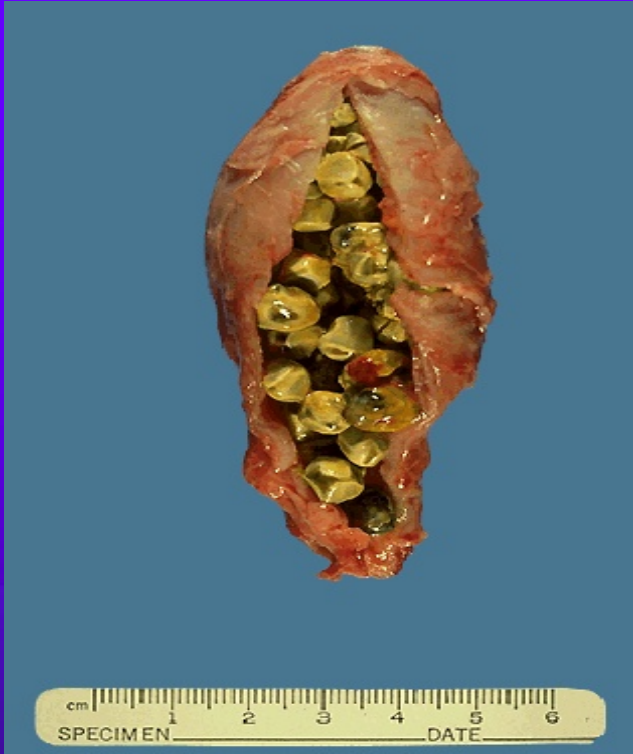
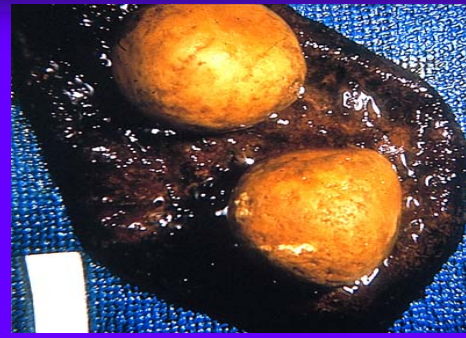


Cholelithiasis & obstructive jaundice

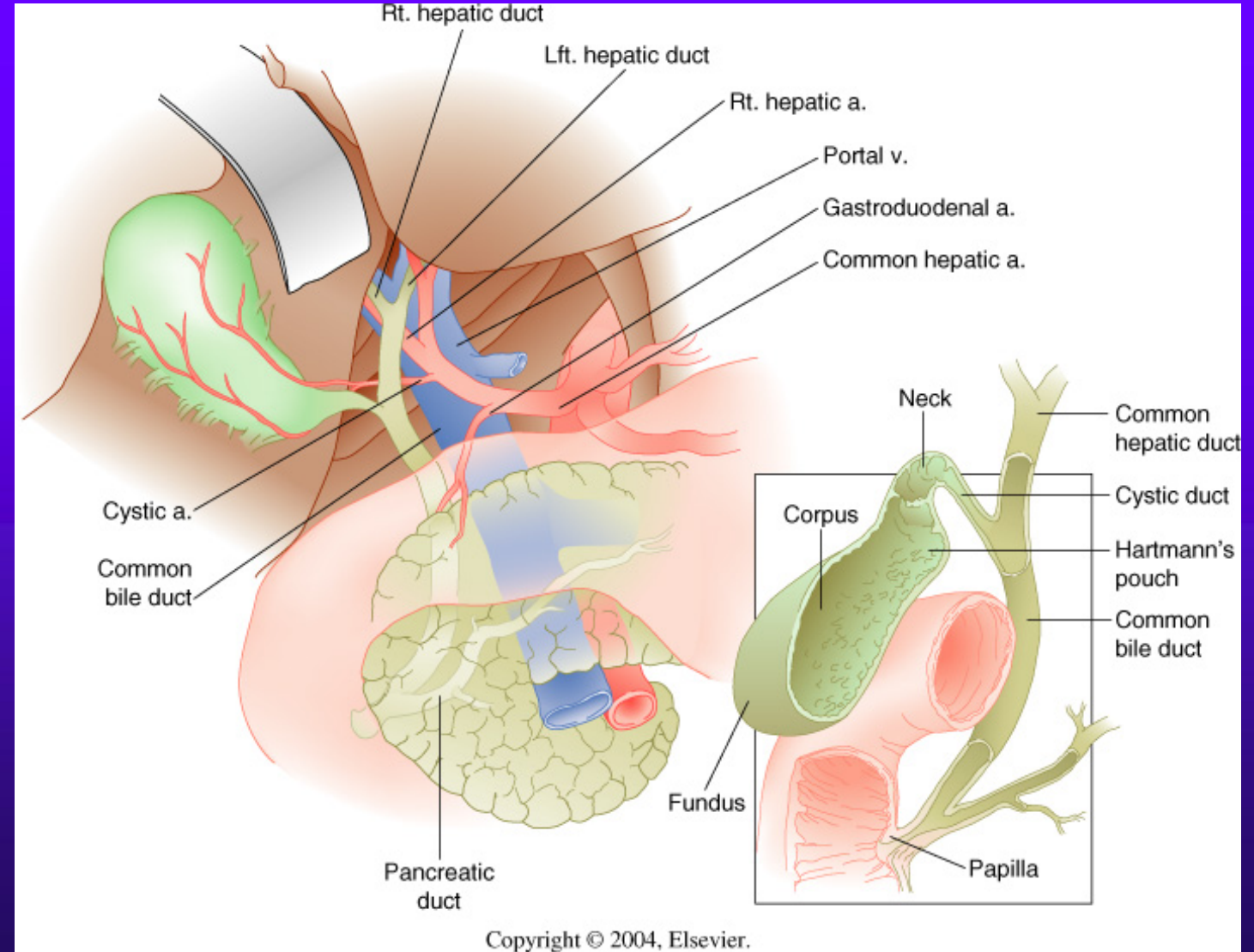


Dr. Abdulsalam Alsharabi
Asst. Professor of Surgery
Consultant Hepatobiliary and Transplant Surgeon

Harvest Time



Anatomy



Variations in Bile Ducts




Gallstone Pathogenesis

- Bile contains:
 - Cholesterol
 - Bile salts
 - Phospholipids
 - Bilirubin
- Gallstones are formed when cholesterol or bilirubinate are supersaturated in bile and phospholipids are decreased



Gallstone Pathogenesis

- 
- Stone formation is:
 1. Initiated by cholesterol or bilirubinate super saturation in bile
 2. Continued to crystal nucleation (microlithiasis or sludge formation)
 3. And gradually stone growth occur
 - Gallstone types
 1. Cholesterol
 2. Pigment
 - Brown
 - Black

Risk Factors for Gallstones

- Obesity
- Rapid weight loss
- Childbearing
- Multiparity
- Female sex
- First-degree relatives
- Drugs: ceftriaxone, postmenopausal estrogens,
- Total parenteral nutrition
- Ethnicity: Native American (Pima Indian),
Scandinavian
- Ileal disease, resection or bypass
- Increasing age



Asymptomatic Gallstone

- Incidentally found gallstone in ultrasound exam for other problems
 - Many individuals are concerned about the problem
- Sometimes pt. has vague upper abdominal discomfort and dyspepsia which cannot be explained by a specific disease
 - If other work up are negative may be
- **Routine cholecystectomy is not indicated**



Definitions

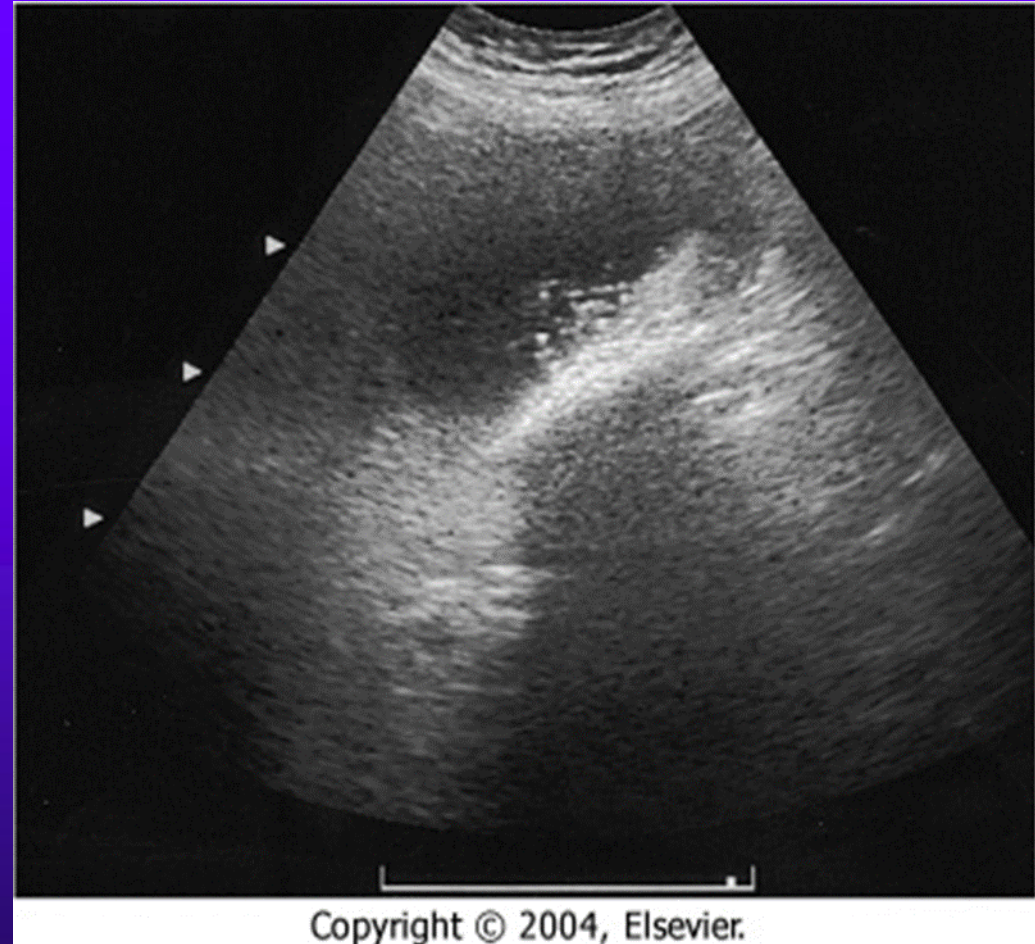
- Biliary colic

- Wax/waning postprandial epigastric/RUQ pain due to transient cystic duct obstruction by stone
- No fever, No leukocytosis, Normal LFT



Gall bladder ultrasound

- Shows gallstones
- the acoustic shadow due to absence of reflected sound waves behind the gallstone



