



Obstructive jaundice: approach & management

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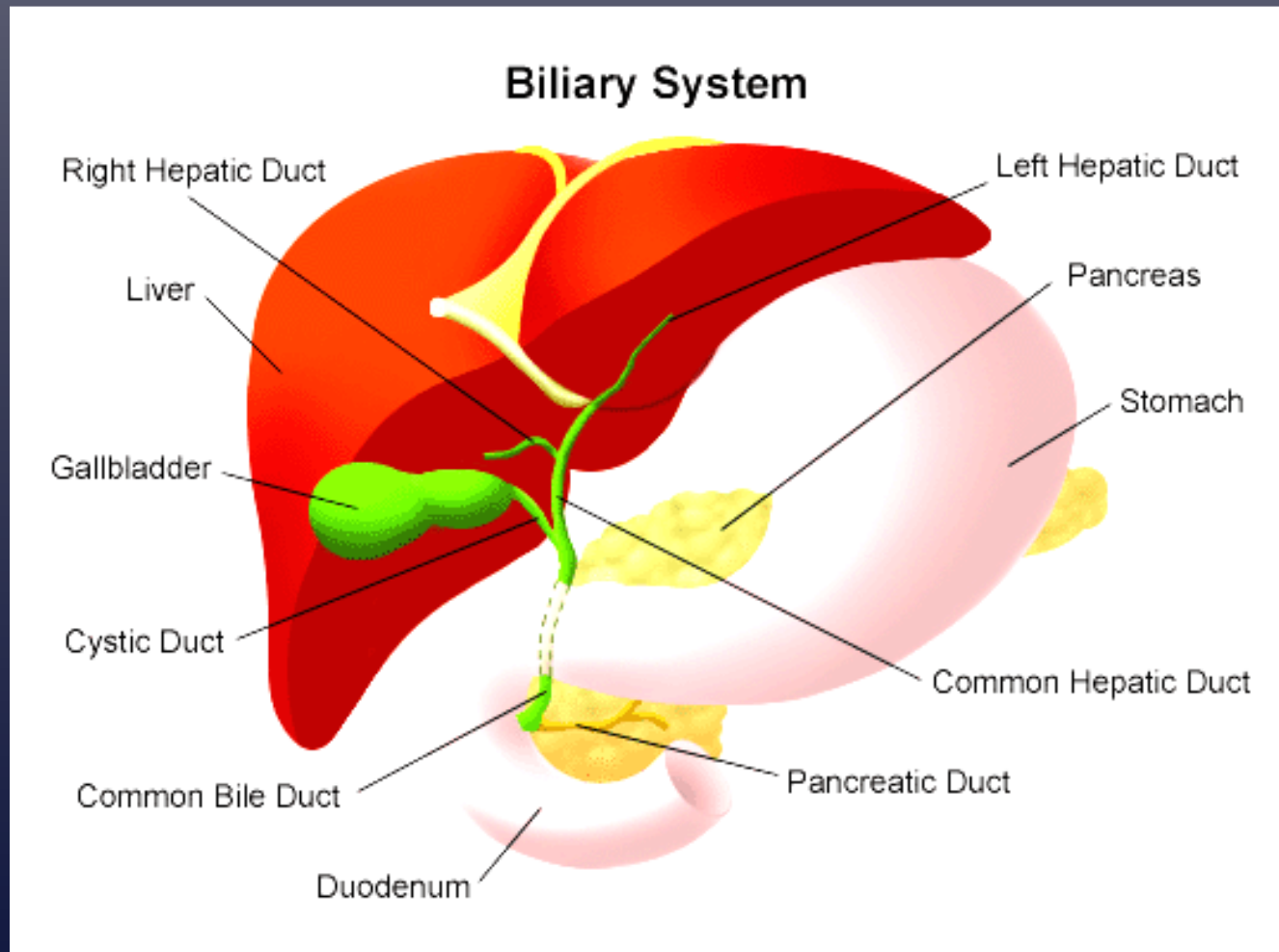
Web: surgeonshamim.com

Jaundice

- A yellow discoloration of the skin, sclerae, and other tissues caused by excess circulating bilirubin.
- A yellow-to-orange color may be imparted to the skin by consuming too much beta carotene, the orange pigment seen in carrots. In this condition, the whites of the eyes remain white, while people with true jaundice often have a yellowish tinge to the eyes.



Anatomy



Physiology

- Bilirubin is derived from Hb breakdown.
- 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 at a level greater than 2 mg%.
 - Normal level 0.1 – 1.1 mg%.
- **Mechanisms:**
 - ↑ production of bilirubin
 - ↓ hepatocyte transport or conjugation
 - Cholestasis
 - Impaired excretion of bilirubin
 - **Impaired delivery of bilirubin into intestine**
 - Surgical jaundice or obstructive jaundice

Classification

Pre-hepatic	Hepatic	Post-hepatic
Haemolysis	Hepatitis	Common bile duct stones
Gilbert's Syndrome	Alcohol	Benign strictures
	Cholestatic liver disease	Ascariasis
	Haemochromatosis	Pancreatic cancer
	Wilson's	Cholangiocarcinoma
	Alpha 1 Anti-trypsin deficiency	Liver metastases
	Liver metastases	

DDx: Unconjugated bilirubinemia

- **↑ production**

- Extravascular hemolysis
- Intravascular hemolysis
- Extravasation of blood into tissues
- Errors in production of red blood cells

- **Impaired hepatic bilirubin uptake**

- Portosystemic shunts
- Drug inhibition: rifampin, probenecid

- **Impaired bilirubin conjugation**

- Gilbert's disease (dec. glucuronyltransferase)
- Crigler-Najar's syndrome (no glucuronyltransferase)
- Neonatal jaundice (physiologic)
- Hyperthyroidism
- Estrogens
- Liver diseases
 - chronic hepatitis, cirrhosis, Wilson's disease

DDx: Conjugated Bilirubinemia

- **Intrahepatic cholestasis/ impaired excretion**

- Hepatitis (viral, alcoholic, and non-alcoholic)
 - Any cause of hepatocellular injury
- Primary biliary cirrhosis or end-stage liver dz
- Sepsis and hypoperfusion states
- TPN
- Pregnancy
- Infiltrative dz: TB, amyloid, sarcoid, lymphoma
- Drugs/toxins i.e. chlorpromazine, arsenic
- Post-op patient or post-organ transplantation
- Hepatic crisis in sickle cell disease

- **Obstructive Jaundice—extrahepatic cholestasis**

- **Choledocholithiasis** (CBD or CHD stone)
- **Cancer** (peri-ampullary or cholangio Ca)
- **Strictures** after invasive procedures
- Acute and chronic **pancreatitis**
- **Primary sclerosing cholangitis (PSC)**
- Parasitic infections
 - *Ascaris lumbricoides*, liver flukes

Causes

- **Benign**

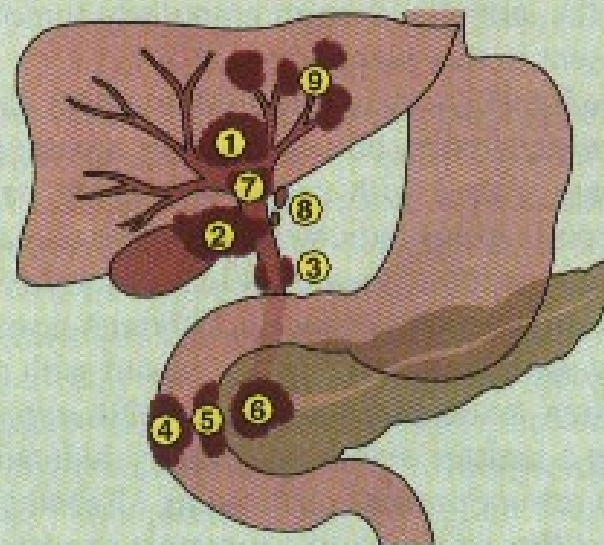
- Gall stones
- Chronic Pancreatitis
- Traumatic biliary Stricture
- Sclerosing Cholangitis
- Parasites

- **Malignant**

- Primary Hepatoma
- Cholangiocarcinoma
- Carcinoma Duodenum
- Carcinoma Pancreas
- Hilar nodes
- Intrahepatic secondary deposit

Malignant Causes

Causes of malignant obstructive jaundice



- | | |
|--------------------------------|-----------------------------------|
| ① Primary hepatoma | ⑥ Carcinoma pancreas |
| ② Carcinoma of the gallbladder | ⑦ High cholangiocarcinoma |
| ③ Low cholangiocarcinoma | ⑧ Hilar nodes |
| ④ Carcinoma duodenum | ⑨ Intrahepatic secondary deposits |
| ⑤ Carcinoma ampulla | |

