

Cholelithiasis

Red imp , green notes
Last slides Mcqs are so so imp !!

429 Surgery team:

Ismail Raslan , Sarah bin Hussain , Badra'a
Almuharib, Nourhan Alshamma'

A Cause For Pain

Background

- Presence of gallstones in the gallbladder.
- Spectrum ranges from asymptomatic, colic, cholangitis, choledocholithiasis, cholecystitis
- Colic is a temporary blockage, cholecystitis is inflammation from obstruction of CBD or cystic duct, cholangitis is infection of the biliary tree.

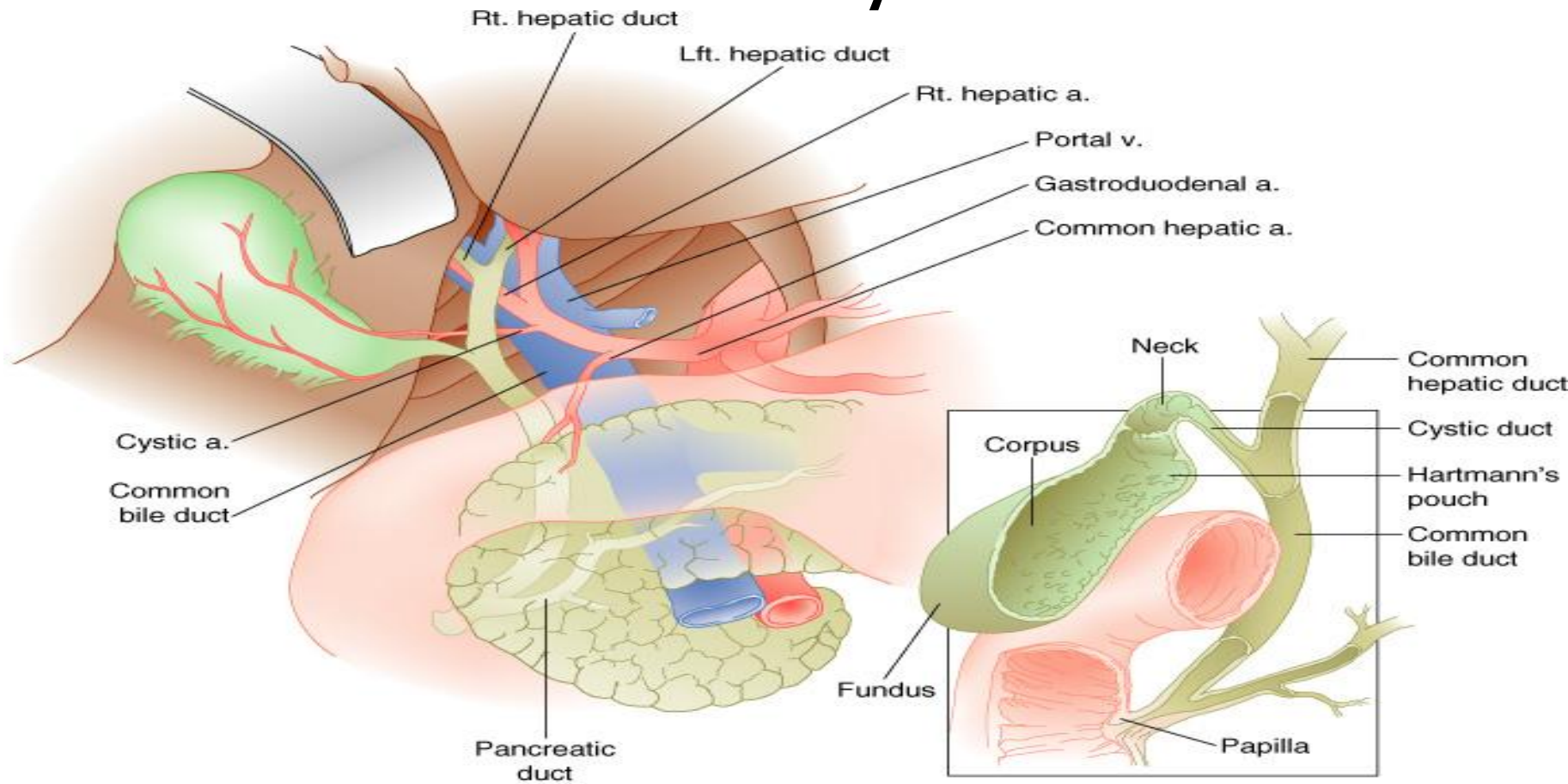
Cholelithiasis : gall bladder stones

Cholecystitis: inflammation of gall bladder

Cholangitis: inflammation of biliary tree

Choledocholithiasis : stones in common Bile duct not necessary cause obstructive jaundice

Anatomy



contents of porta hepatis OR hepatoduodenal ligament:
portal vein, hepatic artery and bile duct
NOT THE HEPATIC VEIN. MCQ !!!!

Variations in Bile Ducts



Pathophysiology

- Three types of stones, cholesterol, pigment, mixed.
- Formation of each types is caused by crystallization of bile.
- Cholesterol stones most common.
- Bile consists of lethicin, bile acids, phospholipids in a fine balance.
- Impaired motility can predispose to stones.

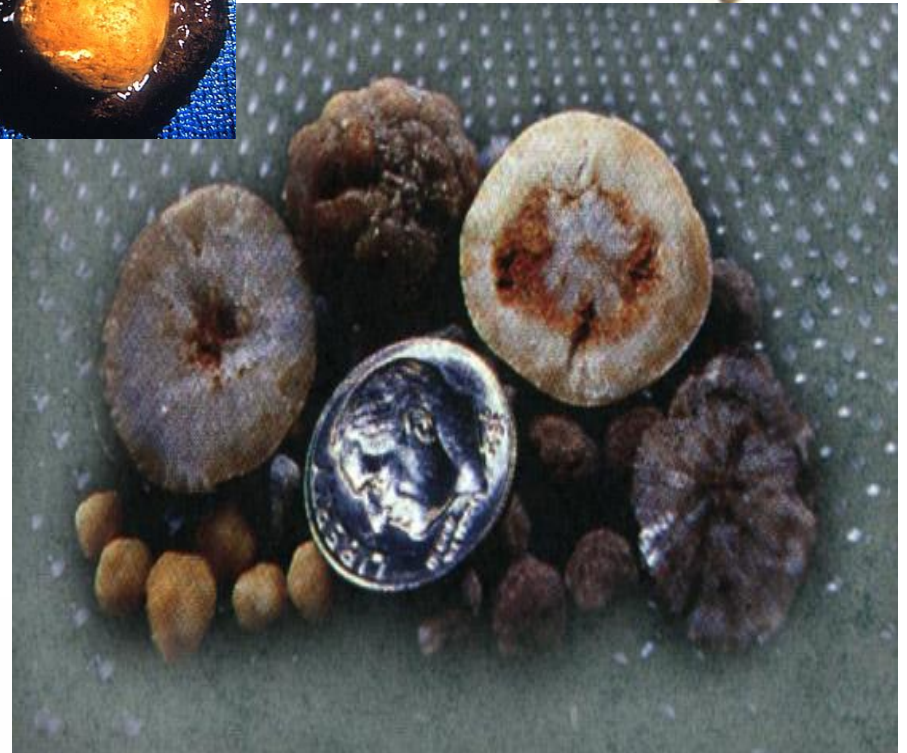
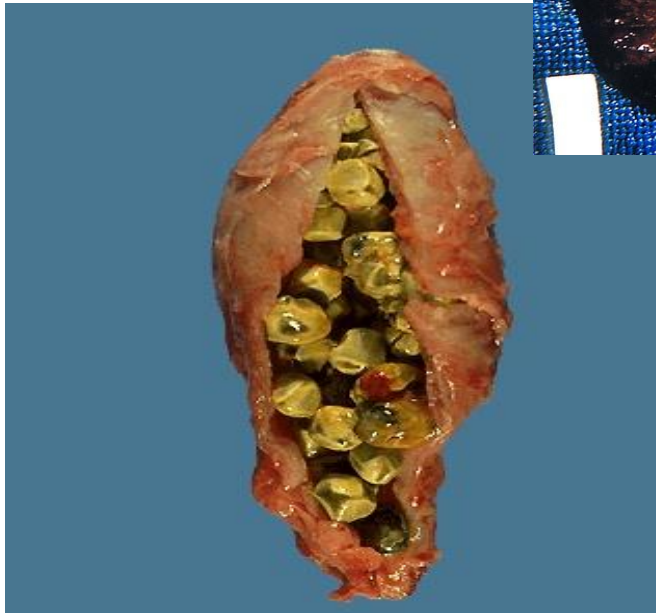
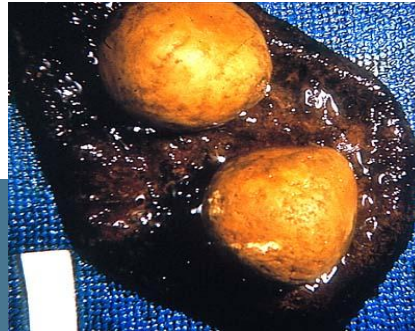
Pathophysiology

- Sludge is crystals without stones. It may be a first step in stones, or be independent of it.
- Pigment stones (15%) are from calcium bilirubinate. Diseases that increase RBC destruction will cause these. Also in cirrhotic patients, parasitic infections.