Ultrasound



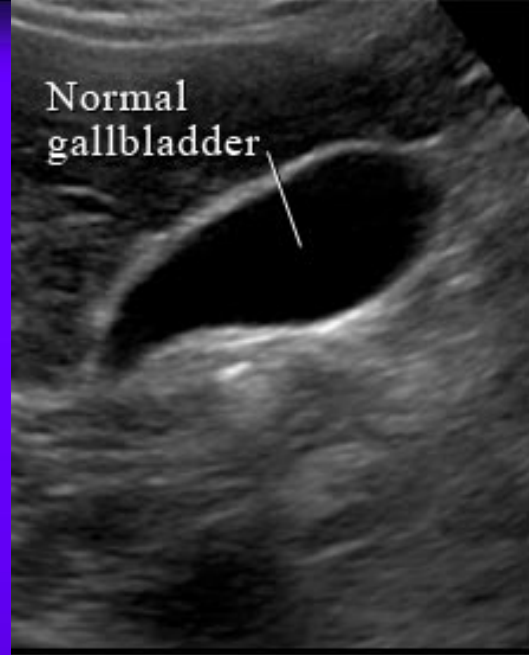
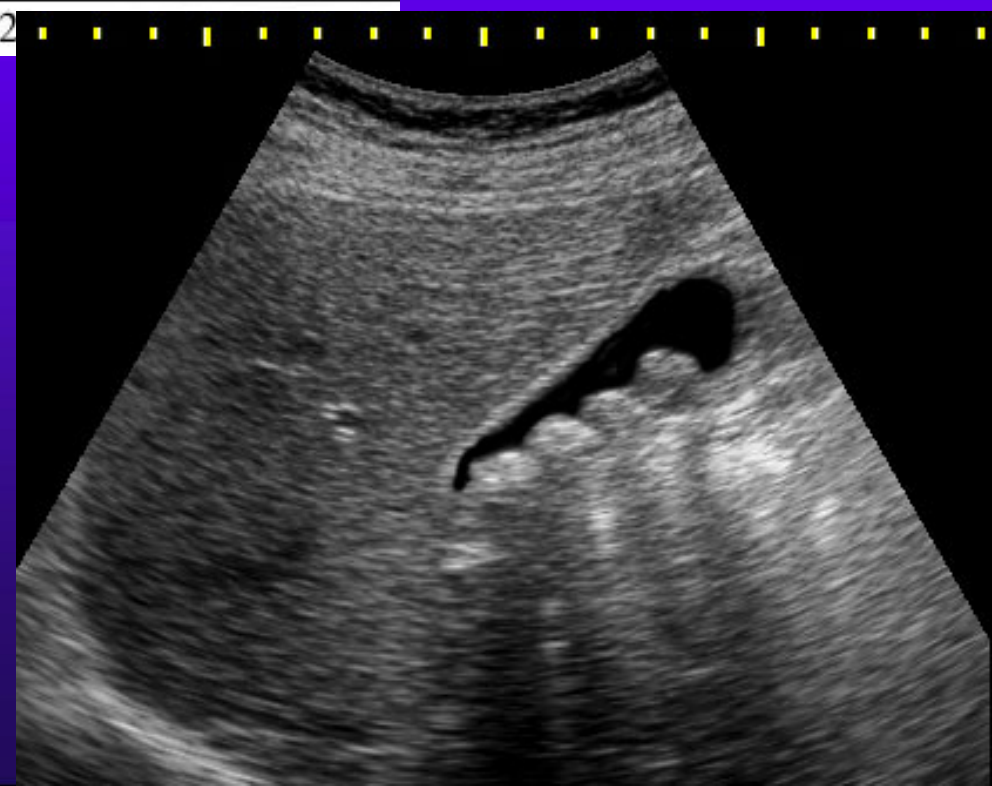


Figure 1

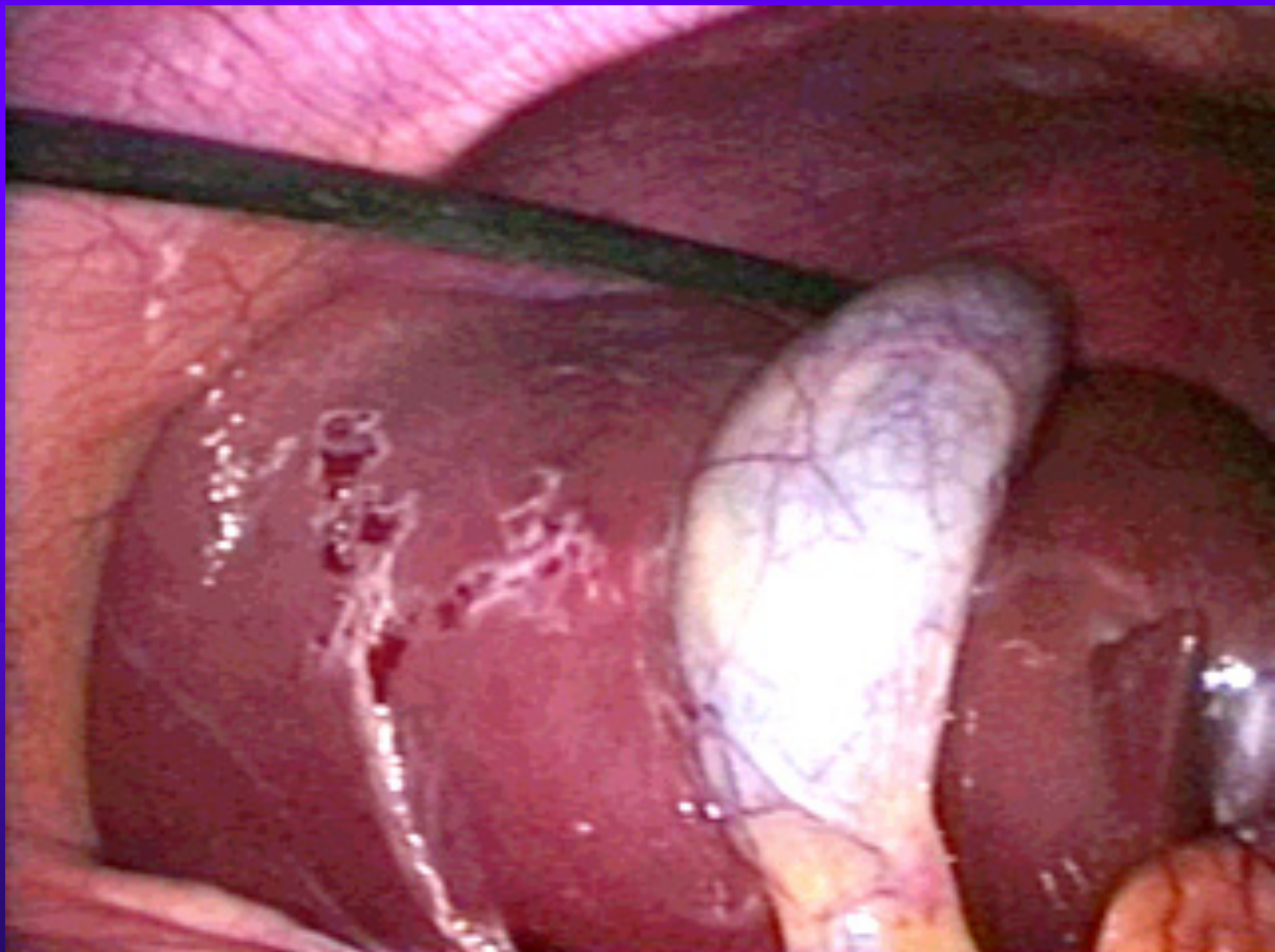


Figure 2



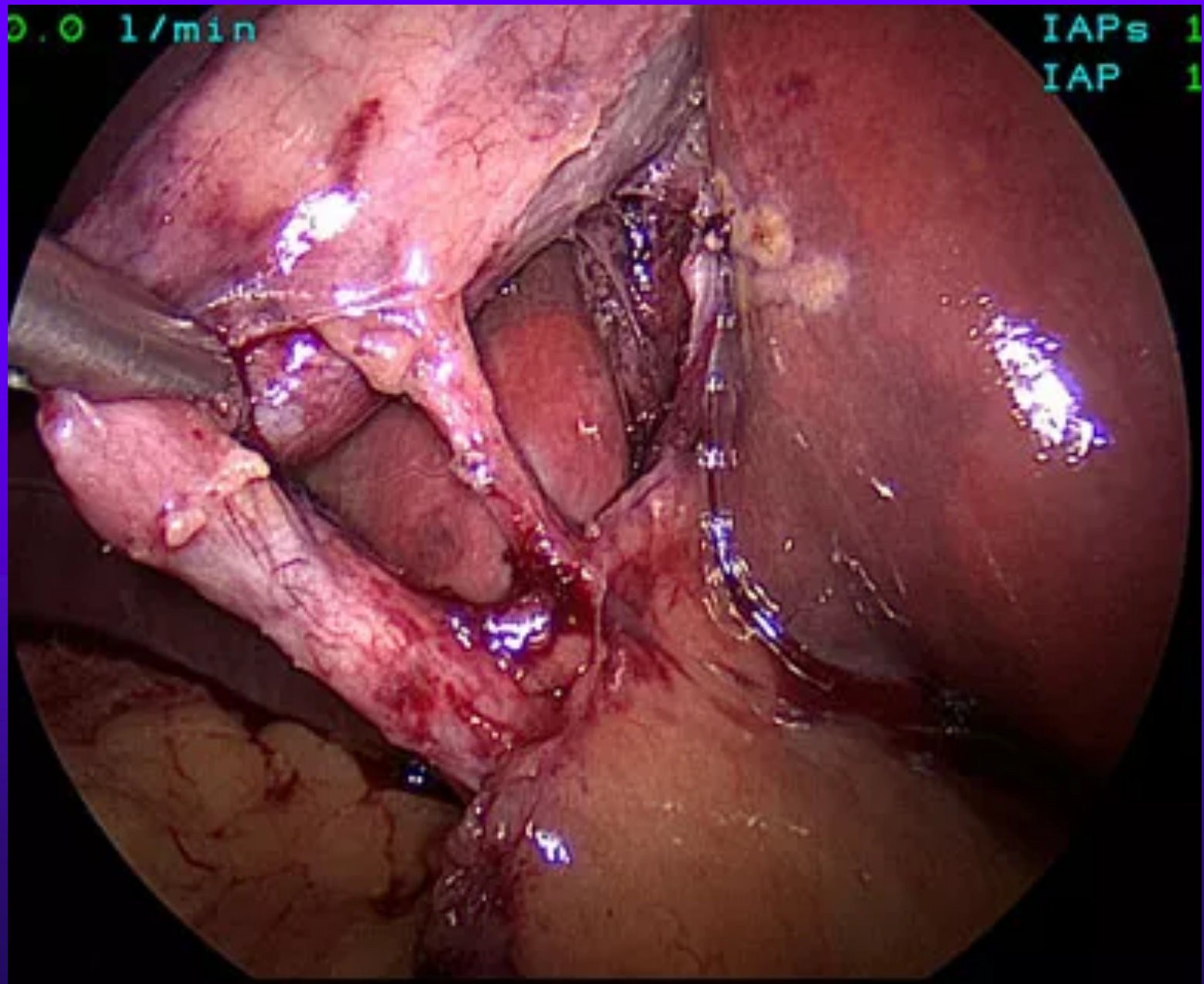
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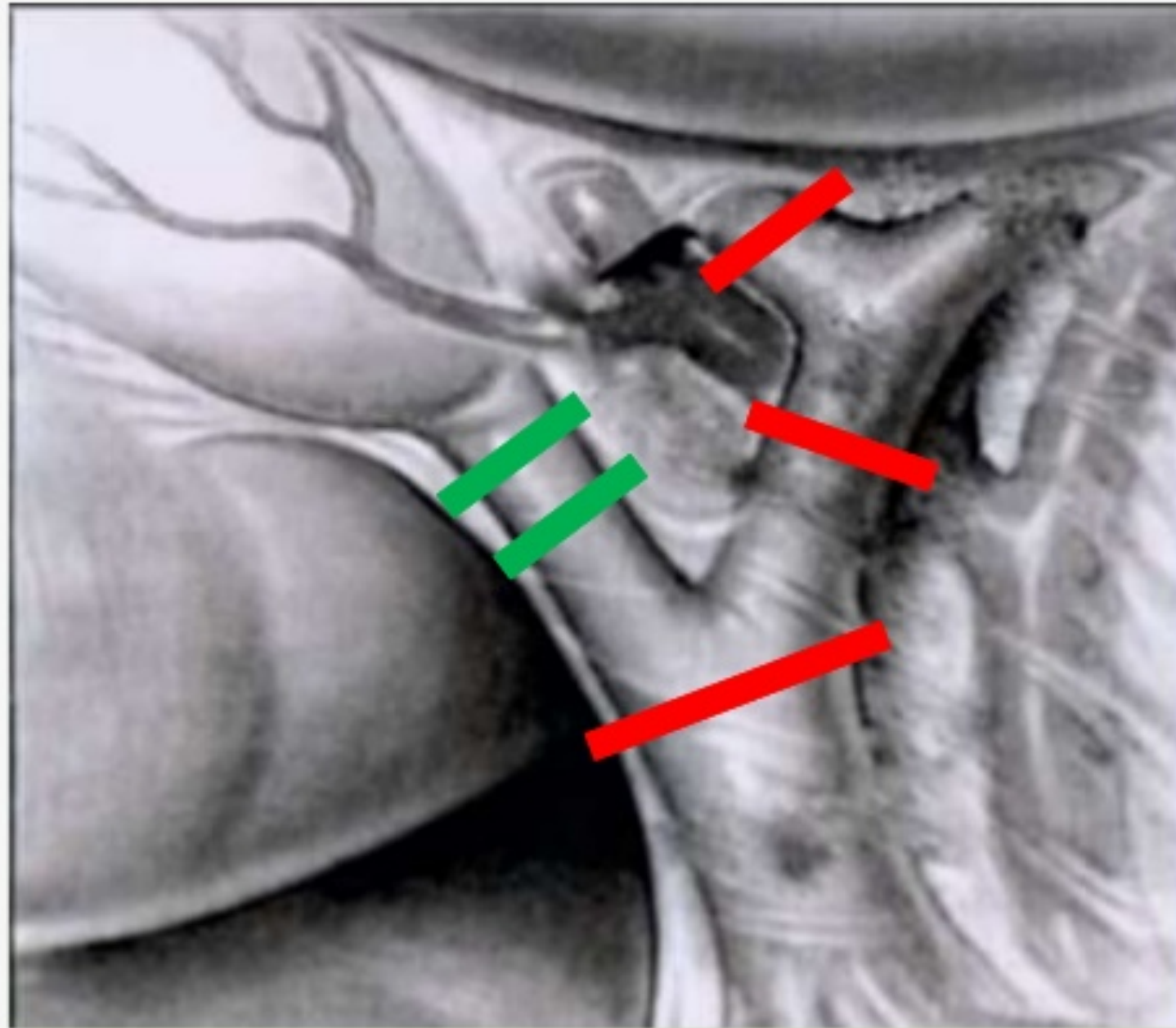