Clinical Presentation

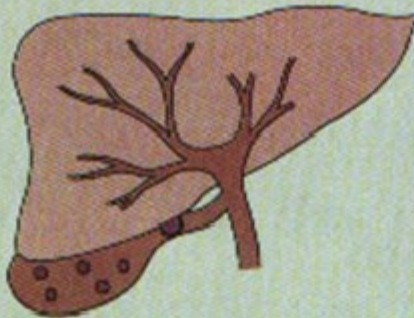
- Jaundice
 - Painless or painful
 - Progressive or intermittent
- Biliary Colic
- Acute Cholangitis
 - Charcot's triad
- Acute Pancreatitis
- Courvoisier's Law

Common clinical scenarios and associated biliary tract pathology



Carcinoma at the porta hepatis

- Dilated intrahepatic ducts
- Collapsed gallbladder
- Non-dilated common bile duct



Stone impacted in Hartmann's pouch

- No jaundice
- Normal intrahepatic ducts
- Distended gallbladder (mucocele)
- Non-dilated common bile duct



Carcinoma of the pancreas

- Dilated intrahepatic ducts
- Distended, thin-walled gallbladder
- Dilated proximal common bile duct
- Distal stricture appears to be malignant



Stone impacted in lower bile duct

- Dilated intrahepatic ducts
- Non-distended, thick-walled gallbladder
- Dilated common bile duct
- Stone impacted at lower end of common bile duct

Investigations

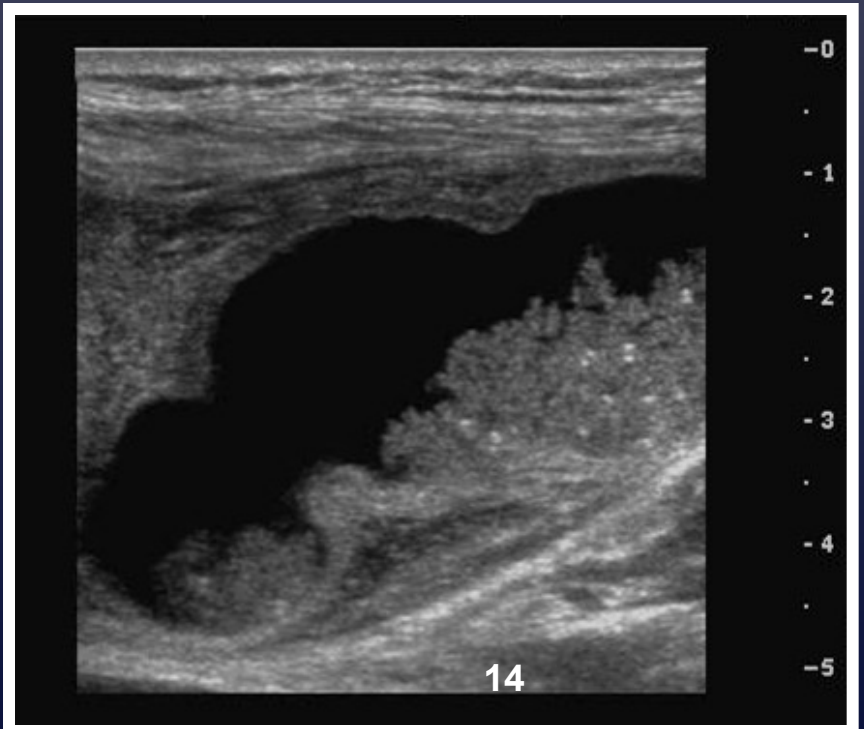
- **Laboratory**

- Full blood count
- UCE
- LFT
- Clotting studies
- Amylase
- HbsAg, anti-HCV

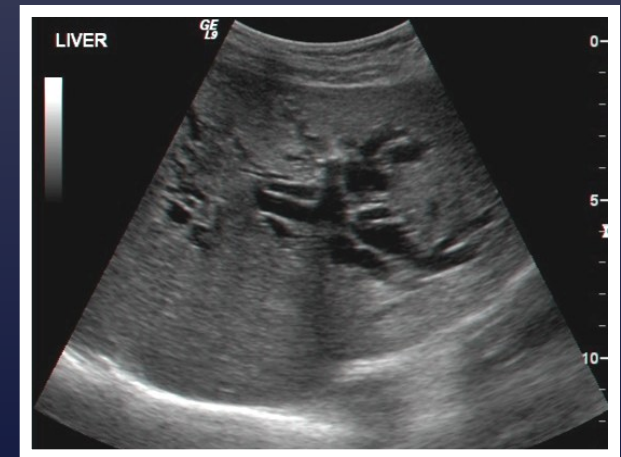
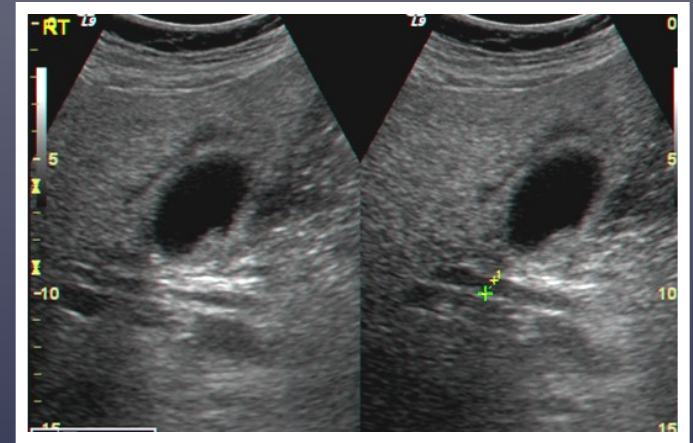
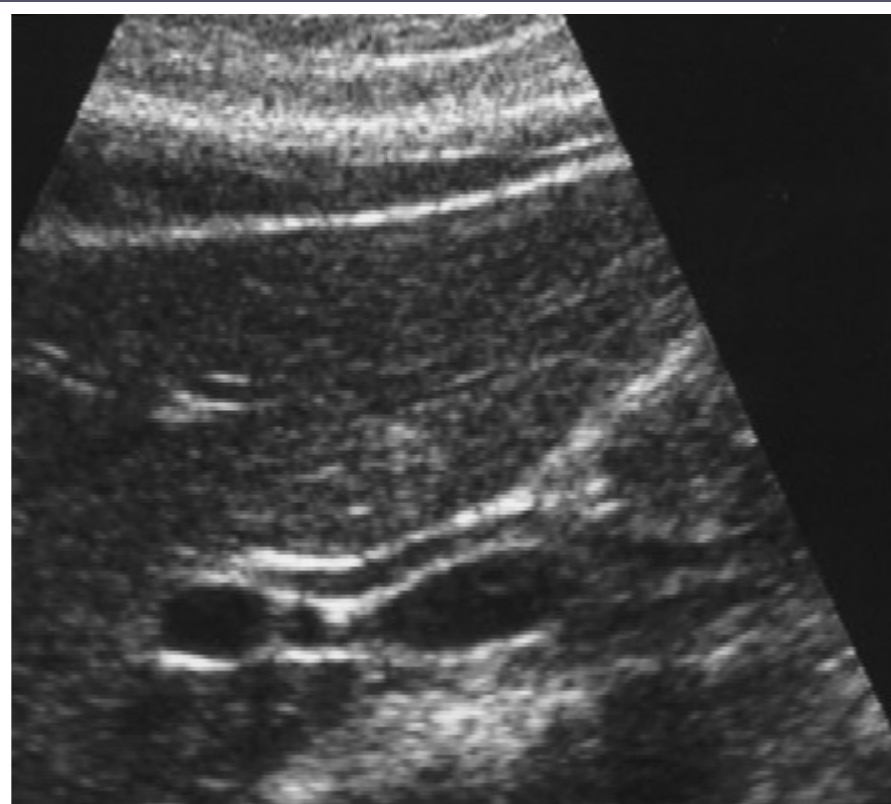
- **Imaging**