Bile : 1Liter/day !

Sludge: beginning of stones , u can find it on U/S

Harvest Time



Frequency

- US: affected by race, ethnicity, sex, medical conditions, fertility.
- 20 million have GS.
- Every year 1-2% of people develop them. Hispanics are at increased risk.
- Internationally: 20% of women, 14% of men.
- Patients over 60 prevalence was 12.9% for men, 22.4% for women.

Morbidity/Mortality

- Every year 1-3% of patients develop symptoms.
- Asymptomatic GS are not associated with fatalities.
- Morbidity and mortality is associated only with symptomatic stones.

Race

- Highest in fair skinned people of northern European descent and in Hispanic populations.
- High in Pima Indians (75% of elderly). In addition Asians with stones are more likely to have pigmented stones than other populations.
- African descent with Sickle Cell Anemia.

Sex

- More common in women. Etiology may be secondary to variations in estrogen causing increased cholesterol secretion, and progesterone causing bile stasis.
- Pregnant women more likely to have symptoms.
- Women with multiple pregnancies at higher risk
- Oral contraceptives, estrogen replacement tx.

Age

- It is uncommon for children to have gallstones. If they do, it's more likely that they have congenital anomalies, biliary anomalies, or hemolytic pigment stones.
- Incidence of GS increases with age 1-3% per year.

History

- 3 clinical stages: **asymptomatic, symptomatic**, and with **complications** (cholecystitis, cholangitis, CBD stones).
- Most (60-80%) are asymptomatic
- A history of epigastric pain with radiation to shoulder may suggest it.
- A detailed history of pattern and characteristics of symptoms as well as US make the diagnosis.
- 80% of patients are asymptomatic, 20% symptomatic > 20% of Symptomatic patients will have the complications “ very rare but it happens pt comes with complication without any previous symptoms “!

History

- Most patients develop symptoms before complications.
- Once symptoms occur, severe symptoms develop in 3-9%, with complications in 1-3% per year, and a cholecystectomy rate of 3-8% per year.
- Indigestion, bloating, fatty food intolerance occur in similar frequencies in patients without gallstones, and are not cured with cholecystectomy.

History

- Best definition of colic is pain that is severe in epigastrium or RUQ that last 1-5 hrs, often waking patient at night.
- In classic cases pain is in the RUQ, however visceral pain and GB wall distension may be only in the epigastric area.
- Once peritoneum irritated, localizes to RUQ.
- Small stones more symptomatic.

Physical

- Vital signs and physical findings in asymptomatic cholelithiasis are completely normal.
- Fever, tachycardia, hypotension, alert you to more serious infections, including cholangitis, cholecystitis.
- Murphy's sign

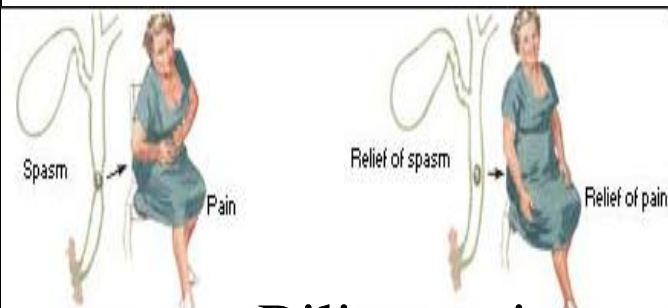
The majority of cases (approximately 80%) are asymptomatic (silent) gall stones, discovered accidentally by abdominal sonar.



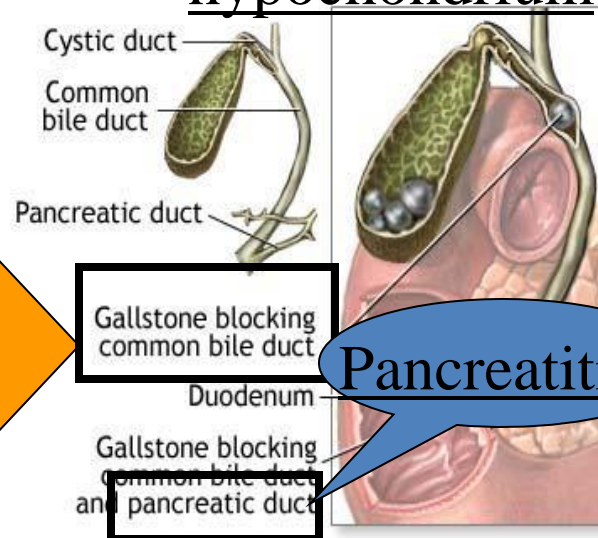
Gall stones increase risk of carcinoma of the gall bladder

Other symptoms are related to site of movement of stone

A gall stone may impact in the neck of gall bladder or in the cystic duct giving biliary pain or cholecystitis



Biliary pain usually occurs in the epigastrium and right hypochondrium



Obstruction of common bile duct leading to pain & jaundice

Gall Stone Formation

Gall stones are not confined to fair, fat, fertile, female of forty

Increased concentration of
unconjugated bilirubin in bile

Ca²⁺-bilirubinate/carbonate/
phosphate & cholesterol

Brown pigment stones



Excess cholesterol
secretion

Insufficient
bile acid production



Cholesterol
stones (< 70%)

Gall stones are
often silent



Female,
obese,
sudden loss of
weight,
Hormone
Replacement
Therapy

Risk Factors

Causes

- Fair, fat, female, fertile of course.
- High fat diet
- Obesity
- Rapid weight loss, TPN, Ileal disease, NPO.
- Increases with age, alcoholism.
- Diabetics have more complications.
- Hemolytics

Differentials

- AAA (abdominal aortic aneurysm)
- Appendicitis
- Cholangitis, cholelithiasis
- Diverticulitis
- Gastroenteritis, hepatitis
- IBD, MI, SBO (small-bowel obstruction)
- Pancreatitis, renal colic, pneumonia

Workup

- Labs with asymptomatic cholelithiasis and biliary colic should all be normal.
- WBC, elevated LFTS may be helpful in diagnosis of acute cholecystitis, but normal values do not rule it out.
- Study by Singer et al examined utility of labs with chole diagnosed with HIDA, and showed no difference in WBC, AST,ALT Bili, and Alk Phos, in patients diagnosed and those without.

Workup

- Elevated WBC is expected but not reliable.
- In retrospective study, only 60% of patients with cholecystitis had a WBC greater than 11,000. A WBC greater than 15,000 may indicate perforation or gangrene.
- ALT, AST, AP more suggestive of CBD stones
- Amylase elevation may be GS pancreatitis.

Imaging Studies

- US and Hida best. Plain x-rays, CT scans ERCP are adjuncts.
- X-rays: 15% stones are radiopaque, porcelain GB may be seen. Air in biliary tree, emphysematous GB wall.
- CT: for complications, ductal dilatation, surrounding organs. Misses 20% of GS. Get if diagnosis uncertain.

What is the first exam ? U/S “95% Sensitivity”

What is the Best exam? CT

MCQ !!!

CT Scan



Plain Films





Imaging

- Ultrasound is 95% sensitive for stones, 80% specific for cholecystitis. It is 98% sensitive and specific for simple stones.
- Wall thickening (2-4mm) false positives!
- Distension
- Pericholecystic fluid, sonographic Murphy's.
- Dilated CBD(7-8mm).