Definitions

- **Chronic cholecystitis**
 - Recurrent bouts of biliary colic leading to chronic GB wall inflammation/fibrosis.
 - No fever, No leukocytosis, Normal LFT





- Recurrent inflammatory process due to recurrent cystic duct obstruction, 90% of the time due to gallstones
- Overtime, leads to scarring/wall thickening
- Attacks of biliary colic may occur overtime



Differential diagnosis of RUQ pain

- **Biliary disease**
 - Acute or chronic cholecystitis
 - CBD stone
 - cholangitis
- **Inflamed or perforated peptic ulcer**
- **Pancreatitis**
- **Hepatitis**
- Rule out:
 - Appendicitis, renal colic, pneumonia, pleurisy and ...

Definitions

■ Acute cholecystitis

- Acute GB distension, wall inflammation & edema due to cystic duct obstruction.
- RUQ pain (>24hrs) +/- fever, ↑WBC, Normal LFT,
 - Murphy's sign = inspiratory arrest





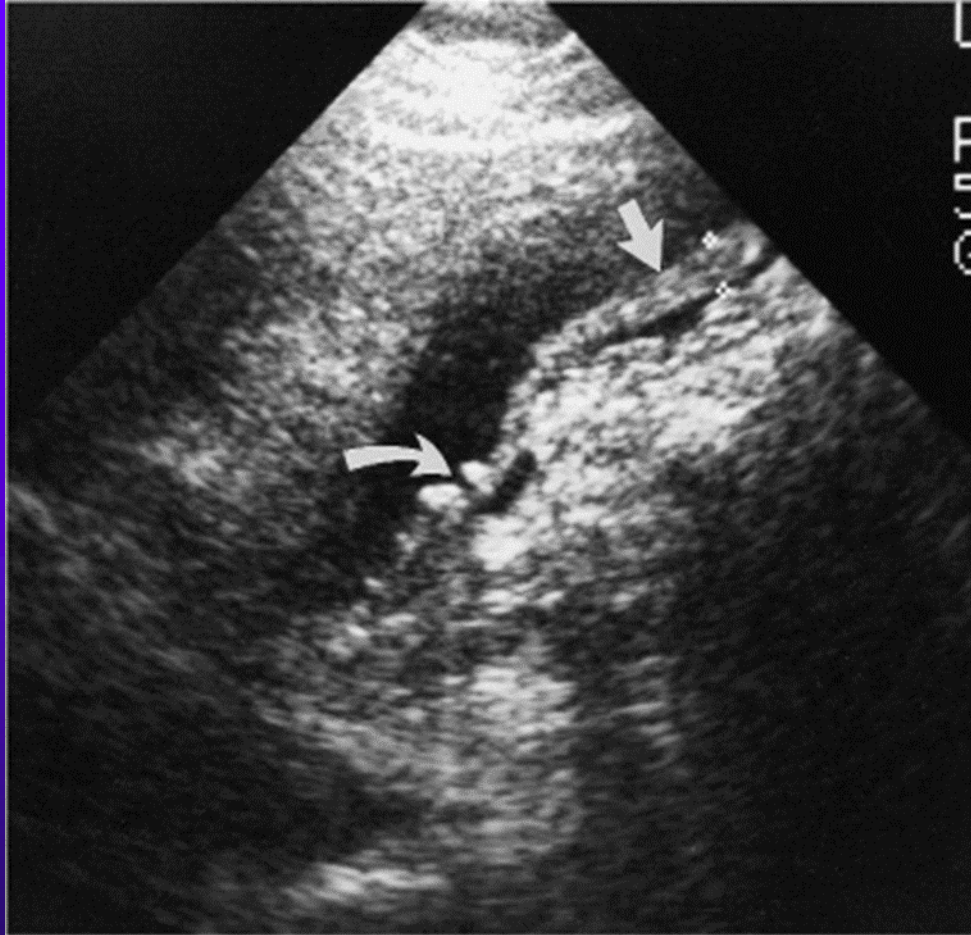
Ultrasound is the first choice for imaging

- Distended gallbladder
- Increased wall thickness (> 4 mm)
- Pericholecystic fluid
- Positive sonographic Murphy's sign (very specific)

Ultrasound



Ultrasound



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- Curved arrow
 - Two small stones at GB neck
- Straight arrow
 - Thickened GB wall
- ◀
 - Pericholecystic fluid = dark lining outside the wall

CT scan



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- → denotes the GB wall thickening
- ► denotes the fluid around the GB
- GB also appears distended

Complications of acute cholecystitis

- Hydrops
 - Obstruction of cystic duct followed by absorption of pigments and secretion of mucus to the gallbladder (white bile)
 - There may be a round tender mass in RUQ
- Urgent Cholecystectomy is indicated



Complications of acute cholecystitis

- Empyema of gallbladder
 - Pus-filled GB due to bacterial proliferation in obstructed GB. Usually more toxic with high fever
- Emergent operation is needed

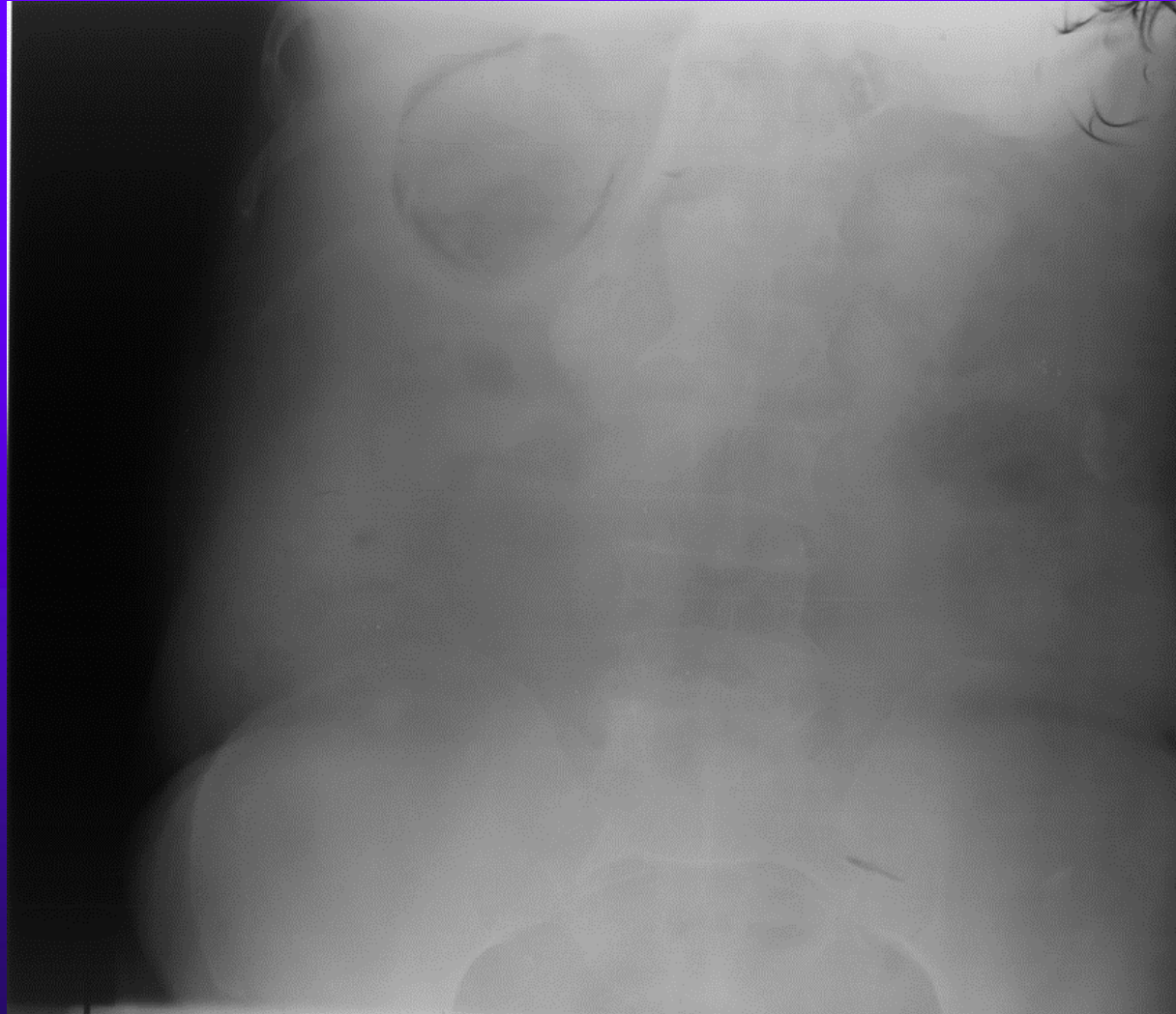




Complications of acute cholecystitis

- Emphysematous cholecystitis
 - More commonly in men and diabetics.
Severe RUQ pain, generalized sepsis.
 - Imaging shows air in GB wall or lumen
- Emergent cholecystectomy is needed