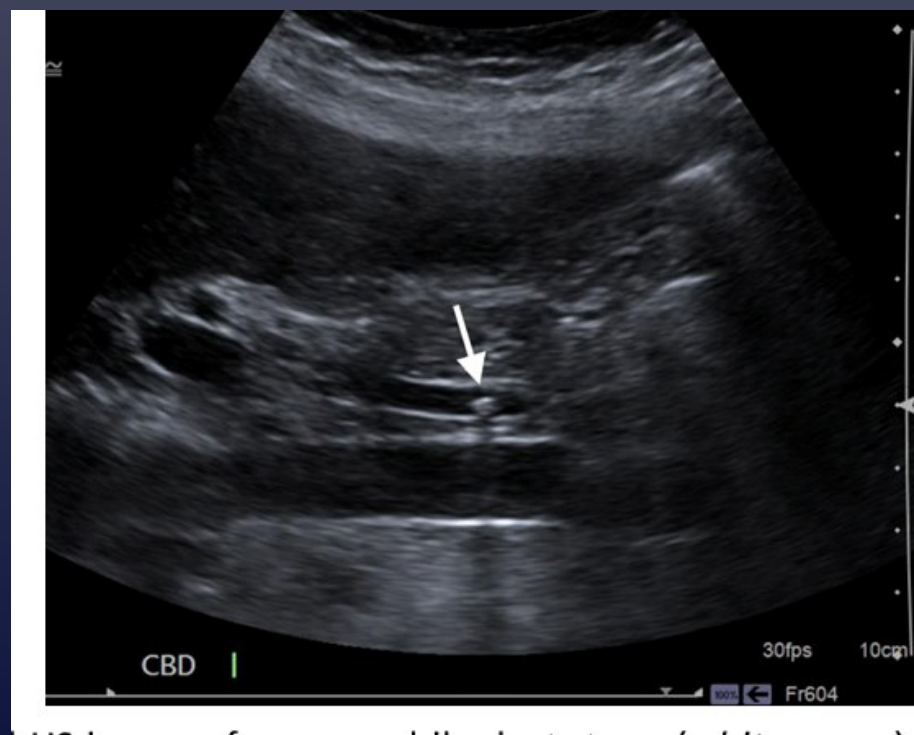
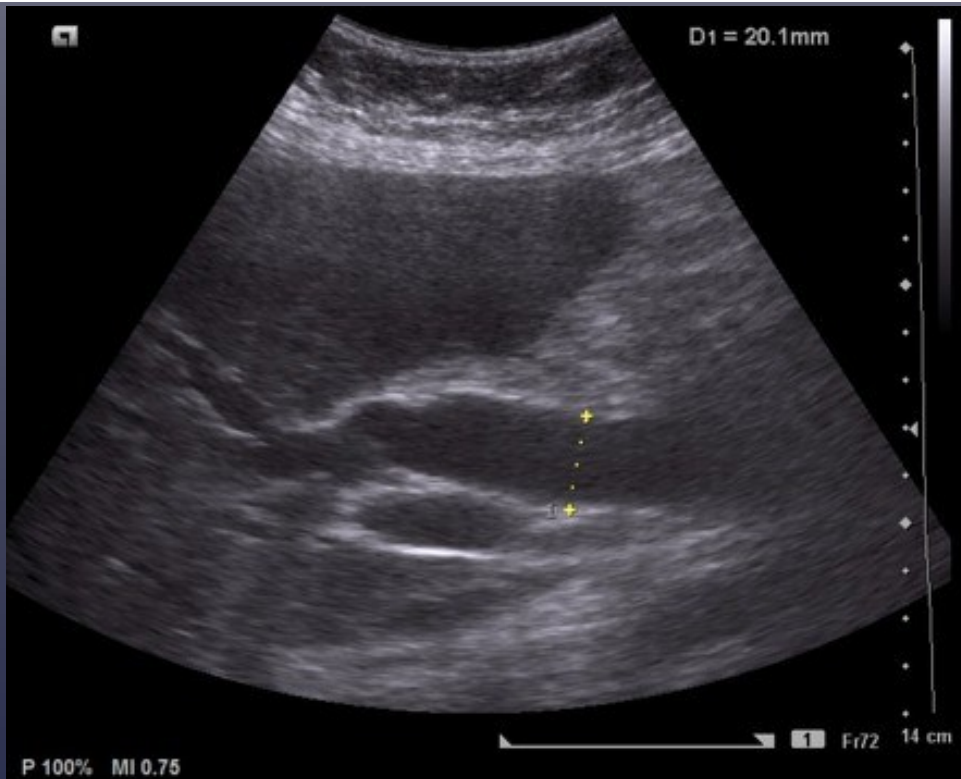
- US
- ERCP
- PTC
- CT
- MRI