Ultrasound



Ultrasound



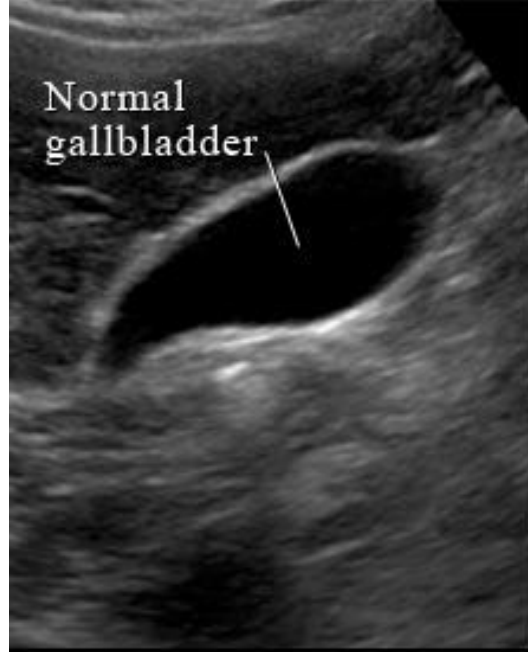


Figure 1



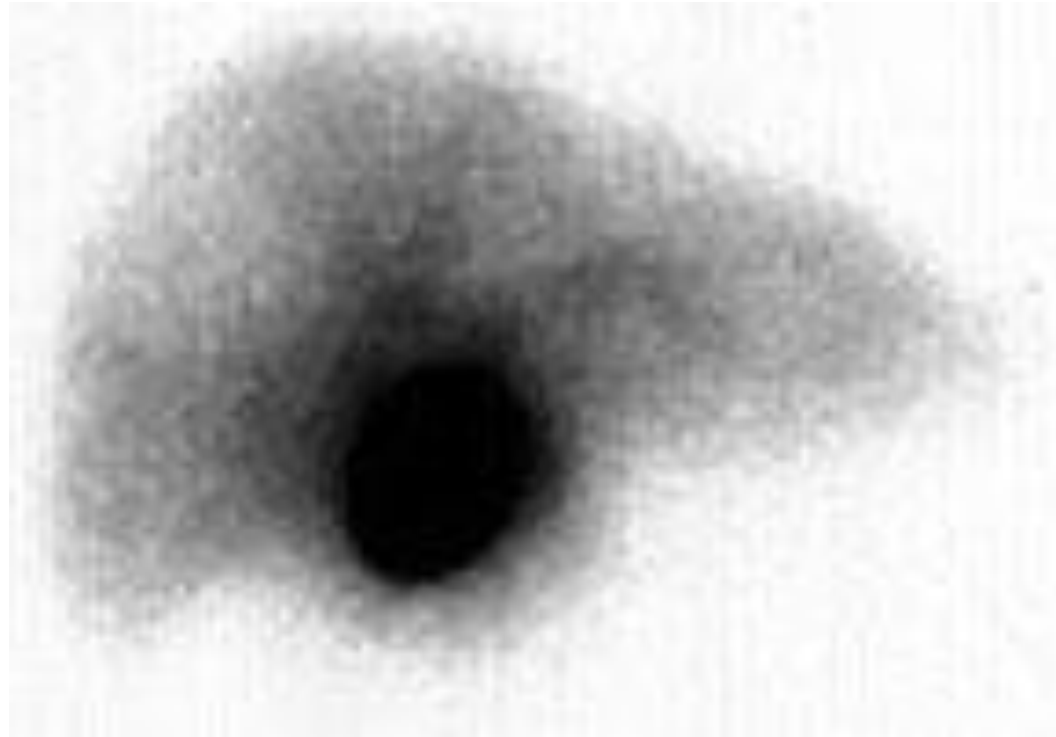
Figure 2



Imaging

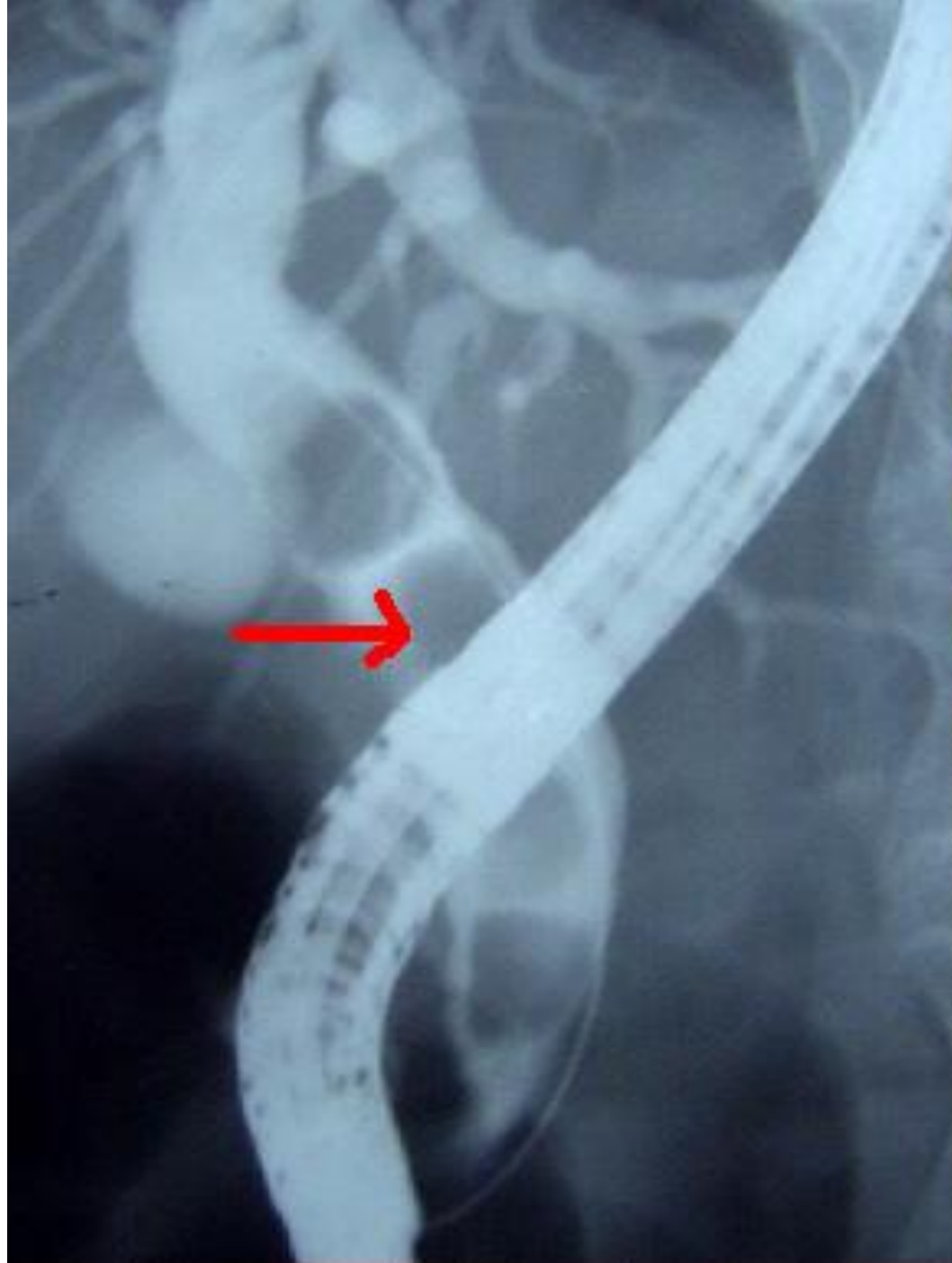
- Hida scan documents cystic duct patency.
- 94% sensitive, 85% specific
- GB should be visualized in 30 min.
- If GB visualized later it may point to chronic cholecystitis.
- CBD obstruction appears as non visualization of small intestine.
- False positives, high bilirubin.

**(HIDA scan)
cholescintigraphy or Hepatobiliary Imino-Diacetic
Acid scan,**



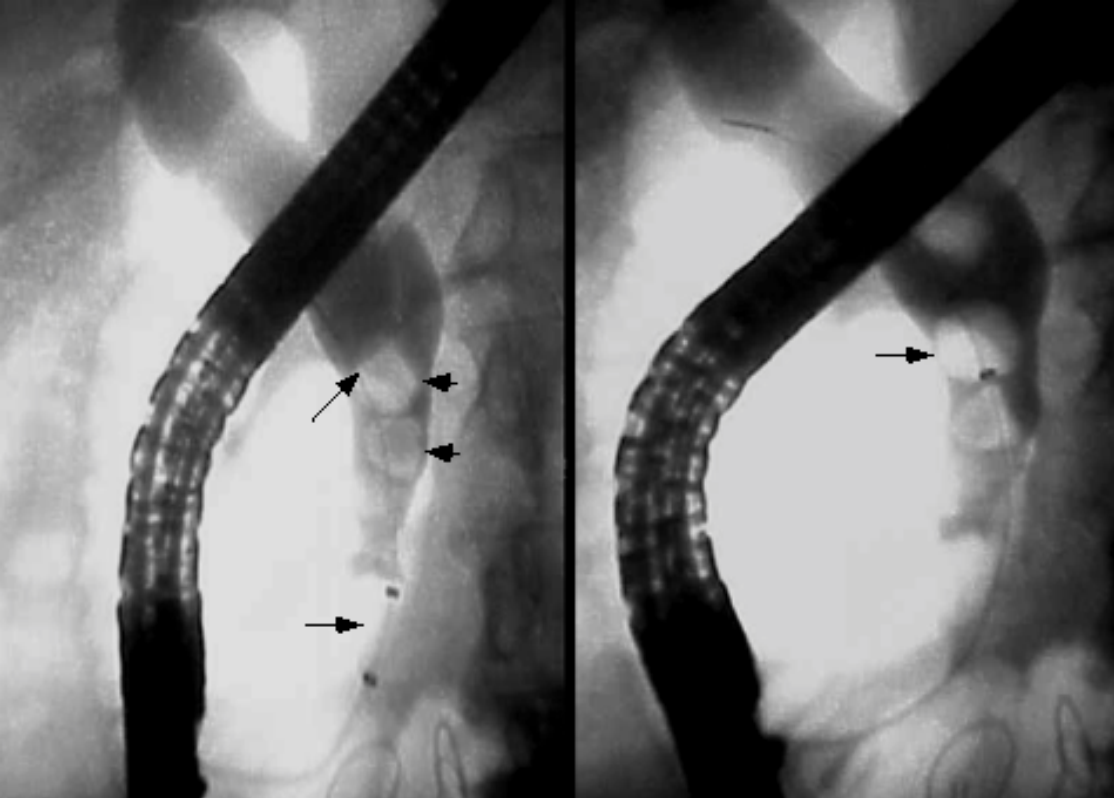
Imaging

- ERCP is diagnostic and therapeutic.
- Provides radiographic and endoscopic visualization of biliary tree.
- Do when CBD dilated and elevated LFTs.
- Complications include bleeding, perforation, pancreatitis, cholangitis.
- the meaning of ERCP : Endoscopic retrograde cholangiopancreatography and for it we need : endoscope + fluoroscopy (Xray and contrast and guide wire) MCQ !!!
- if patient present with jaundice you admit him for ERCP MCQ!!