Emphysematous cholecystitis





Complications of acute cholecystitis

- Perforated gallbladder
 - Pericholecystic abscess (up to 10% of acute cholecystitis)
 - Percutaneous drainage in acute phase
 - Biliary peritonitis due to free perforation
- Emergent Laparotomy



Complications of acute cholecystitis

- Chronic perforation into adjacent viscus
(cholecystoenteric fistula)
 - Air is seen in the biliary tree
 - The stone can cause small bowel obstruction if large enough
(**gallstone ileus**)
- Laparotomy is needed for extraction of stone, cholecystectomy and closure of fistula

Gallstone Ileus



Definitions

Acalculous cholecystitis

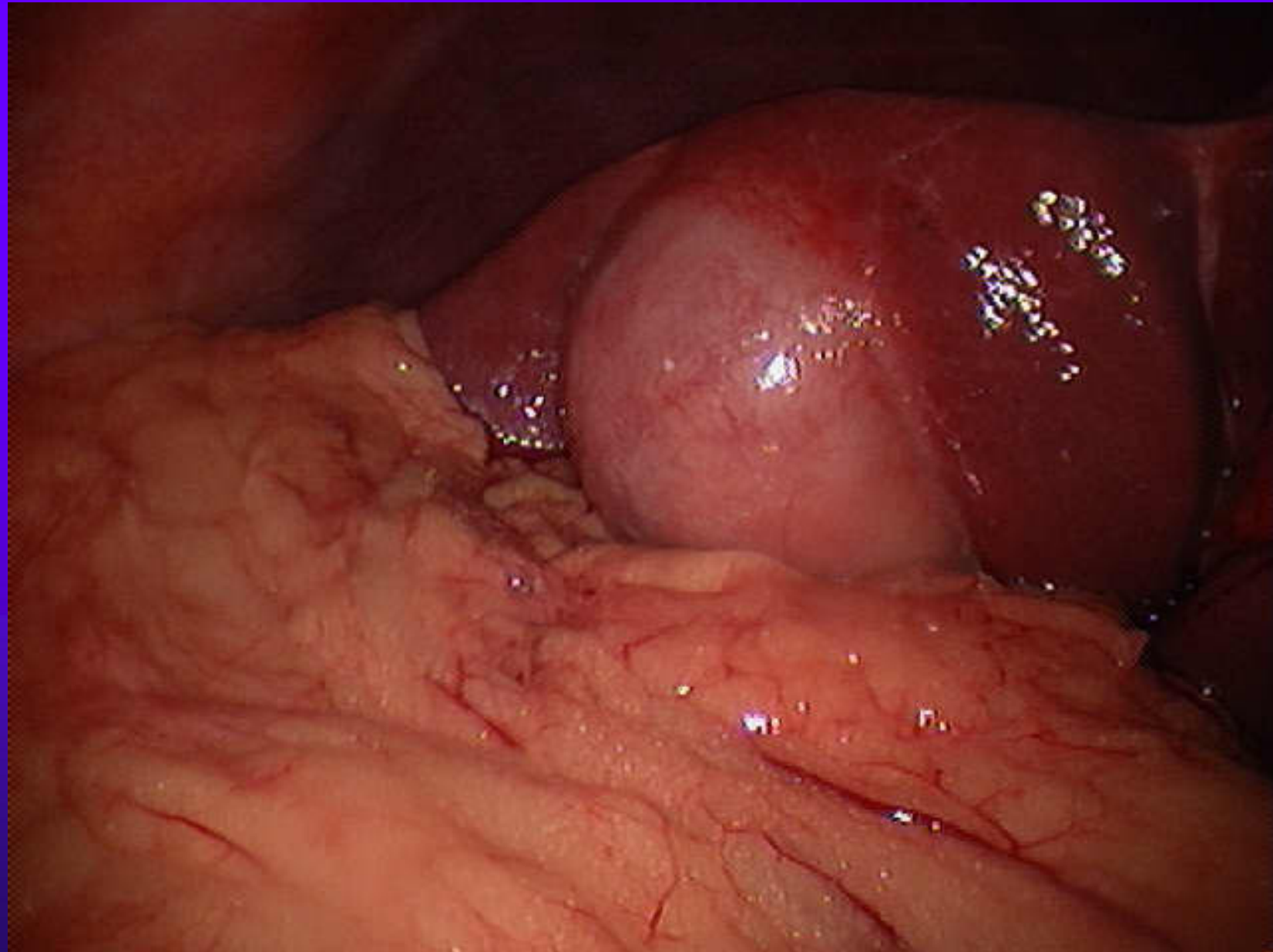
- A form of acute cholecystitis
- GB inflammation due to biliary stasis(5% of time) and not stones(95%).
- Often seen in critically ill patients