Sonography: Gallbladder

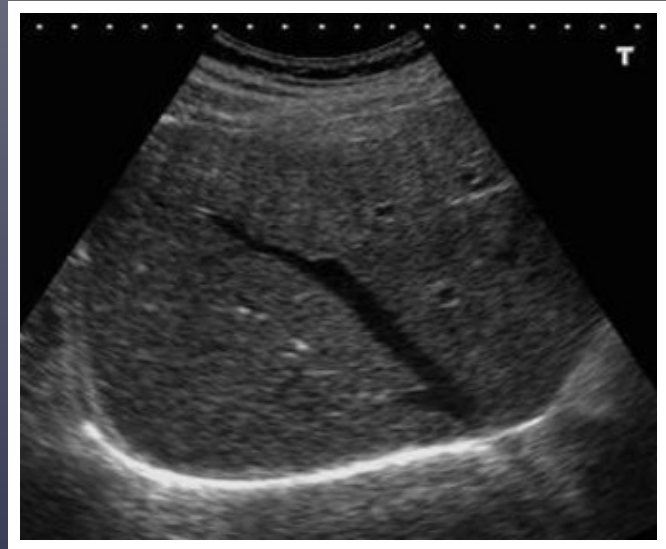


Sonography: Dilated Bile Ducts

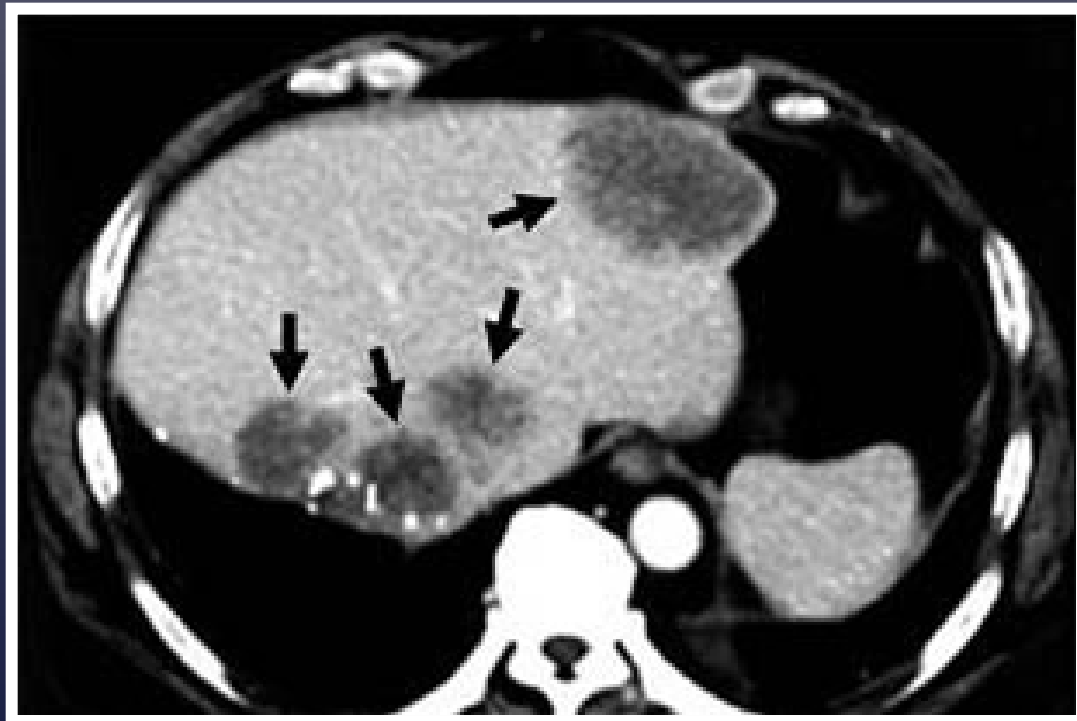




Sonography: Liver



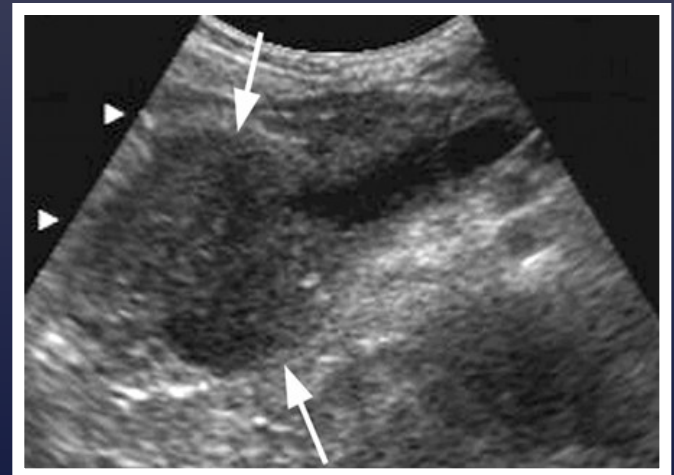
CT scan: Liver

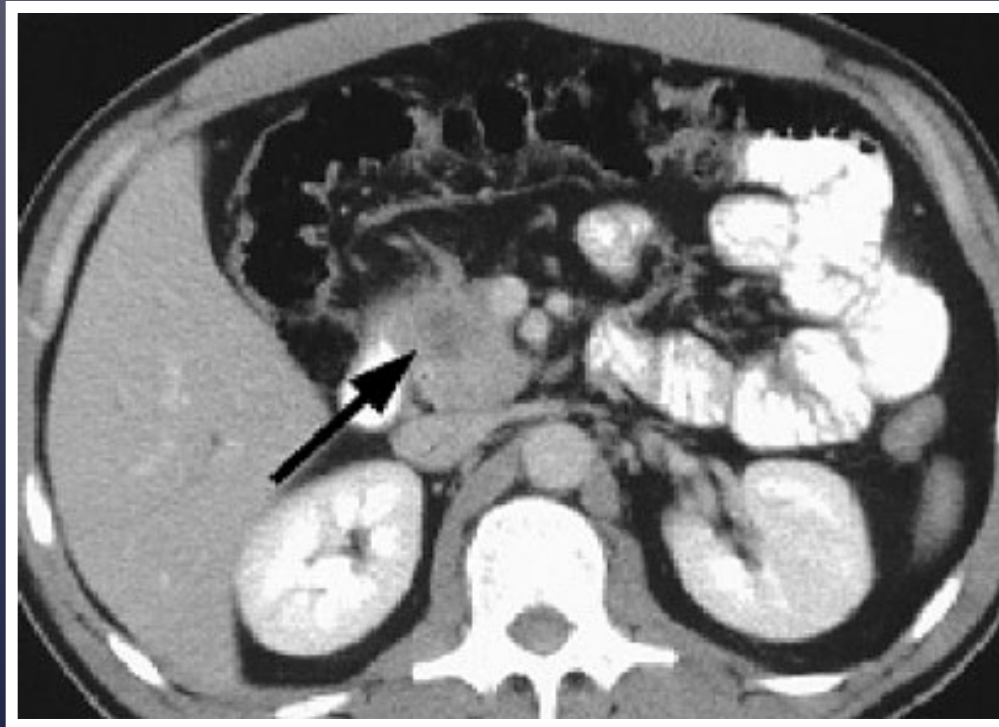


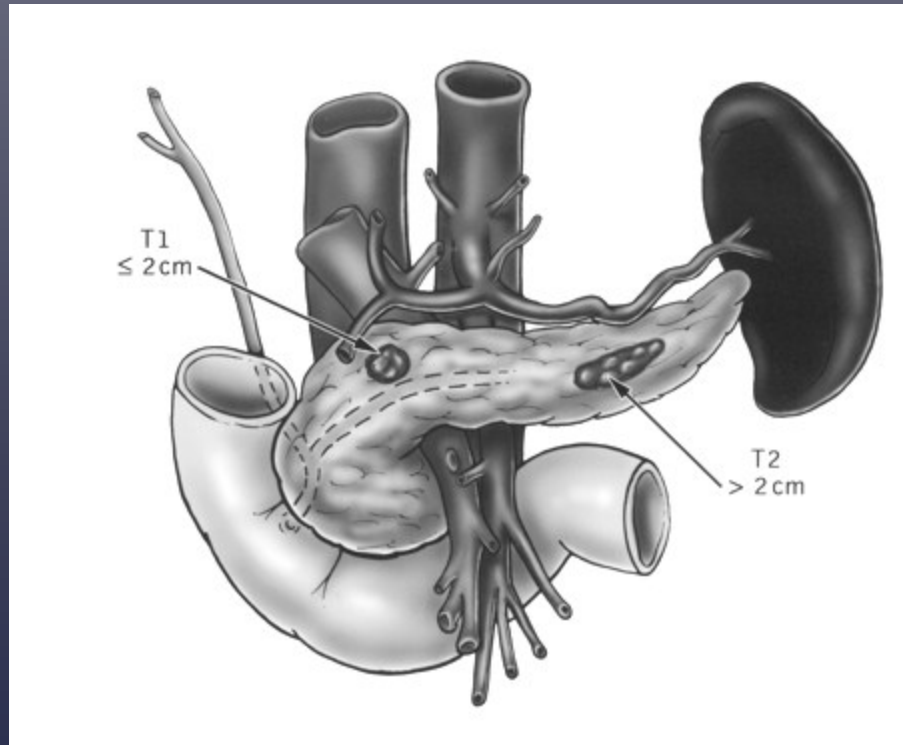
Sonography: Pancreas



CT scan: Pancreas







ERCP (Endoscopic retrograde cholangiopancreatography)

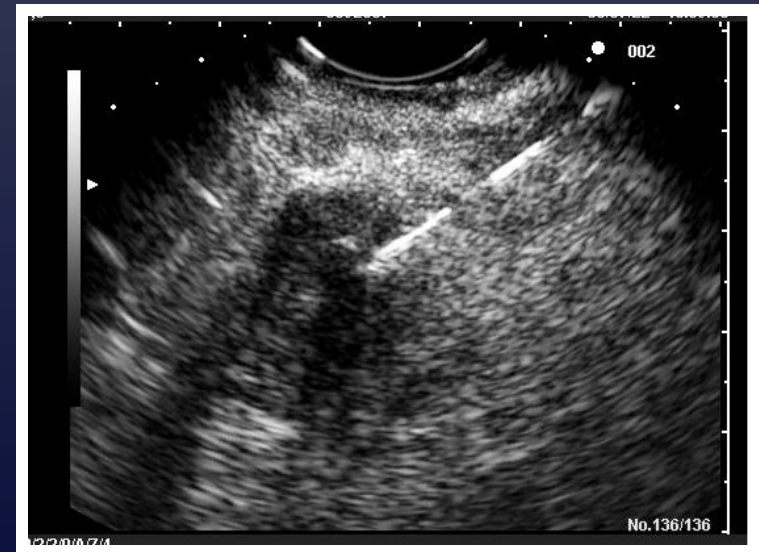


Endoscopic US

- combines endoscopy and US
- Visualization
 - Pancreas (sensitivity > CT for small tumors)
 - Biliary Strictures (sensitivity similar to MRCP)
 - Choledolithiasis
- tissue sampling (EUS-FNA)

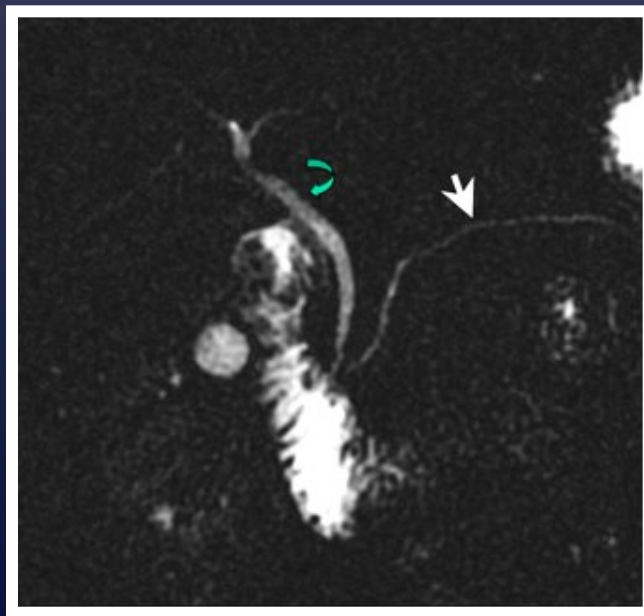
FNAC

- **US**
 - Trans-abdominal
 - Endoscopic
- **CT**
- 86% diagnosis accuracy for malignancy
- Complications rare (bleeding/infection < 1%)