ERCP





Balloon extraction of common bile duct stones Balloon extraction of common bile duct stones. Left panel shows a balloon catheter being threaded over a guidewire within the common bile duct (thin arrows). At least two gallstones are visible in the distal common bile duct (arrow heads), which is dilated. In the right panel, the balloon has been inflated above a gallstone (arrow), which permits the balloon to drag the gallstone out of the duct. Courtesy of Isaac Raijman, MD.



Emergency Department Care

- Suspect GB colic in patients with RUQ pain of less than 4-6h duration radiating to back.
- Consider acute cholecystitis in those with longer duration of pain, with or without fever. Elderly and diabetics do not tolerate delay in diagnosis and can proceed to sepsis.
- if patient present with acute cholecystitis and low BP admit to ICU and give inotrops then relieve obstruction “ MCQ!!

Emergency Department Care

- After assessment of ABCs, perform standard IV, pulse oximetry, EKG, and monitoring. Send labs while IV placed, include cultures if febrile.
- Primary goal of ED care is diagnosis of acute cholecystitis with labs, US, and or Hida. Once diagnosed, hospitalization usually necessary. Some treated as OP.

Emergency Department Care

- In patients who are unstable or in severe pain, consider a bedside US to exclude AAA and to assist in diagnosis of acute cholecystitis.
- Replace volume with IVF, NPO, +/- NGT.
- Administer pain control early. A courtesy call to surgery may give them time to examine without narcotics.

Consults

- Historically cholecystitis was operated on emergently which increased mortality.
- Surgical consult is appropriate, and depending on the institution, either medicine or surgery may admit the patients for care.
- Get GI involved early if suspect CBD obstruction.

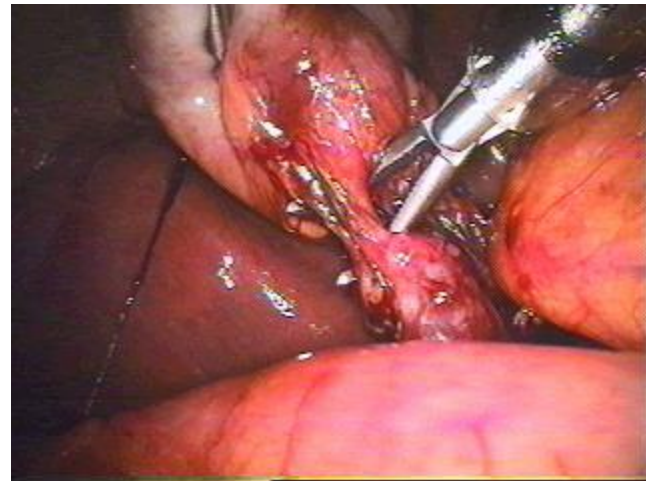
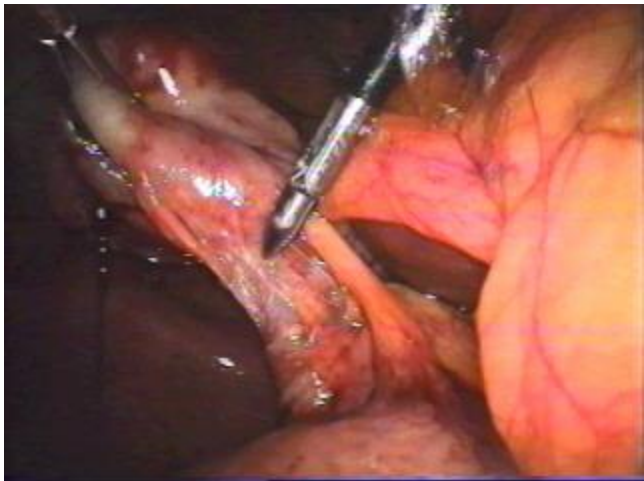
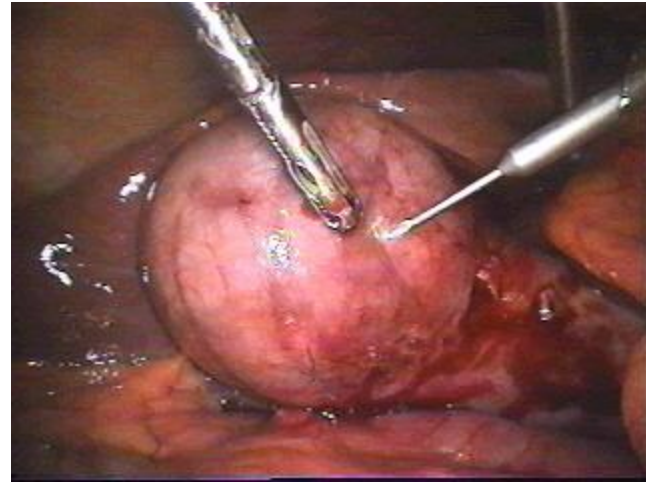
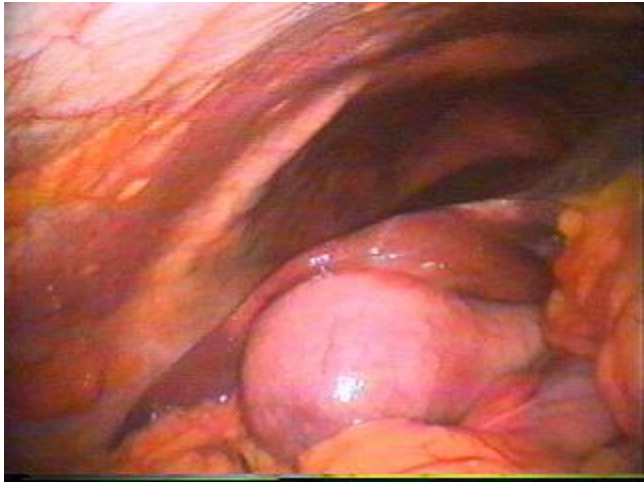
Medications

- Anticholinergics such as Bentyl (dicyclomine hydrochloride) to decrease GB and biliary tree tone. (20mg IM q4-6).
- Demerol 25-75mg IV/IM q3
- Antiemetics (phenergan, compazine).
- Antibiotics (Zosyn 3.375g IV q6) need to cover Ecoli(39%), Klebsiella(54%), Enterobacter(34%), enterococci, group D strep.

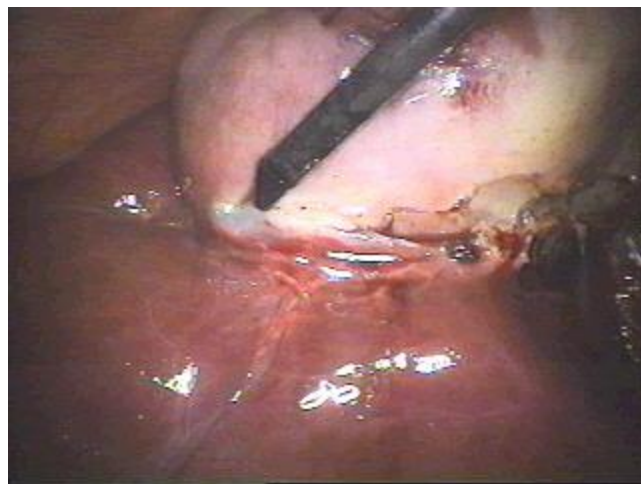
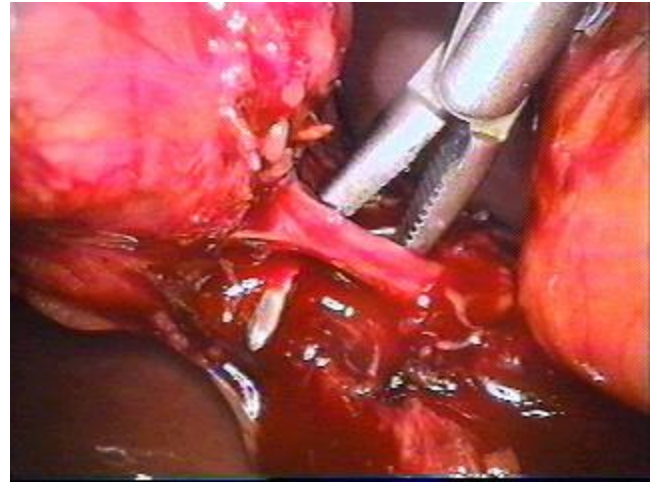
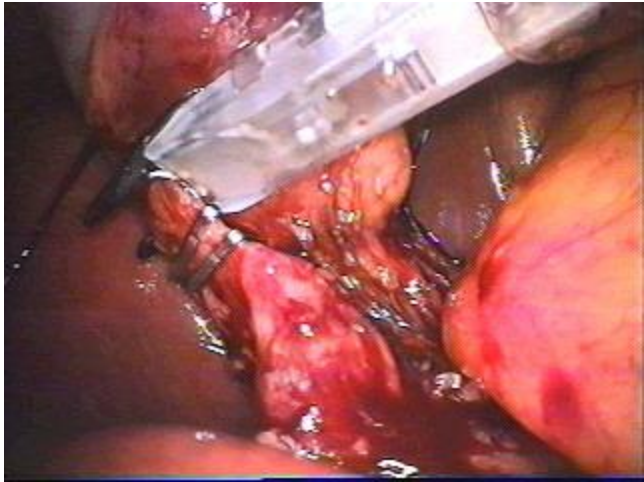
Further Inpatient Care