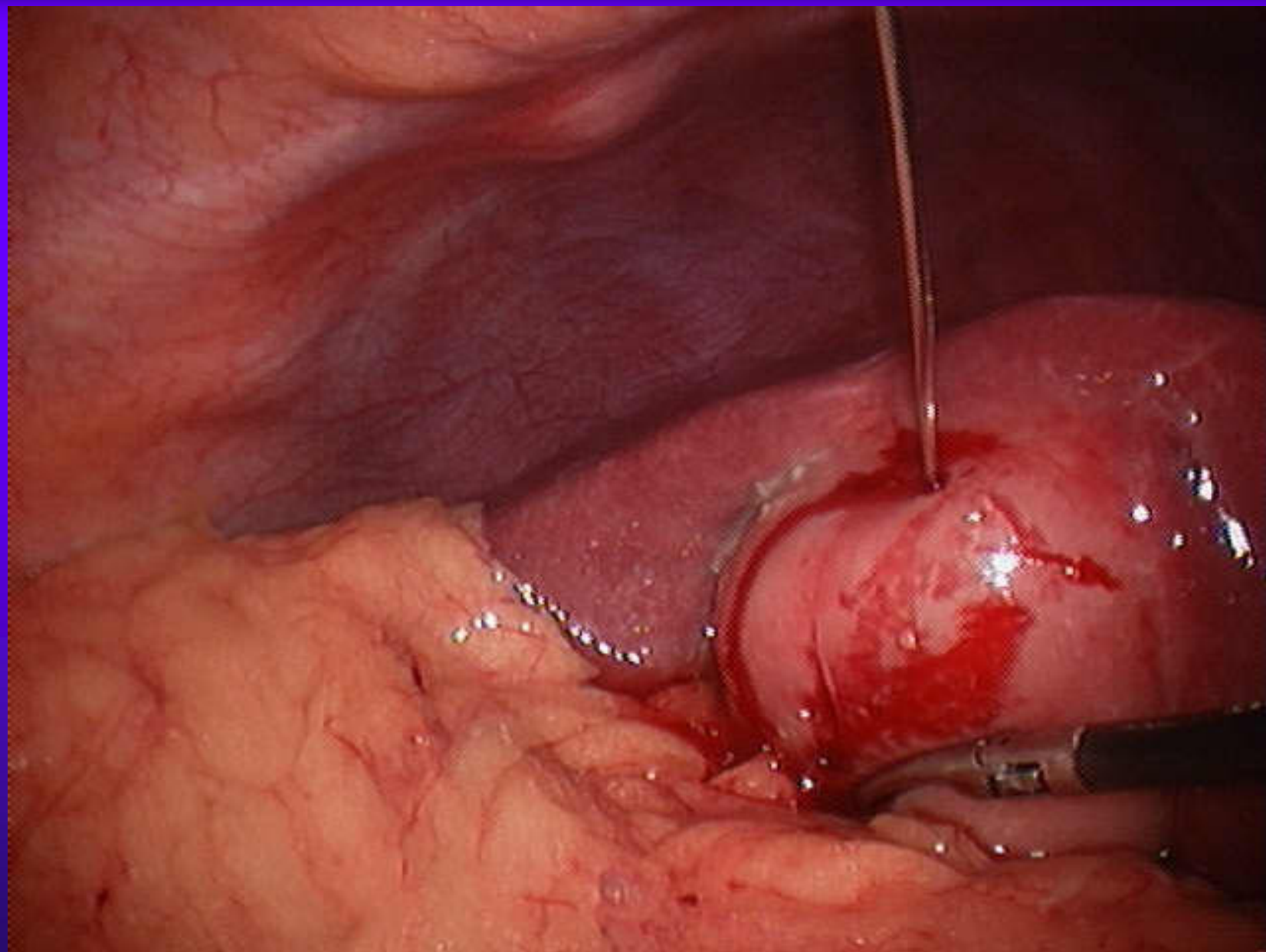


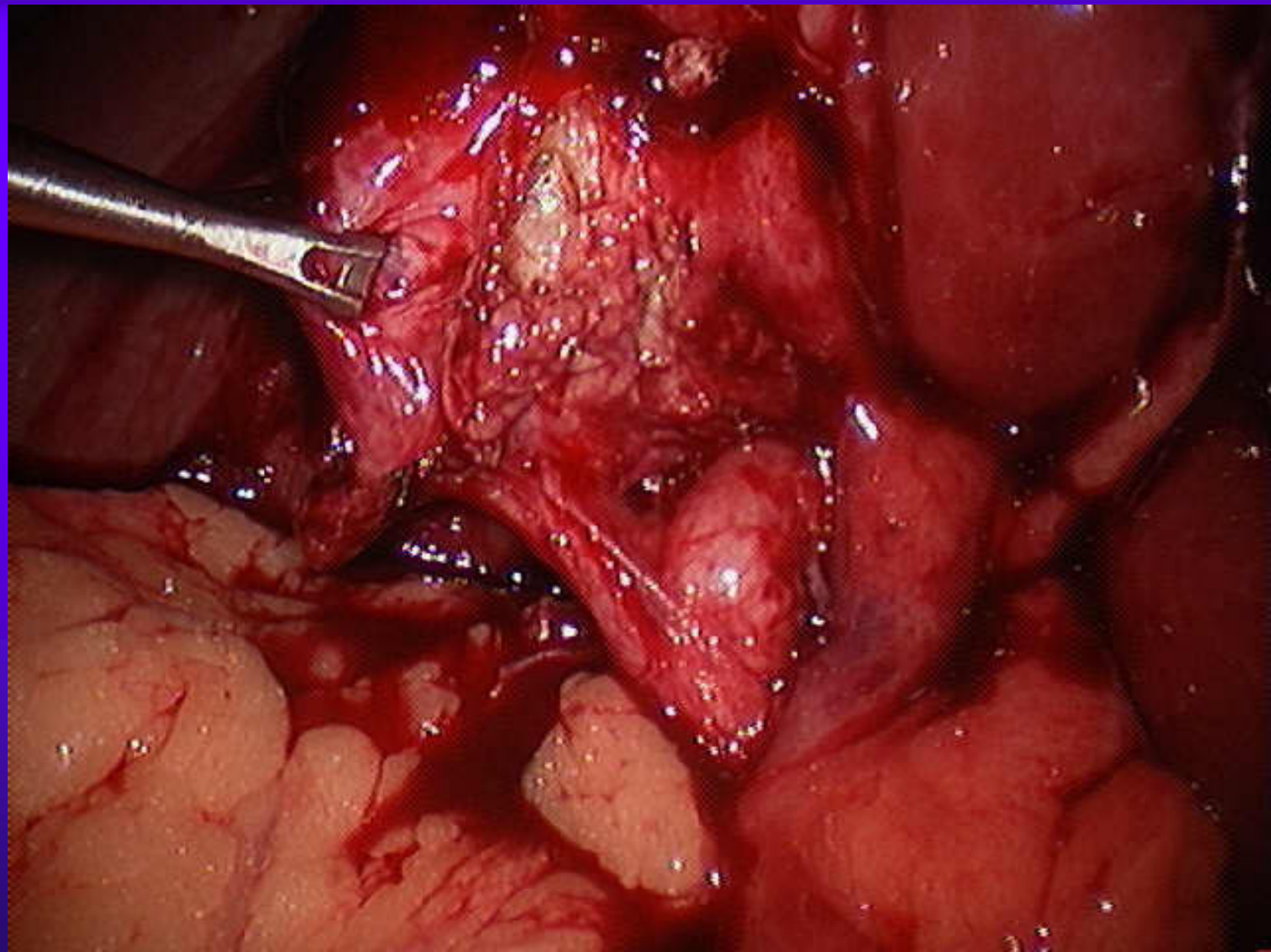


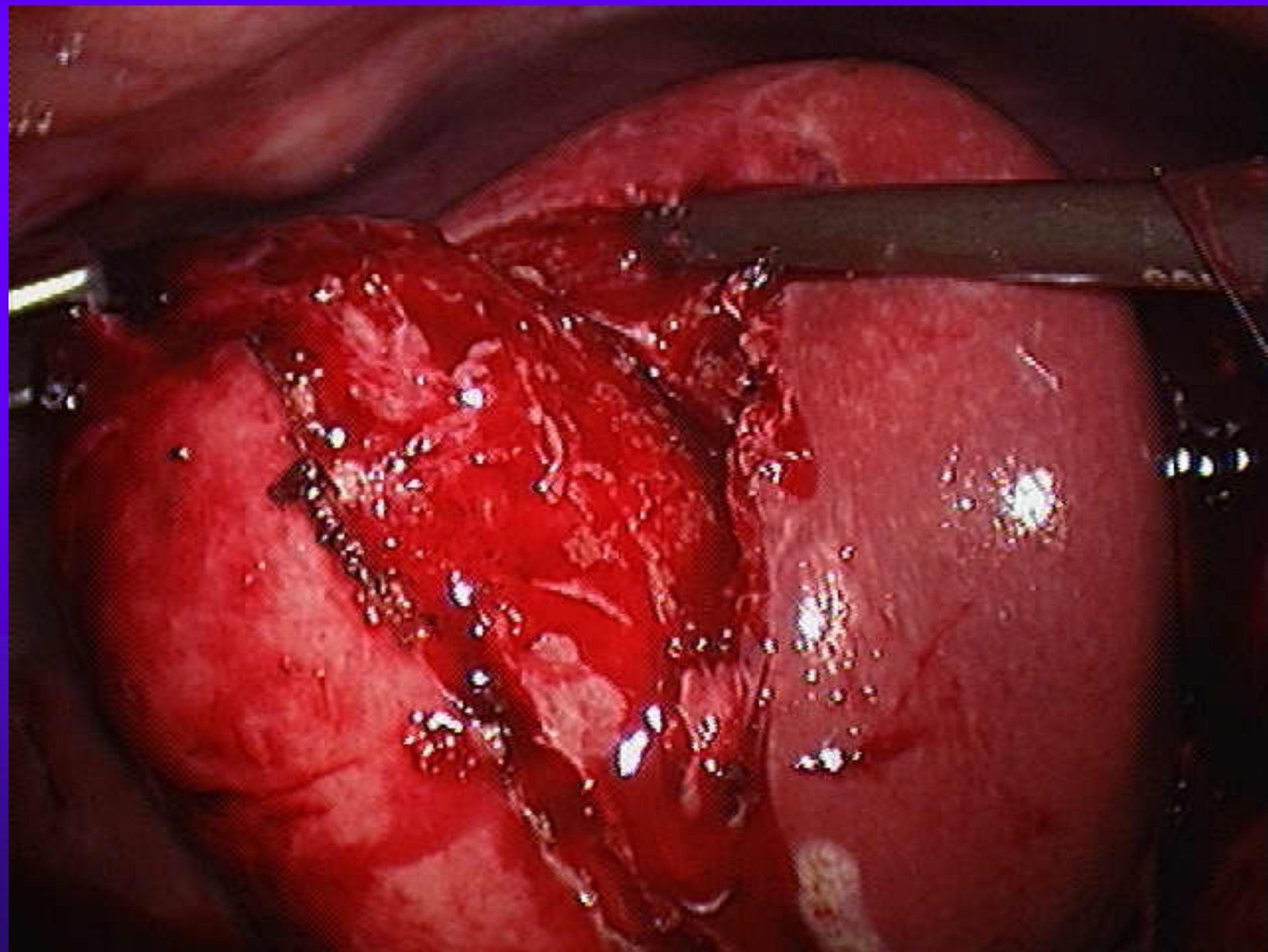
Acute acalculous cholecystitis

- 5-10% of cases of acute cholecystitis
- Seen in critically ill pts or prolonged TPN
- More likely to progress to gangrene, empyema & perforation due to ischemia
- Caused by gallbladder stasis from lack of enteral stimulation by cholecystokinin
- Emergent operation is needed

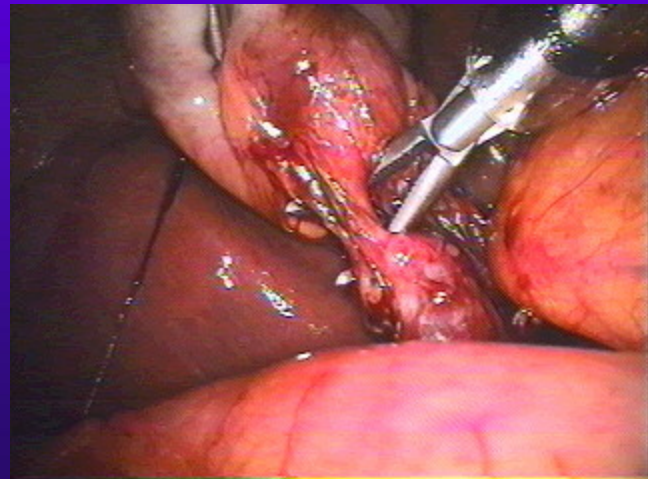
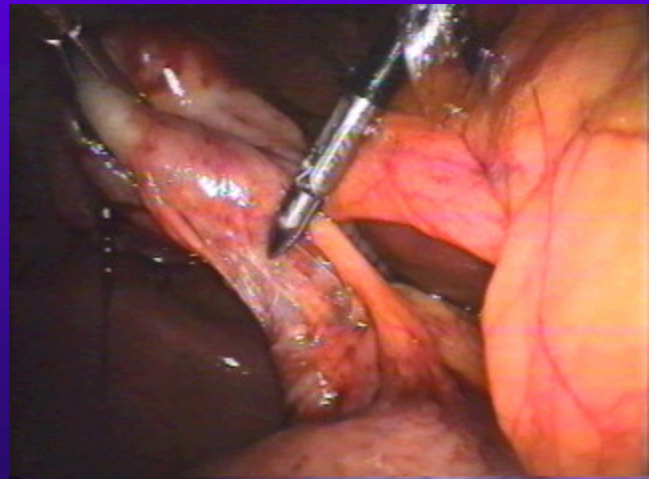
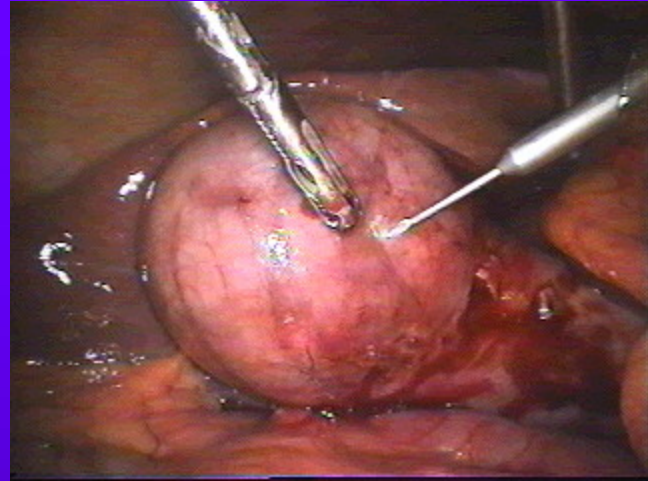
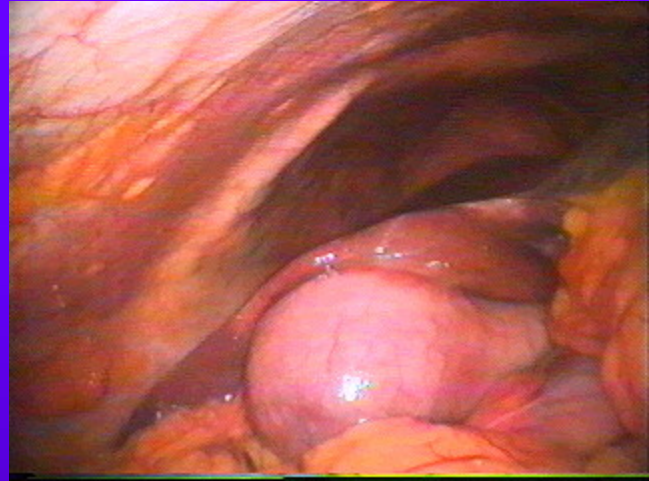