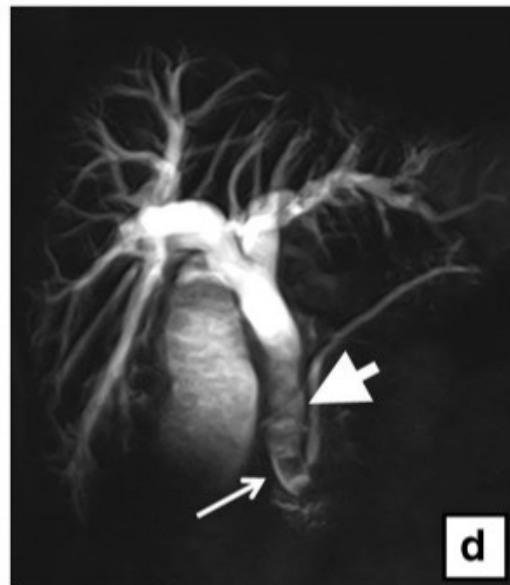
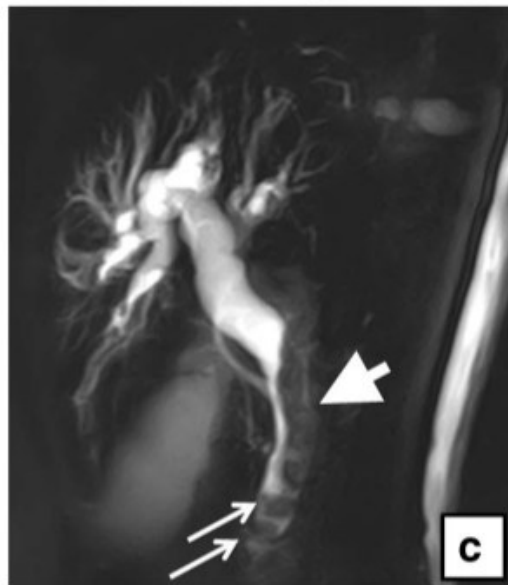
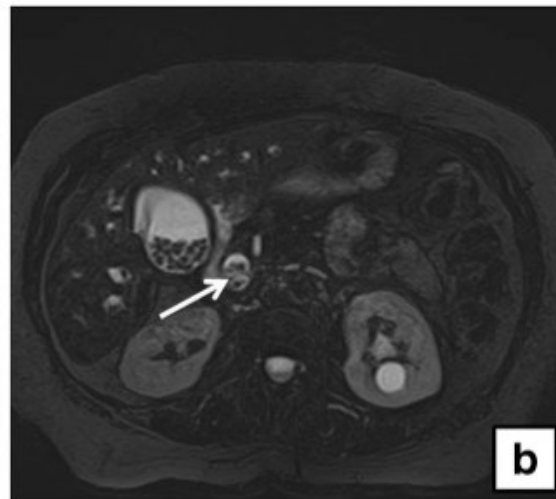


MRCP (Magnetic resonance cholangiopancreatography)

- Detection of biliary/pancreatic duct stones, strictures, or dilatations within the biliary system
- Malignancy
- Limitation of MRCP
 - Therapeutic applications (ERCP)
 - Expensive



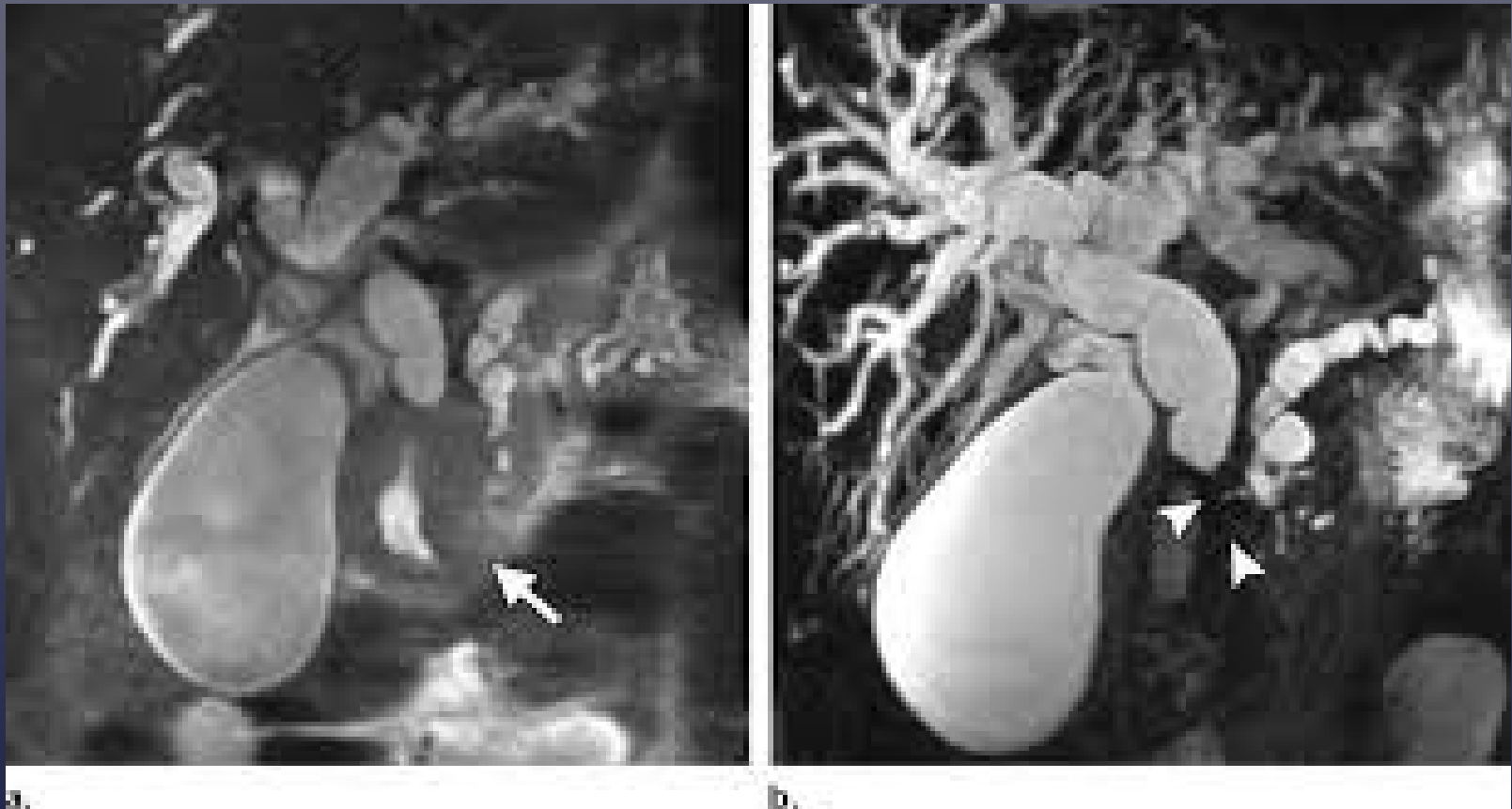
Common bile duct stone (red arrow) and multiple stones (black arrow) gallbladder as visualized by MRCP.



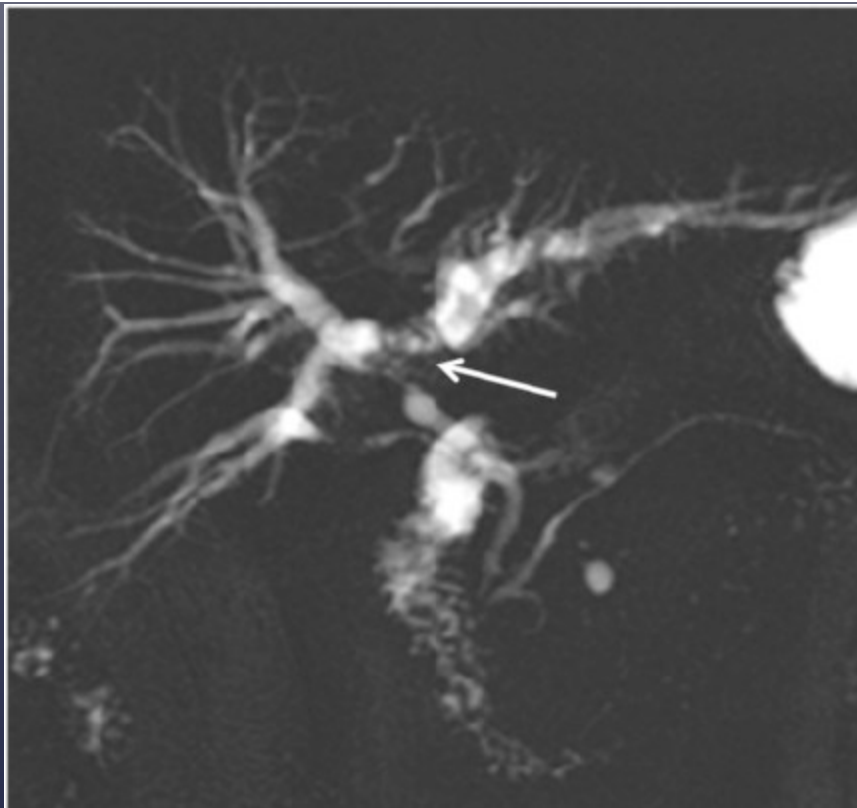
a Axial T2-weighted MRI shows multiple filling defects in the gallbladder and in the dilated CBD (arrow) .

b Axial fat-saturated T2-weighted MRI of the same patient at the same level of a.