- Cholecystectomy can be performed after the first 24-48h or after the inflammation has subsided. Unstable patients may need more urgent interventions with ERCP, percutaneous drainage, or cholecystectomy.
- Lap chole very effective with few complications (4%). 5% convert to open. In acute setting up to 50% open.

Laparoscopic Cholecystectomy



Laparoscopic Cholecystectomy





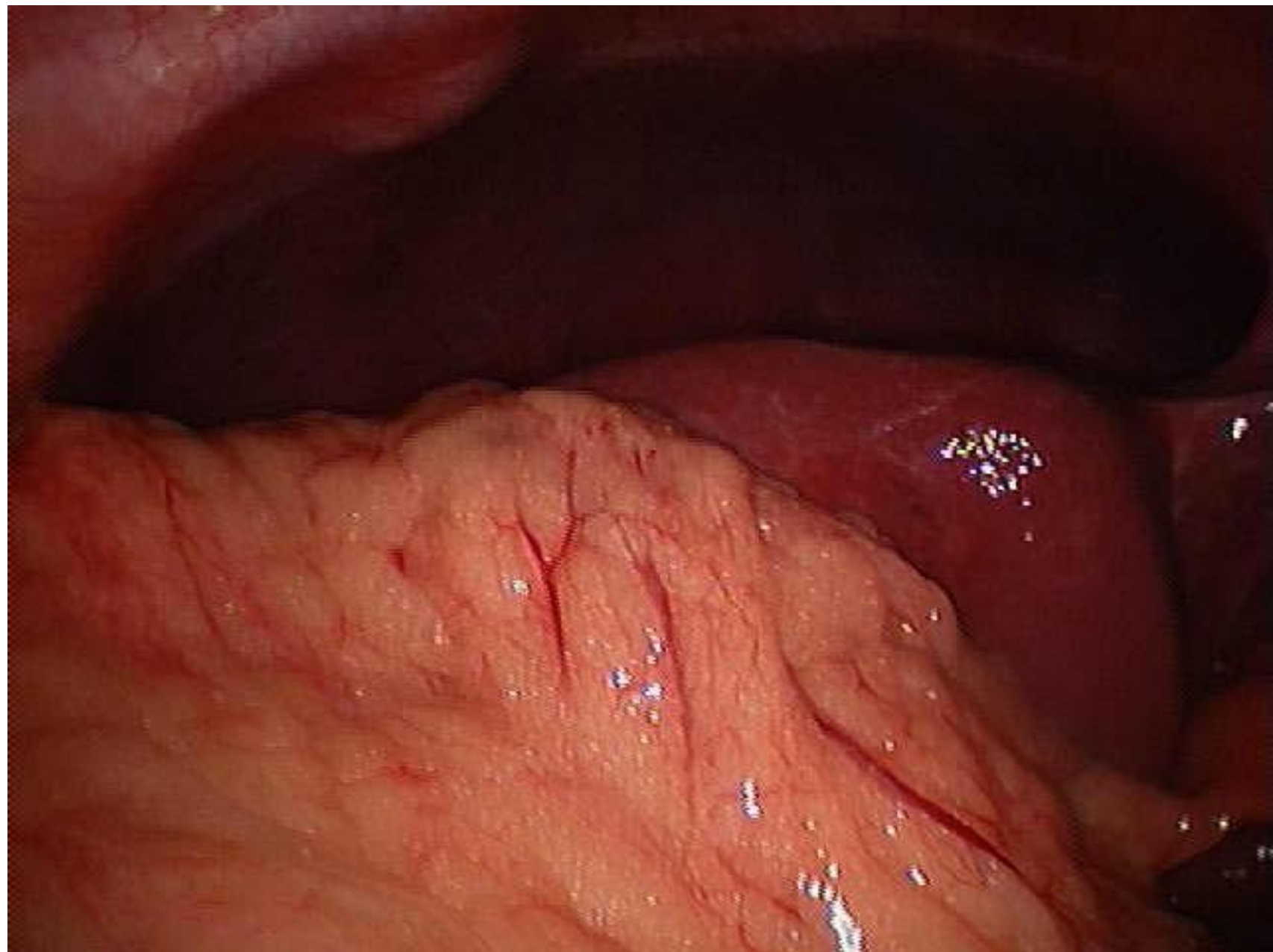


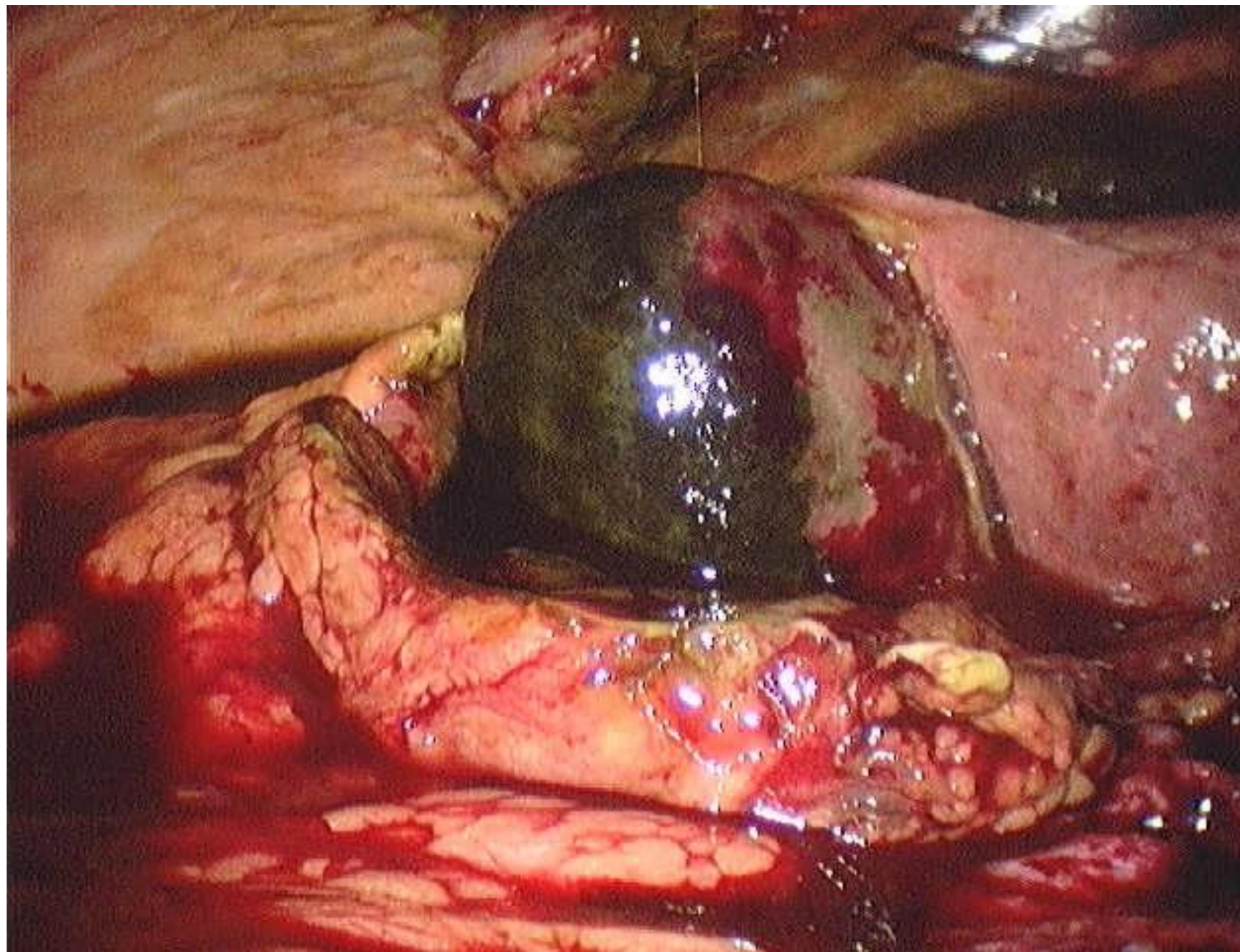


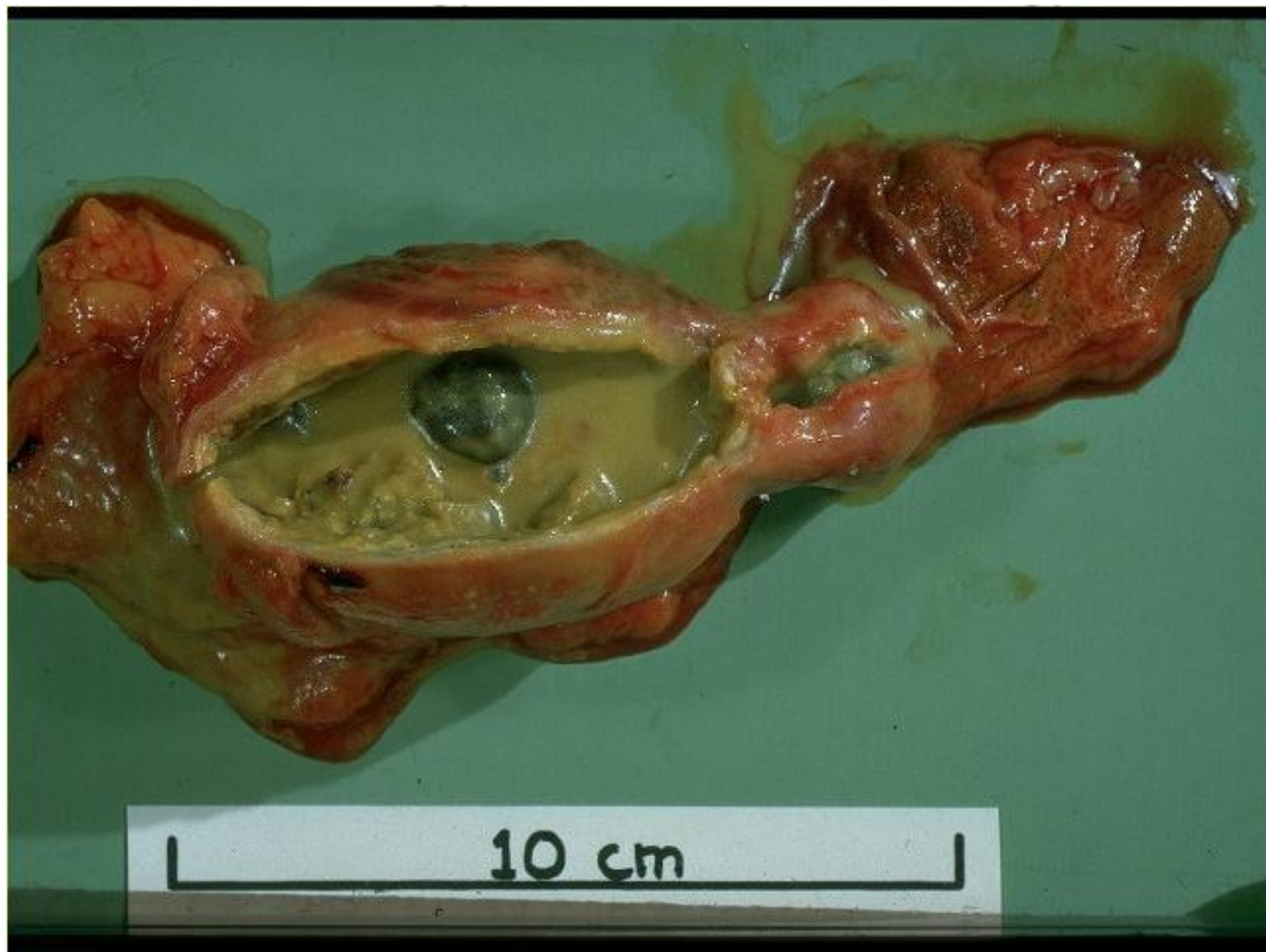


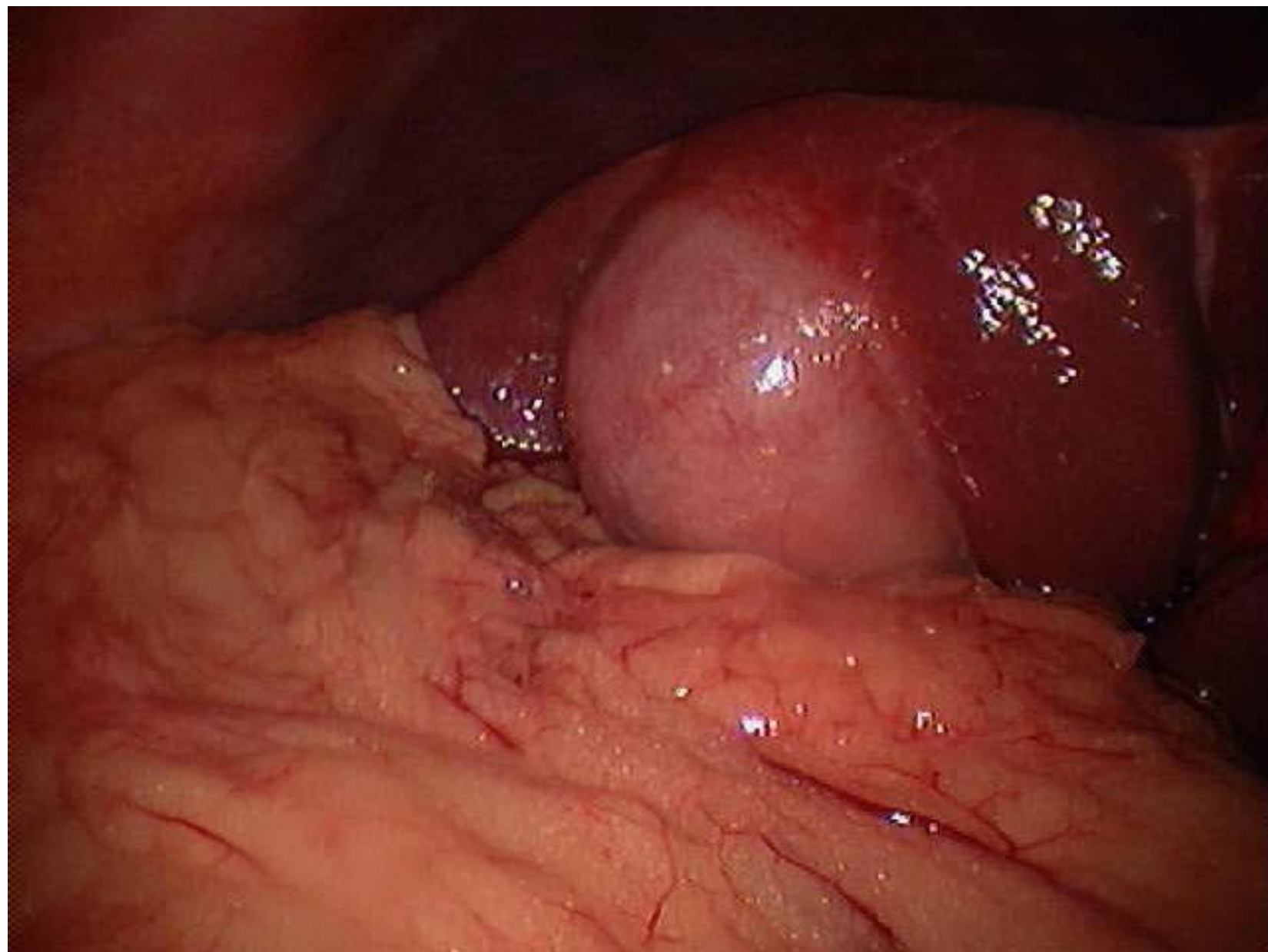


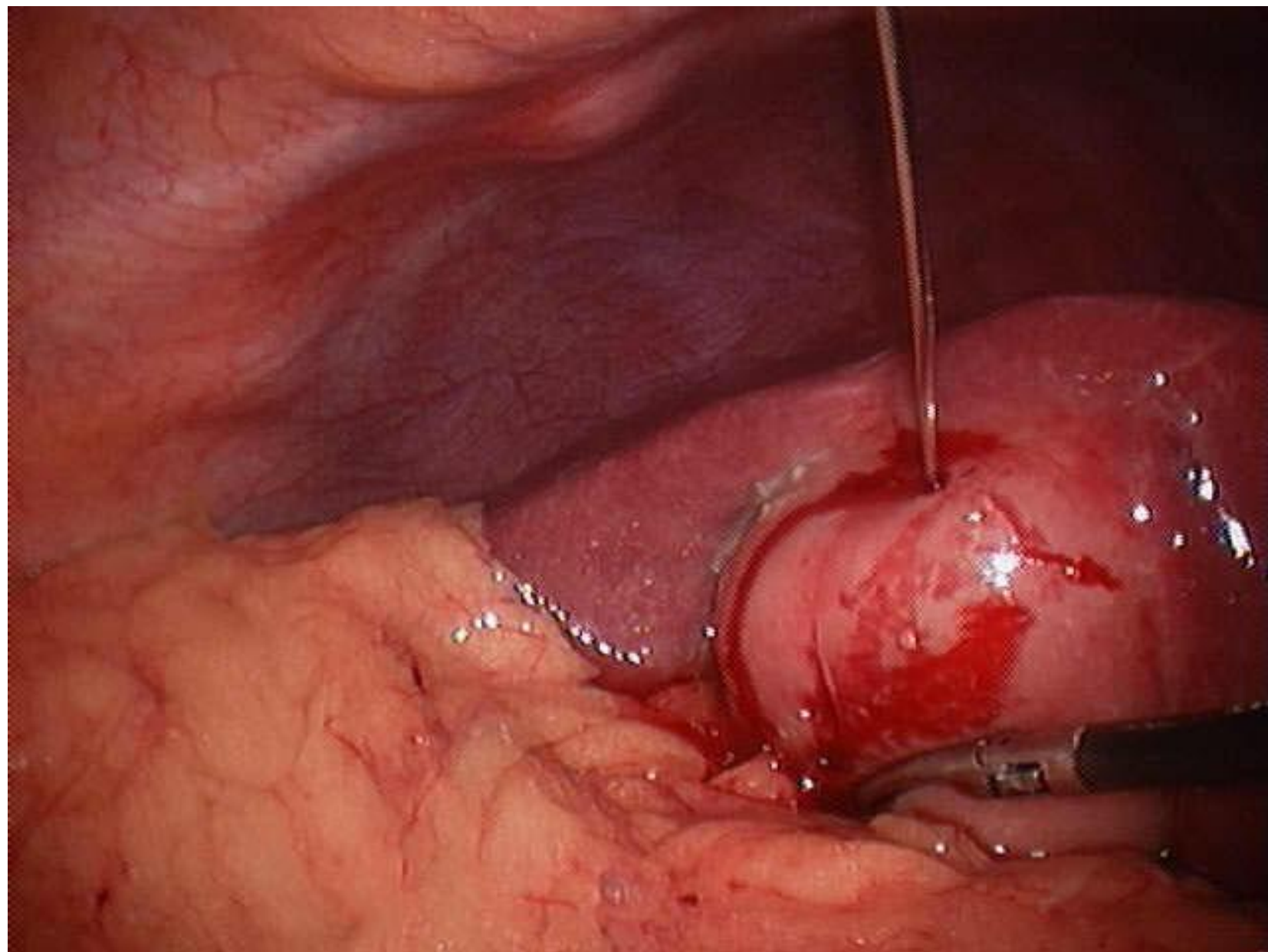