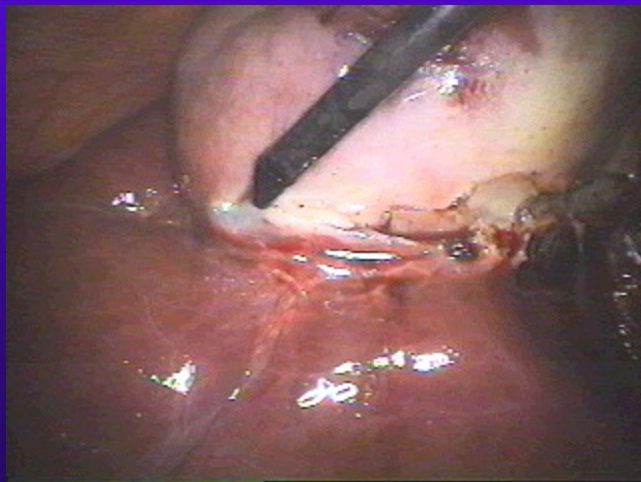
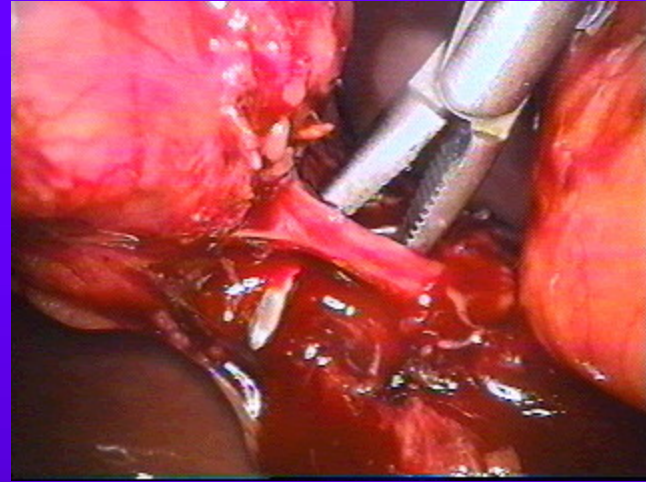
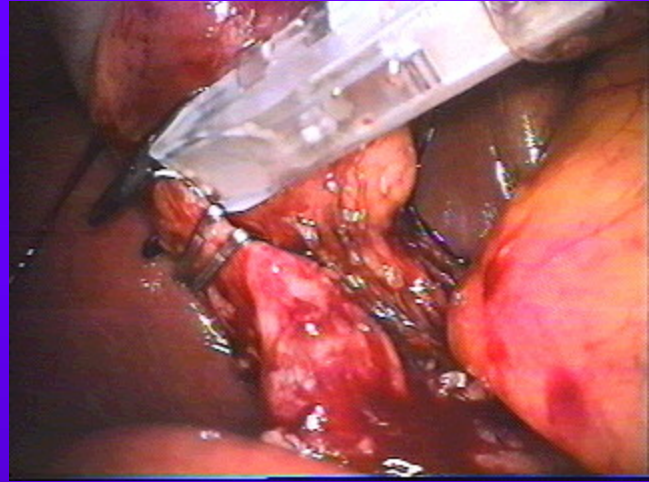