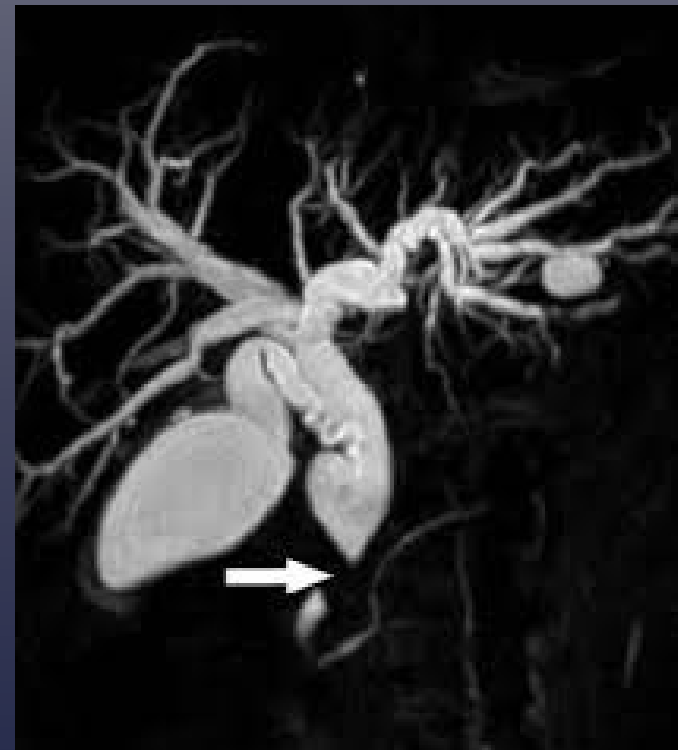
c, d Coronal MIP reformat of the same patient shows multiple filling defects in the gallbladder and in the dilated CBD (arrowhead), and two stones are seen in the distal CBD (arrows)



MRI shows tapering stricture in lower CBD (*arrow*), with double duct sign.



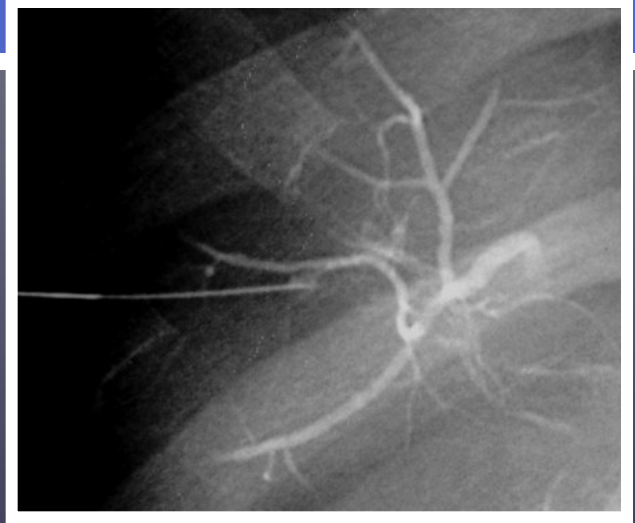
MRCP of a classical Klatskin 's tumor. The confluence, proximal hepatic ducts and proximal common hepatic duct are strictured (arrow). The common bile duct is of normal caliber.

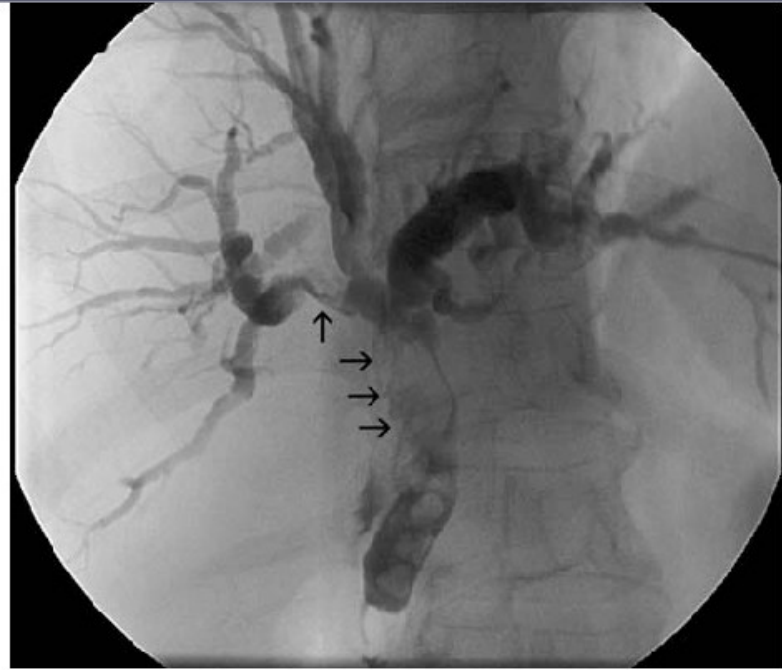


MR cholangiopancreatographic image shows abrupt cutoff with segmental narrowing of distal common bile duct (arrow) and upstream bile duct dilatation.

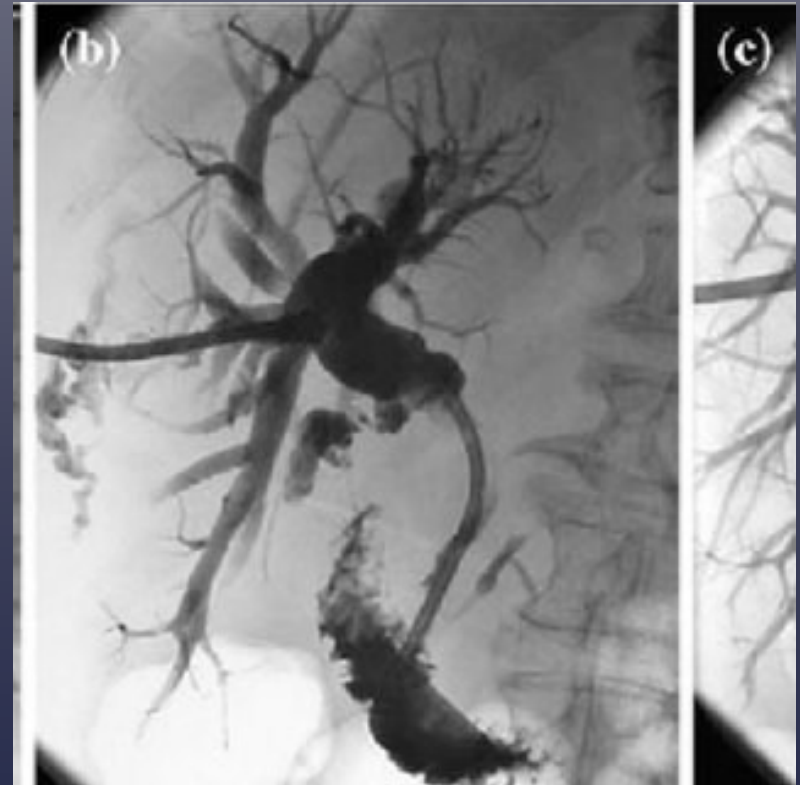
Percutaneous transhepatic cholangiogram (PTC)

- The liver is punctured to enter the peripheral intrahepatic bile duct system
- Contrast medium is injected into the biliary system
- Identification of the obstruction
- Therapeutic for lesions proximal to the common hepatic duct
- Complications (~in 3% severe)
 - peritonitis
 - Sepsis
 - Cholangitis/subphrenic abscess

