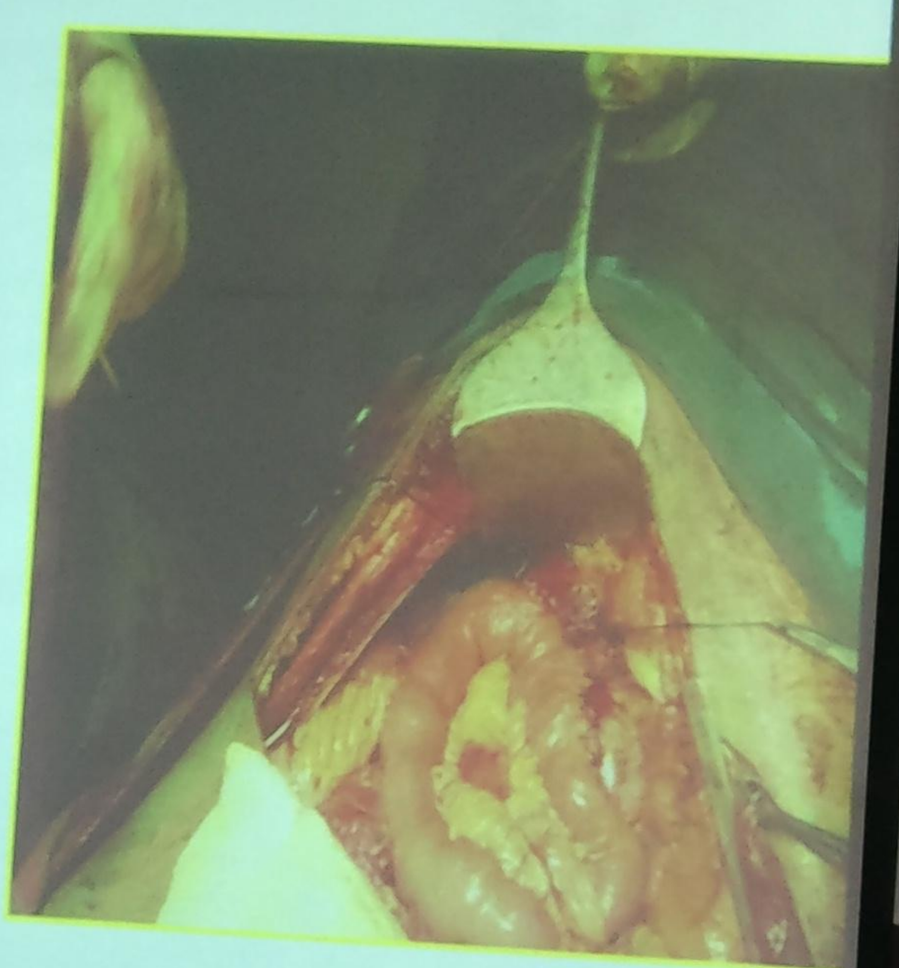


Kocherizing the Duodenum



The End Result





Adjuvant Therapy

- Autopsy series show that 85% of patients will experience recurrence in operative field.
- 70% have metastases to liver.
- So need to address local control (radiation) and distant disease (chemotherapy).