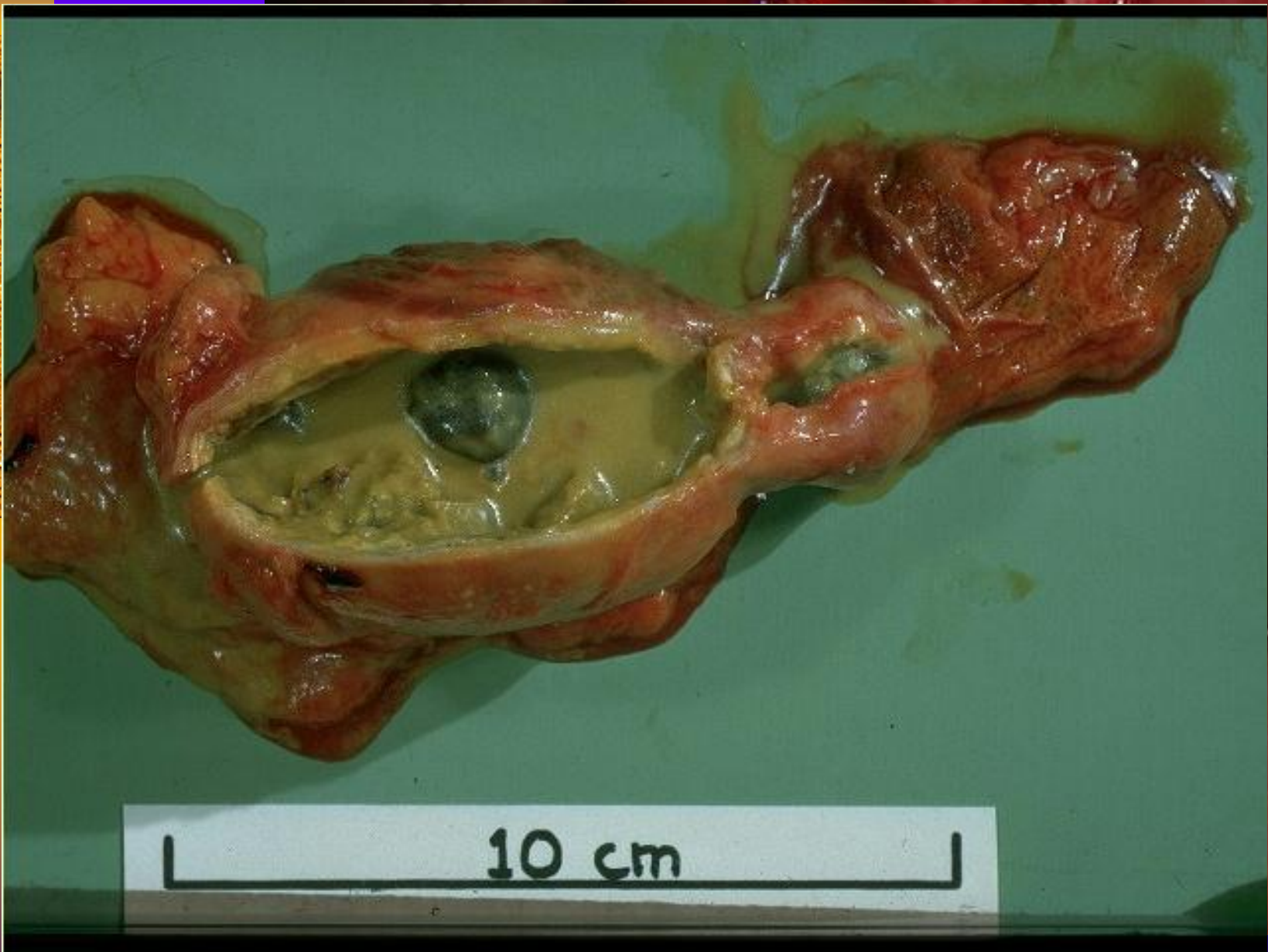


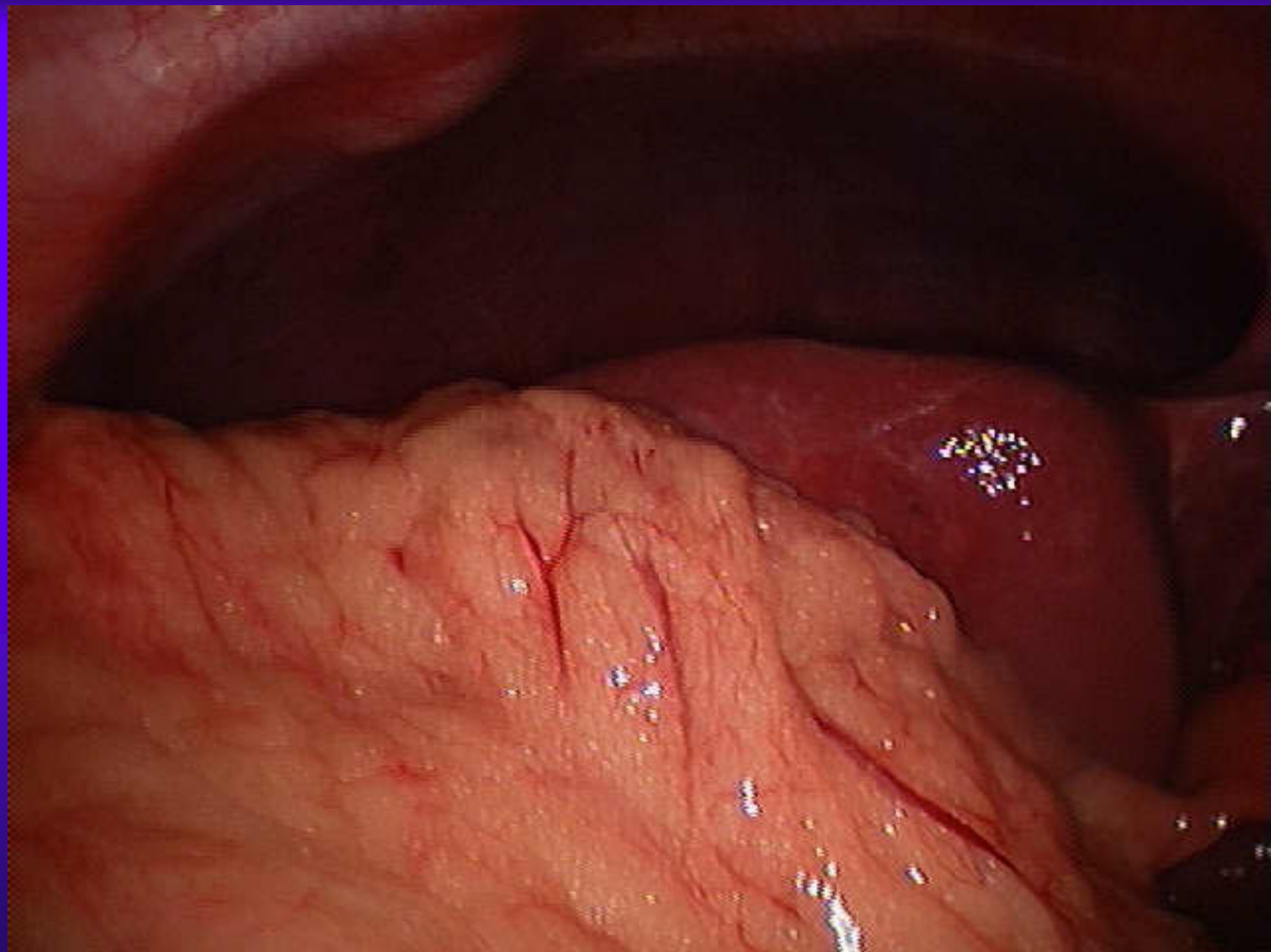
Laparoscopic Cholecystectomy

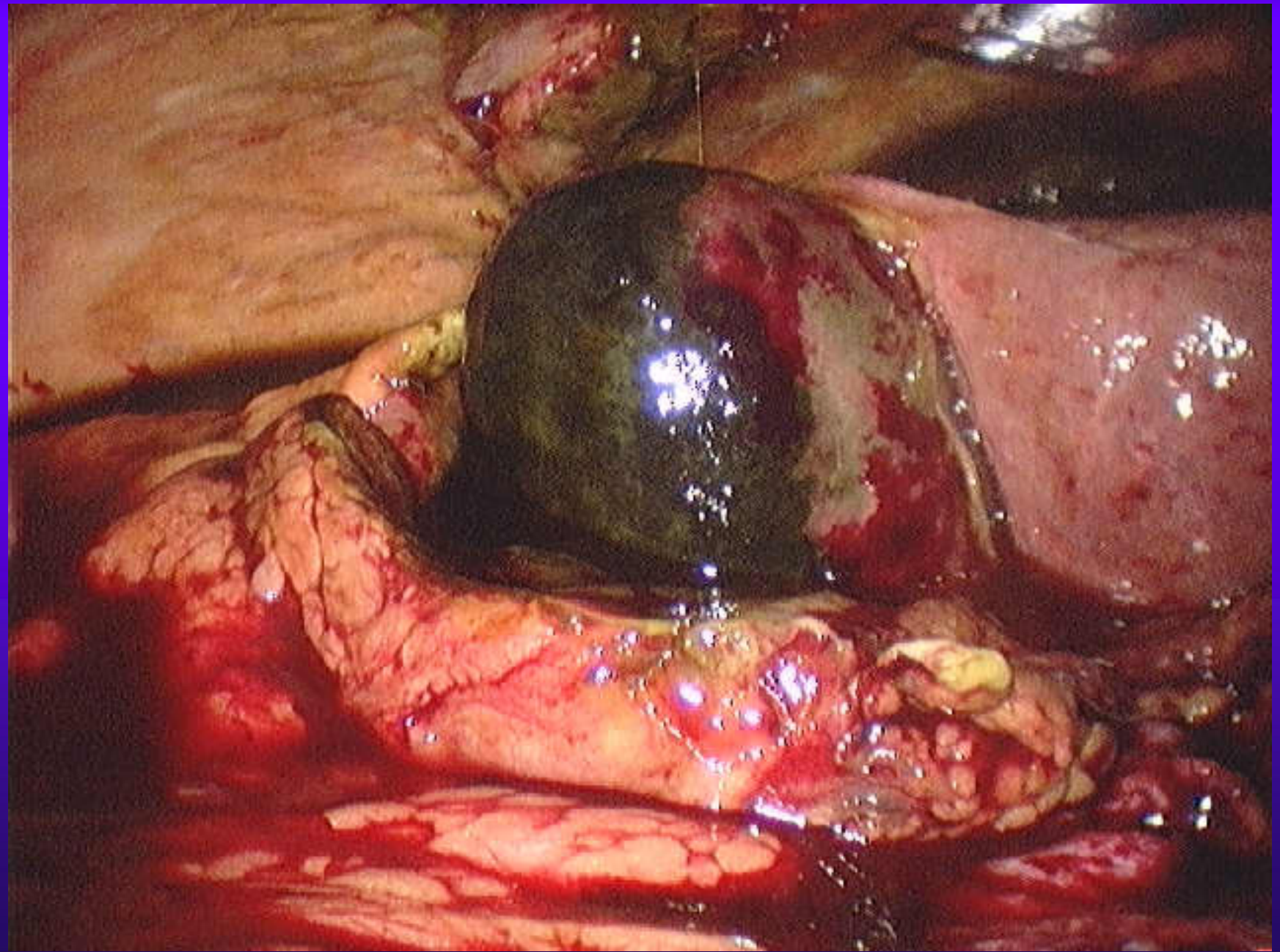


Laparoscopic Cholecystectomy









Choledocholithiasis

Pathogenesis:

- Stone obstructing CBD (bear in mind there are other causes for obstructive jaundice) – danger is progression to ascending cholangitis.

USS

- Will confirm gallstones in the gallbladder
- CBD dilatation i.e. >8mm (not always!)
- May visualise stone in CBD (most often does not)

MRCP

- In cases where suspect stone in CBD but USS indeterminate
- E.g. 1 obstructive LFTs but USS shows no biliary dilatation and no stone in CBD
- E.g. 2 normal LFTS but USS shows biliary dilatation

ERCP

- If confirmed stone in CBD on USS or MRCP proceed to ERCP which will confirm this (diagnostic) and allow extraction of stones and sphincterotomy (therapeutic)

Treatment

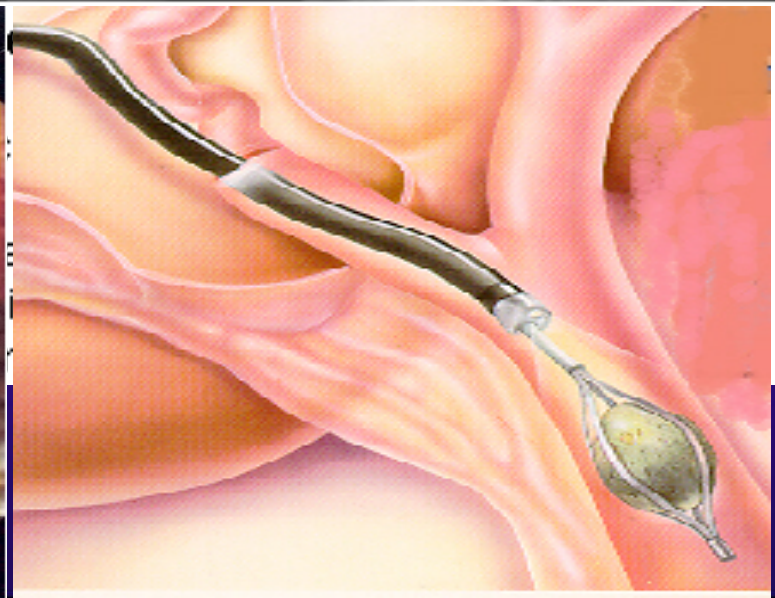
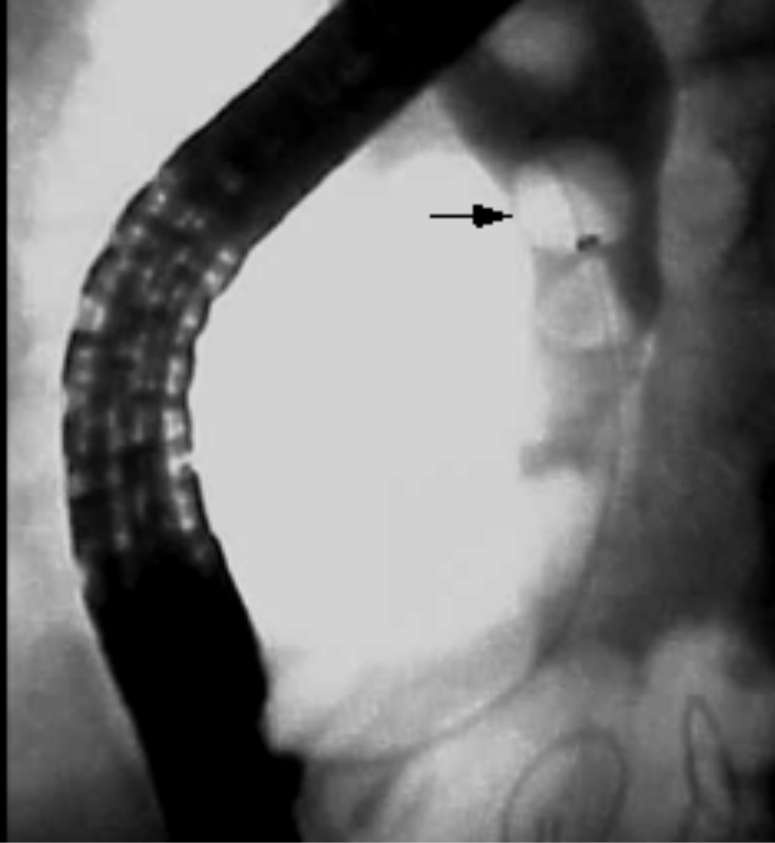
- Must unobstruct biliary tree with ERCP to prevent progression to ascending cholangitis
- Whilst awaiting ERCP monitor for signs of sepsis suggestive of cholangitis

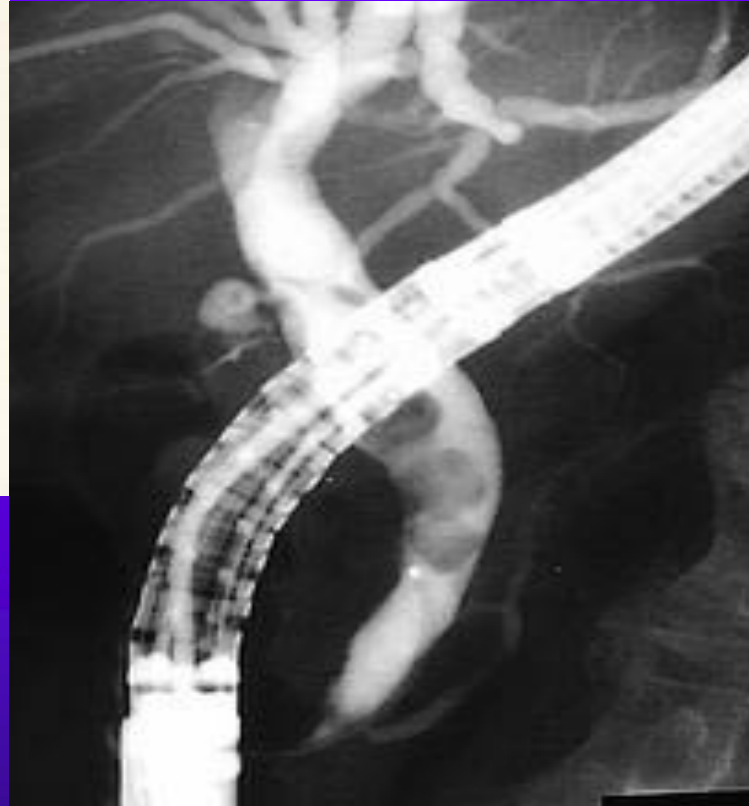
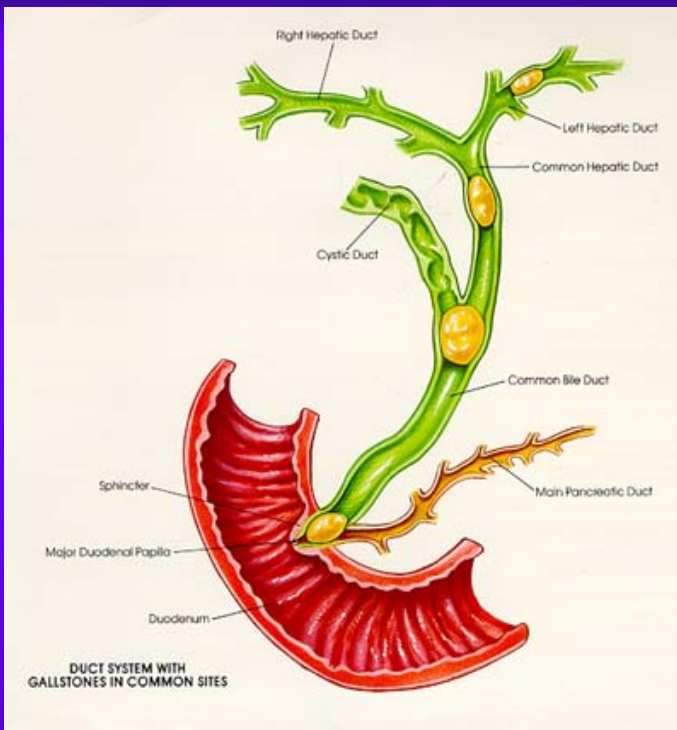