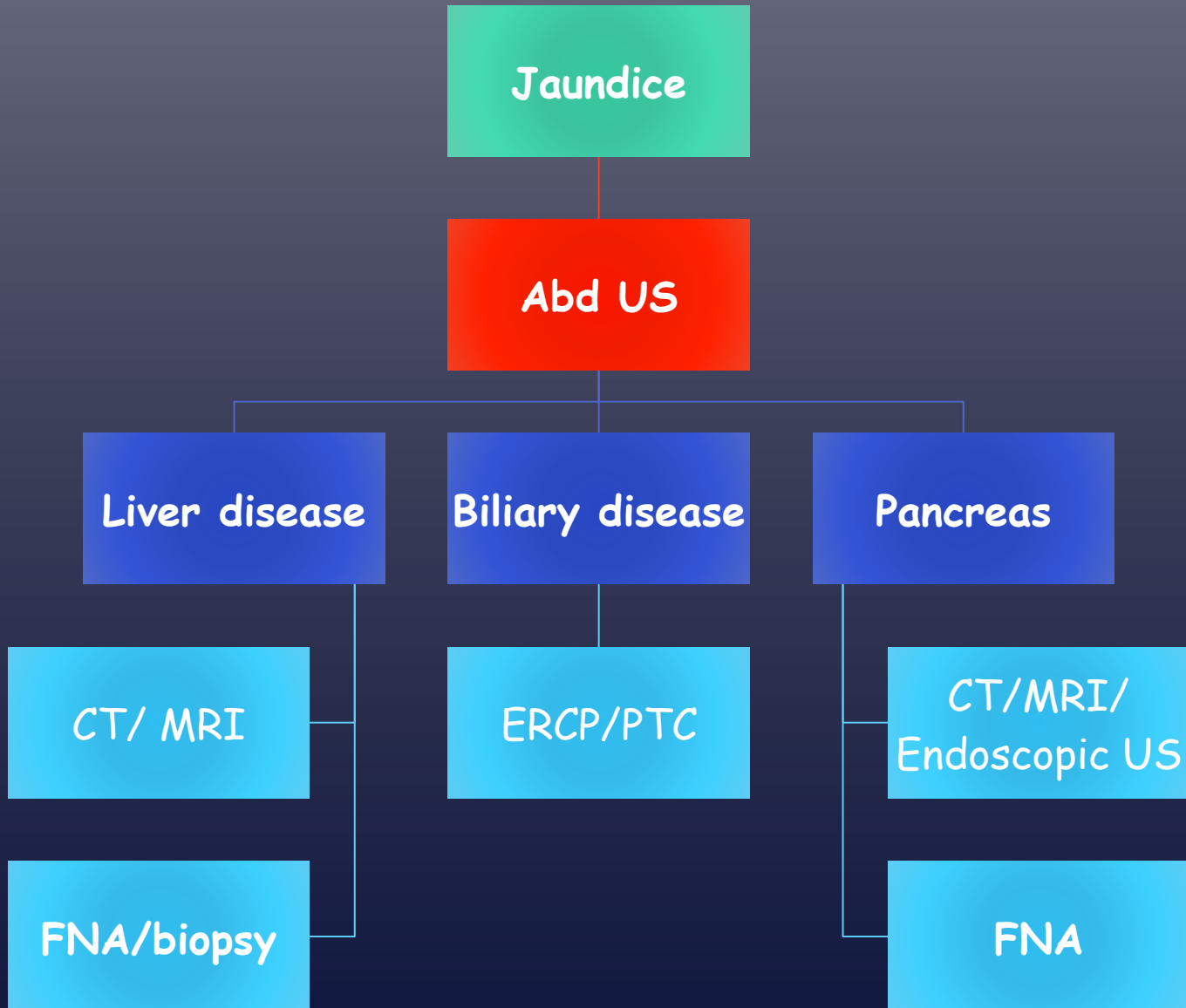




PTC obtained from left lobe biliary access shows malignant obstruction of the right main hepatic duct and proximal common bile duct (arrows), with several stones distally



PTC showing obstruction in the upper CHD due to cholangiocarcinoma.



Treatment

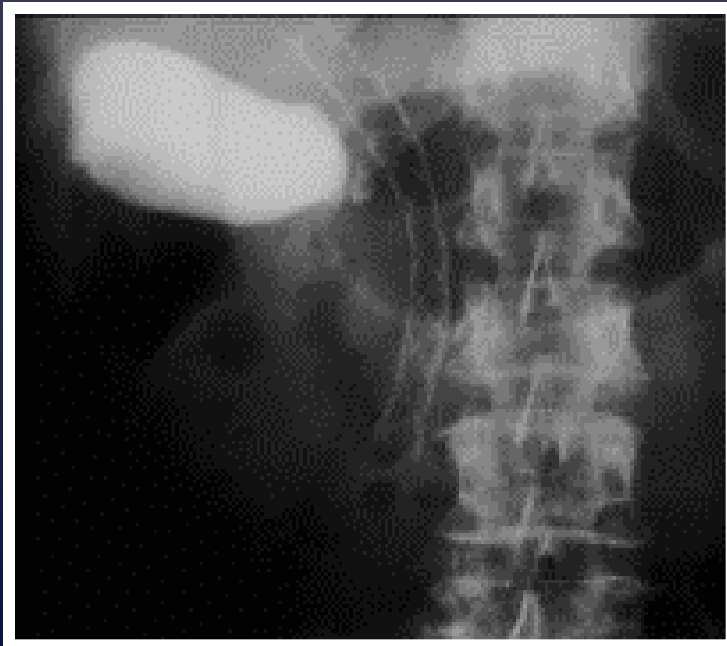
- **Non surgical**
 - Endoscopic sphincterotomy
 - Spontaneous extrusion of stone into duodenum
 - Extaction with balloons
 - Extraction with basket



7 Common bile duct stone (arrow) extraction using a Dormia basket as visualized by ERCP.

- Palliative therapy- drainage

- Malignant Stricture
- External drainage **PTC**
- Internal drainage-Stent **ERCP**



Surgical treatment

Preoperative preparation:

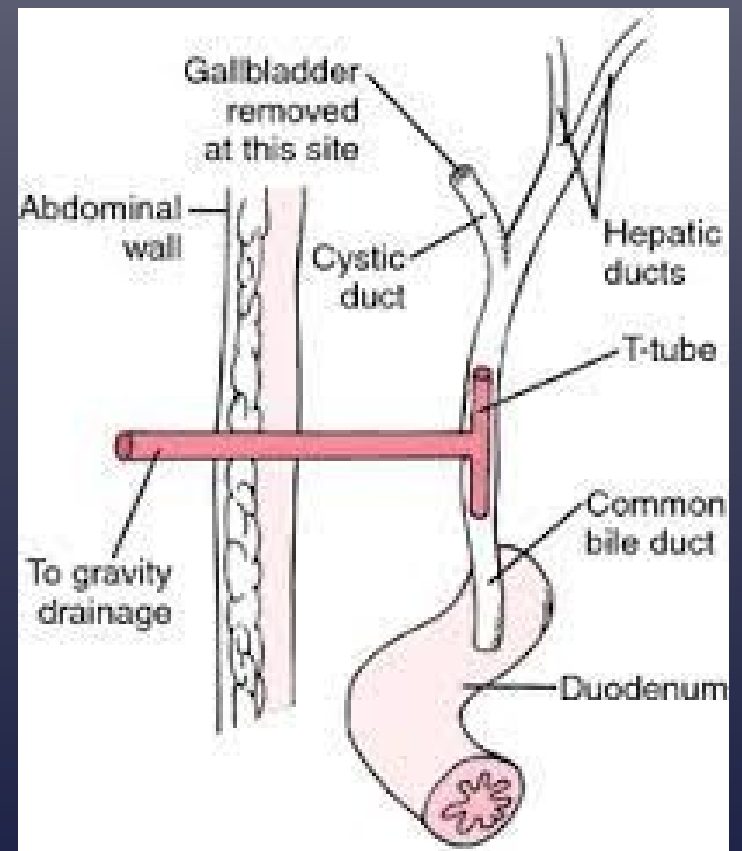
- *Ascertain whether there is associated sepsis (cholangitis);*
 - *Infective causes may represent an increased risk to members of staff potentially exposed to body fluids.*
 - *There is also a risk of other **infections**, so that prophylactic antibiotics will be needed.*
- ***Impaired clotting** occurs because of vitamin K deficiency & this should be corrected.*
- *There is an increased risk of **renal failure** (hepatorenal syndrome) & so patients must be kept well hydrated.*

- **Minimal Invasive Surgery**

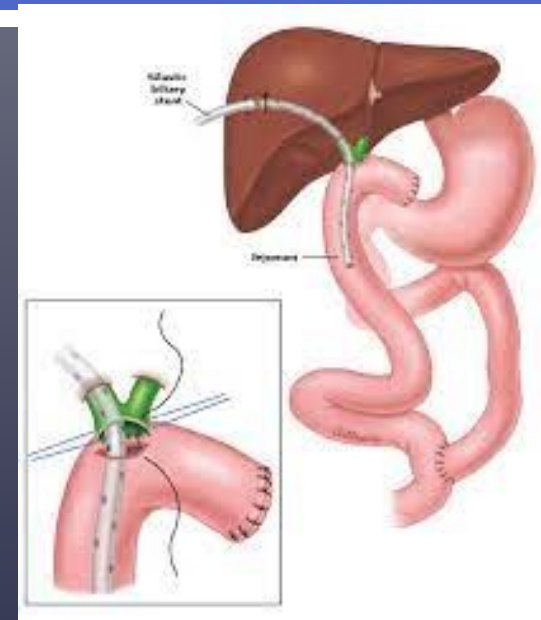
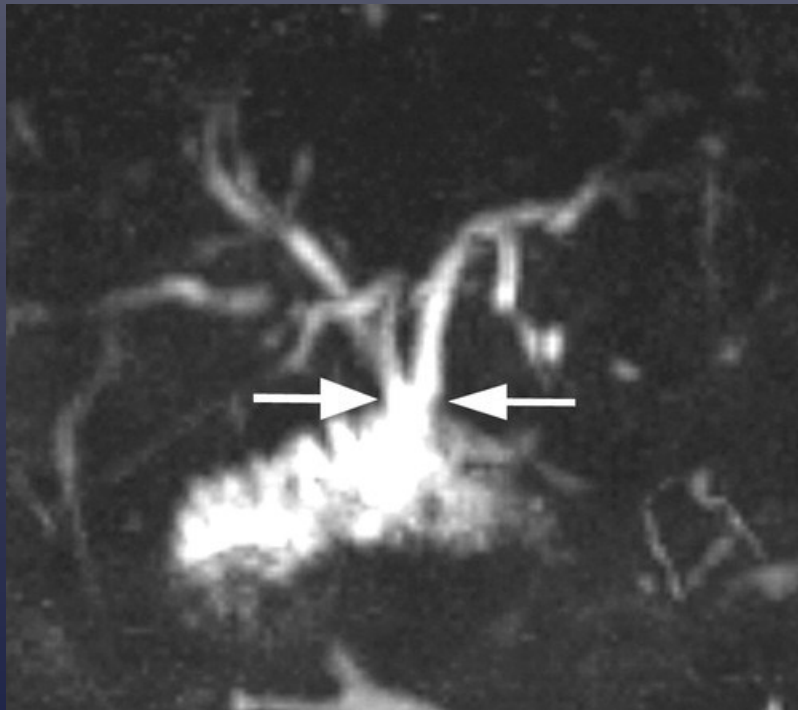
- Laparoscopic exploration of CBD
 - Via cystic duct
 - By direct choledochotomy