ERCP









STONE EXTRACTION BY BASKET



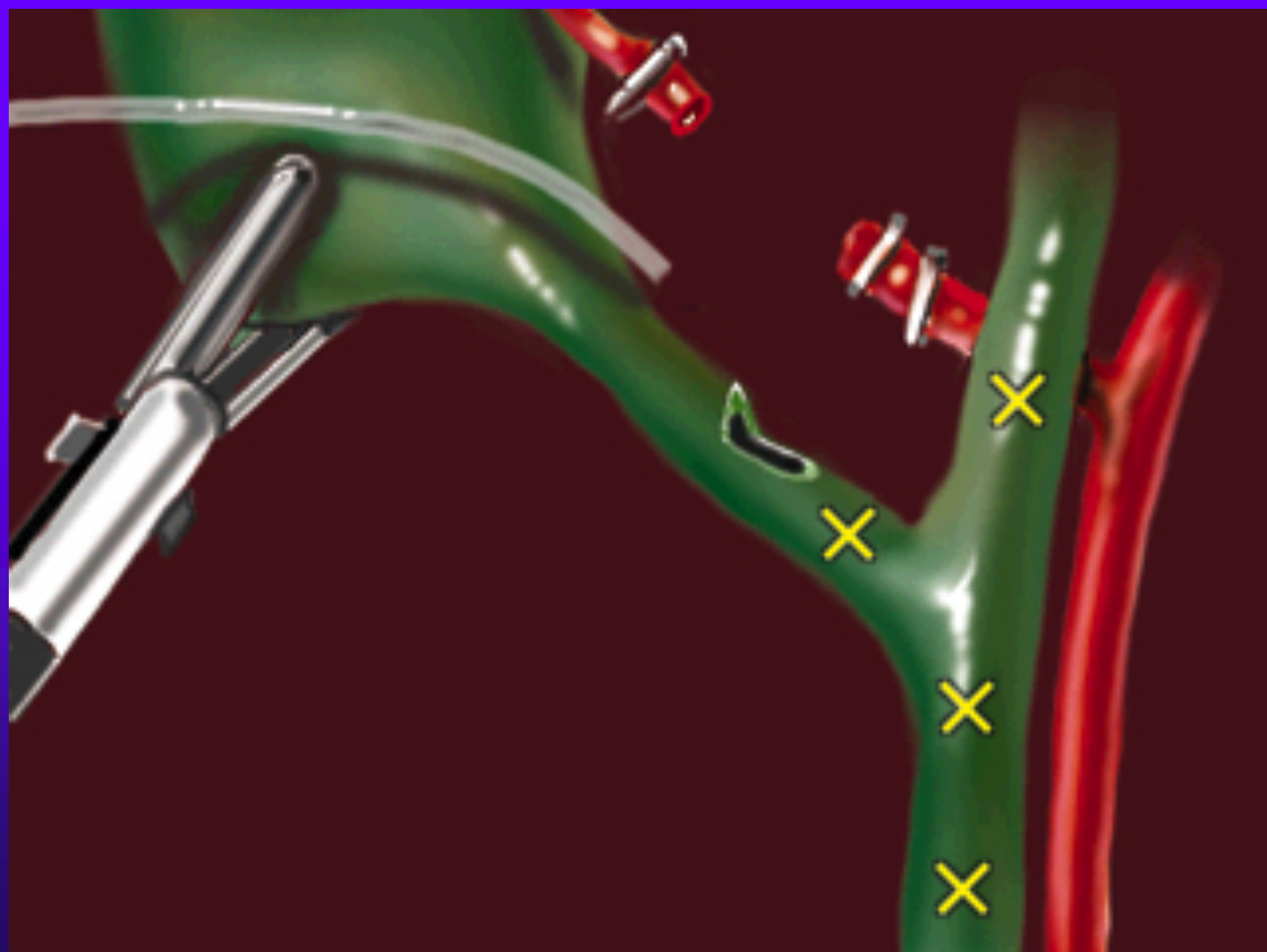
STONE EXTRACTION BY BALLON

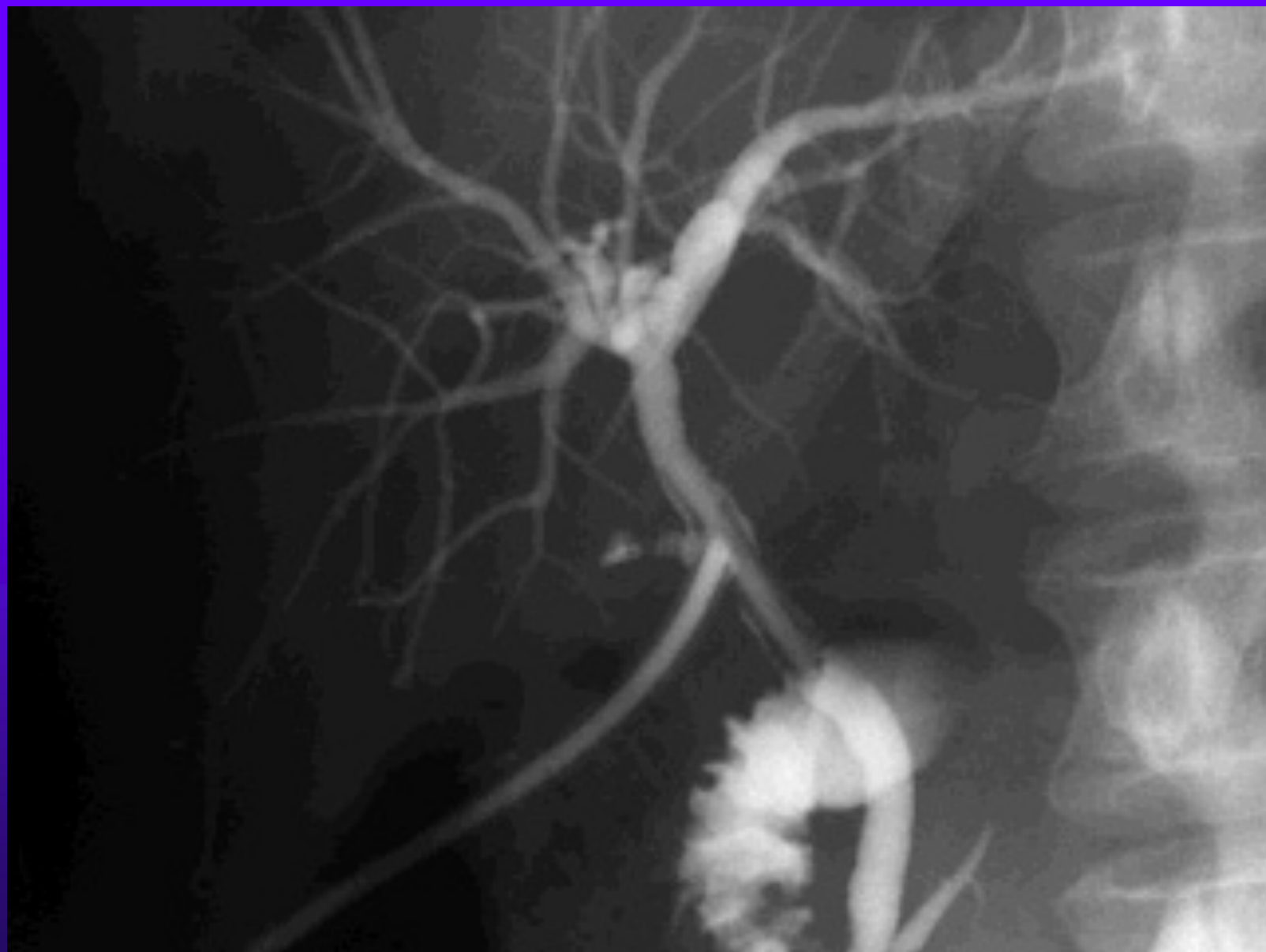


Cholangitis

- Medical management (successful in 85% of cases):
 - NPO
 - IV Fluids
 - IV AB.
- **Emergent decompression** if medical treatment fails
 1. ERCP
 2. Percutaneous transhepatic drainage (PTC)
 3. Emergent laparotomy









| Complication | History | Examination | Blood tests |
|-----------------------|---|--|--|
| Biliary Colic | <ul style="list-style-type: none"> - Intermittent RUQ/epigastric pain (minutes/hours) into back or right shoulder - N&V | <ul style="list-style-type: none"> -Tender RUQ -No peritonism -Murphy's - -Apyrexial, HR and BP (N) | <ul style="list-style-type: none"> -WCC (N) CRP (N) - LFT (N) |
| Acute Cholecystitis | <ul style="list-style-type: none"> -Constant RUQ pain into back or right shoulder -N&V -Feverish | <ul style="list-style-type: none"> -Tender RUQ -Peritonism RUQ (guarding/rebound) -Murphy's + -Pyrexia, HR (↑) | <ul style="list-style-type: none"> -WCC and CRP (↑) -LFT (N or mildly (↑)) |
| Empyema | <ul style="list-style-type: none"> -Constant RUQ pain into back or right shoulder -N&V -Feverish | <ul style="list-style-type: none"> -Tender RUQ -Peritonism RUQ -Murphy's + -Pyrexia, HR (↑), BP (↔ or ↓) -More septic than acute cholecystitis | <ul style="list-style-type: none"> -WCC and CRP (↑) -LFT (N or mildly (↑)) |
| Obstructive Jaundice | <ul style="list-style-type: none"> -Yellow discolouration -Pale stool, dark urine -painless or associated with mild RUQ pain | <ul style="list-style-type: none"> -Jaundiced -Non-tender or minimally tender RUQ -No peritonism -Murphy's - -Apyrexial, HR and BP (N) | <ul style="list-style-type: none"> -WCC and CRP (N) -LFT: obstructive pattern bili (↑), ALP (↑), GGT (↑), ALT/AST (↔) -INR (↔ or ↑) |
| Ascending Cholangitis | <ul style="list-style-type: none"> Becks triad -RUQ pain (constant) -Jaundice -Rigors | <ul style="list-style-type: none"> -Jaundiced -Tender RUQ -Peritonism RUQ -Spiking high pyrexia (38-39) -HR (↑), BP (↔ or ↓) -Can develop septic shock | <ul style="list-style-type: none"> -WCC and CRP (↑) -LFT : obstructive pattern bili (↑), ALP (↑), GGT (↑), ALT/AST (↔) -INR (↔ or ↑) |
| Acute Pancreatitis | <ul style="list-style-type: none"> -Severe upper abdominal pain (constant) into back -Profuse vomiting | <ul style="list-style-type: none"> -Tender upper abdomen -Upper abdominal or generalised peritonism -Usually apyrexial, HR (↑), BP (↔ or ↓) | <ul style="list-style-type: none"> -WCC and CRP (↑) -LFT: (N) if passed stone or obstructive pattern if stone still in CBD -Amylase (↑) -INR/APTT (N) or (↑) if DIC |
| Gallstone Ileus | <ul style="list-style-type: none"> - 4 cardinal features of SBO | <ul style="list-style-type: none"> -distended tympanic abdomen -hyperactive/tinkling bowel sounds | |