- **Open surgery**

- Choledochotomy with T tube drainage
- Supra duodenal sphincteroplasty with T tube drainage
- Trans duodenal sphincteroplasty
- Choledochoduodenostomy
- Hepaticojejunostomy
- Whipple's operation

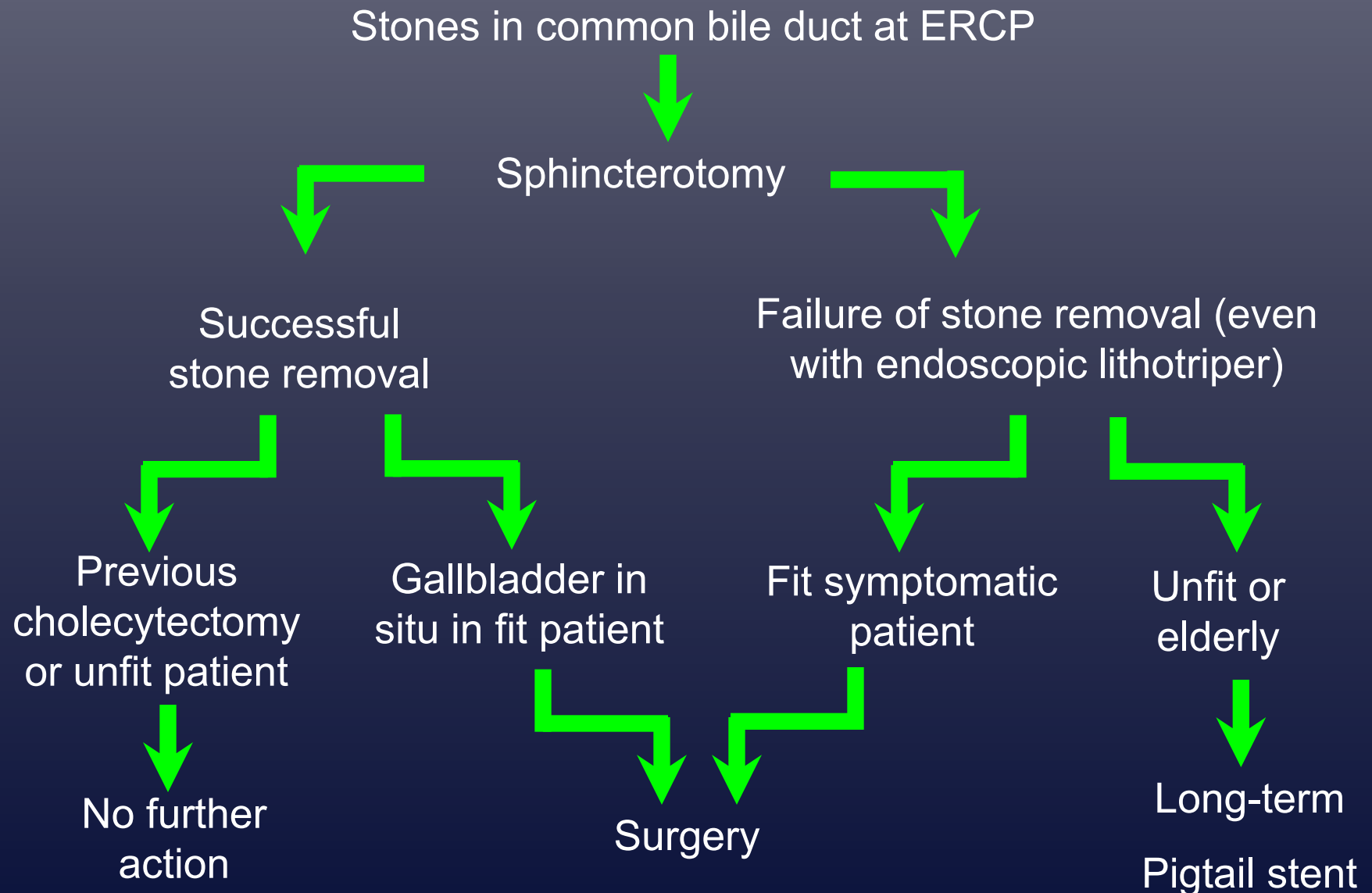


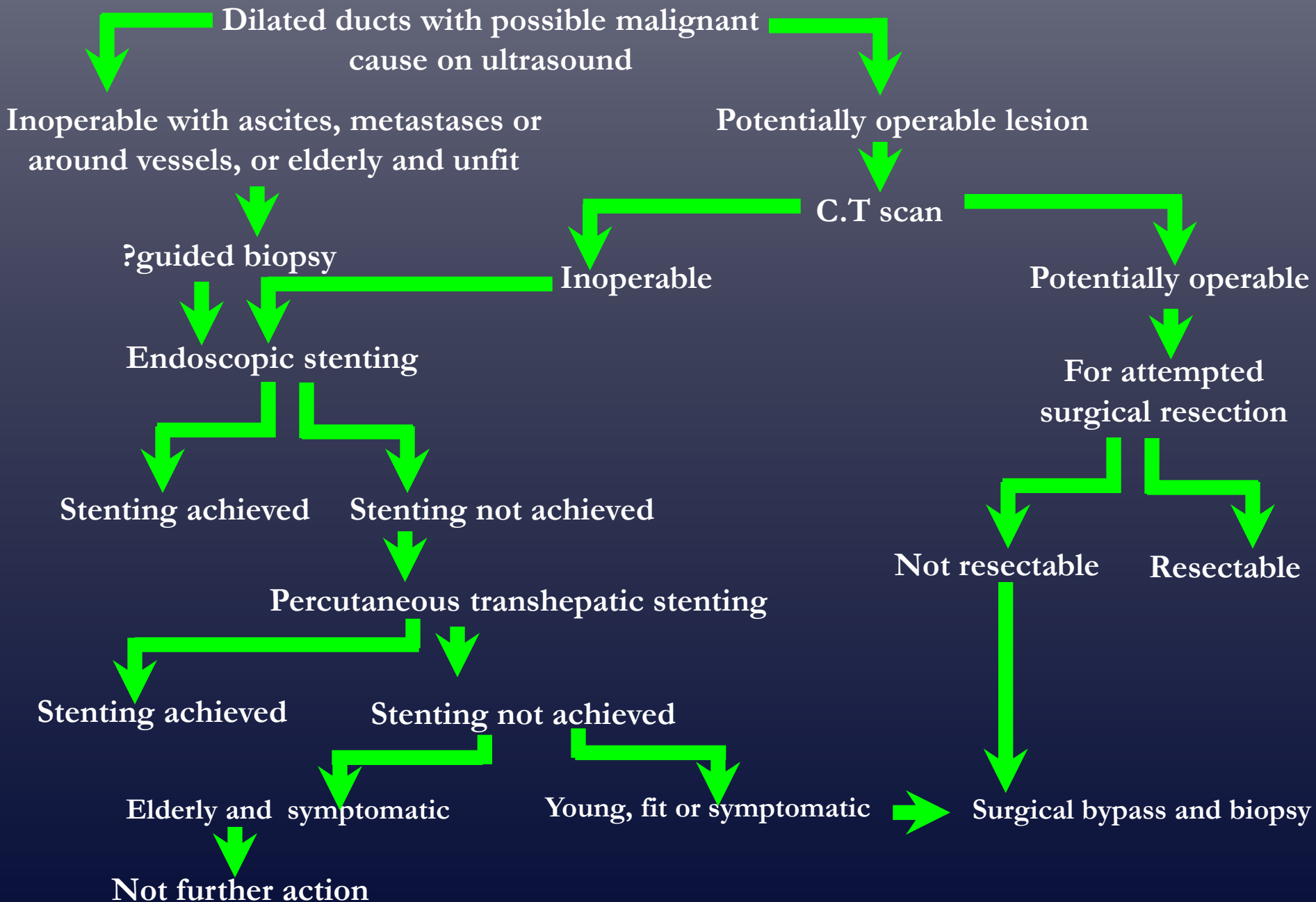
Hepaticojejunostomy



T tube Cholangiogram







THE END!