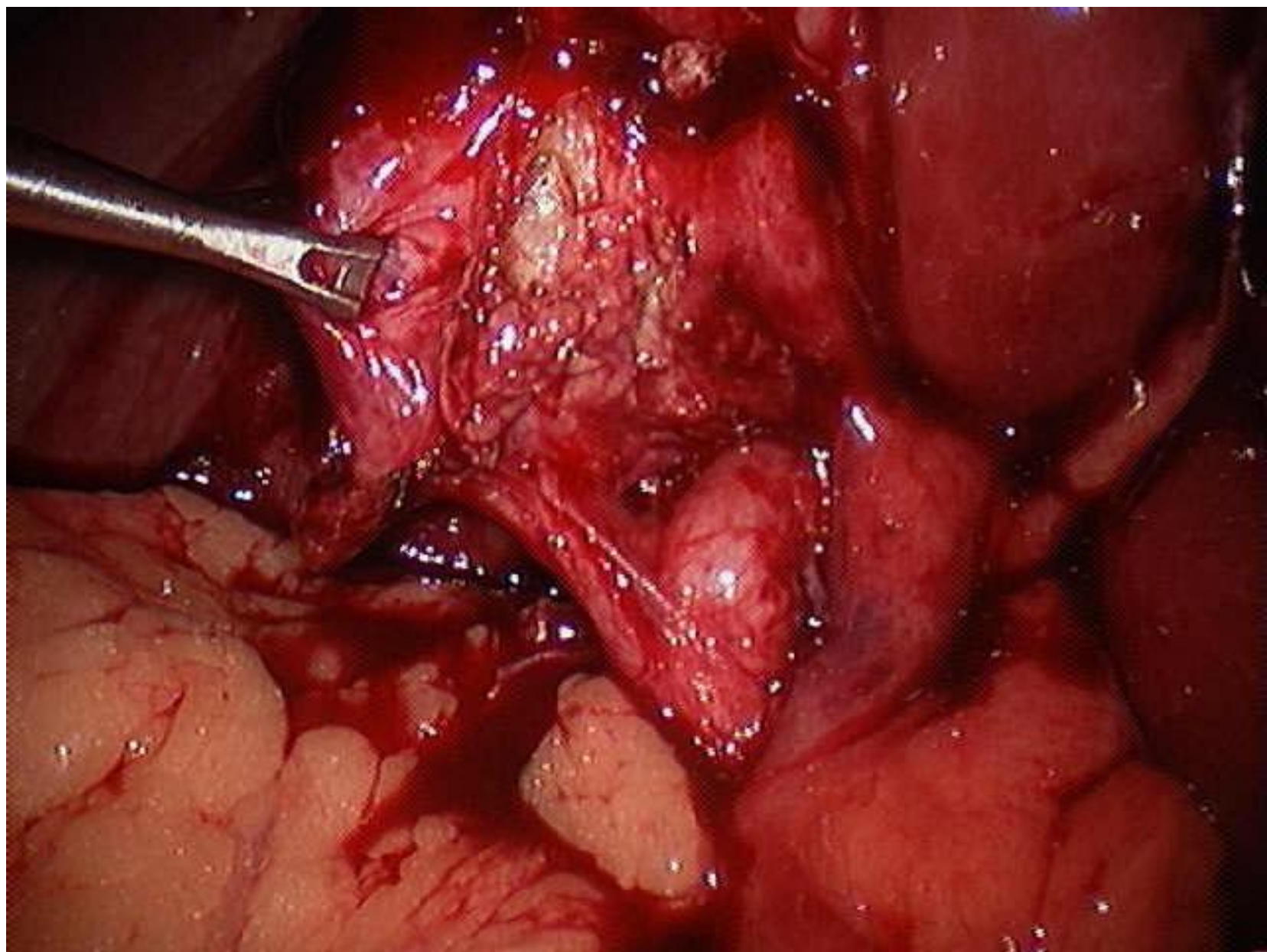


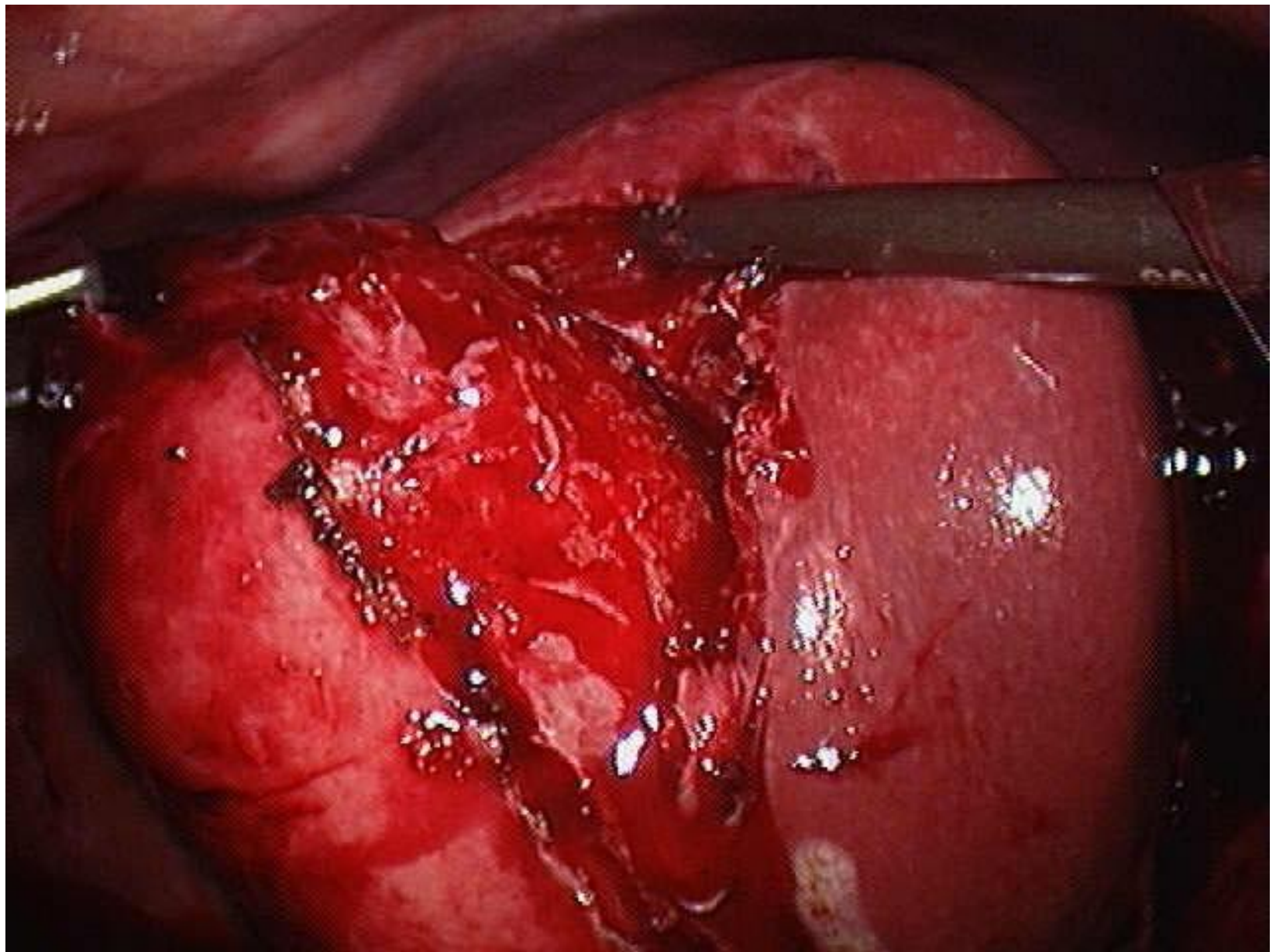


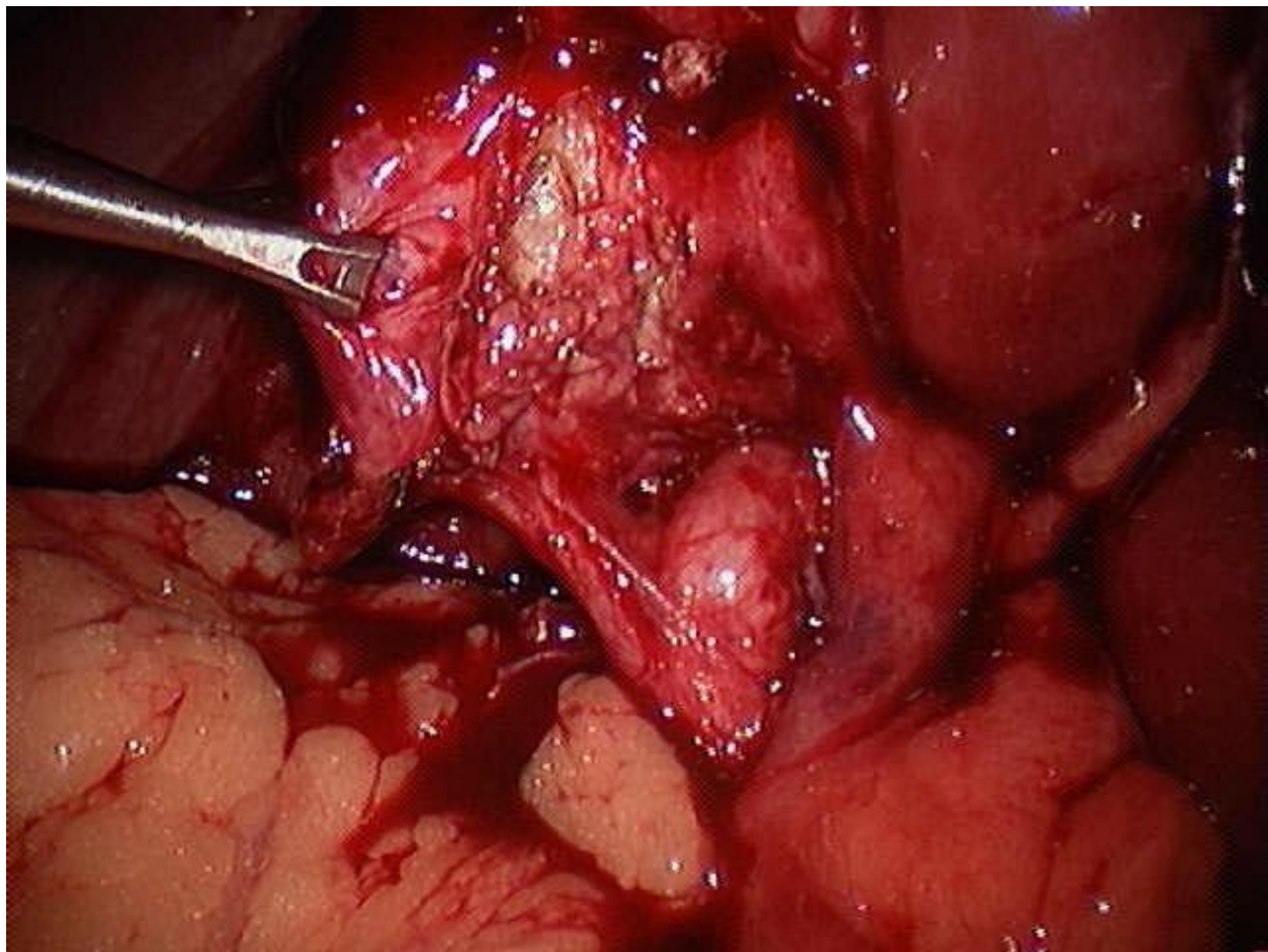


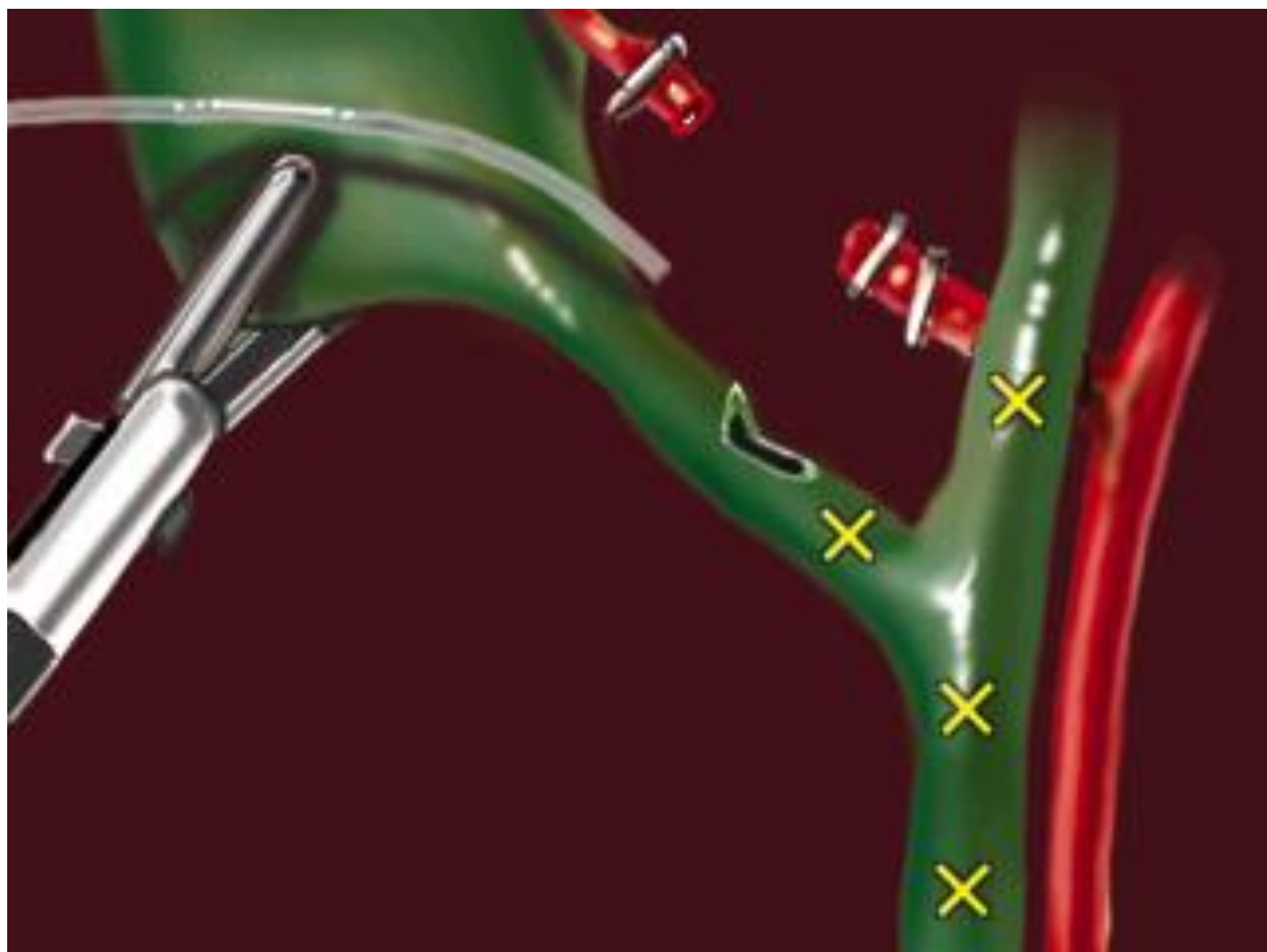


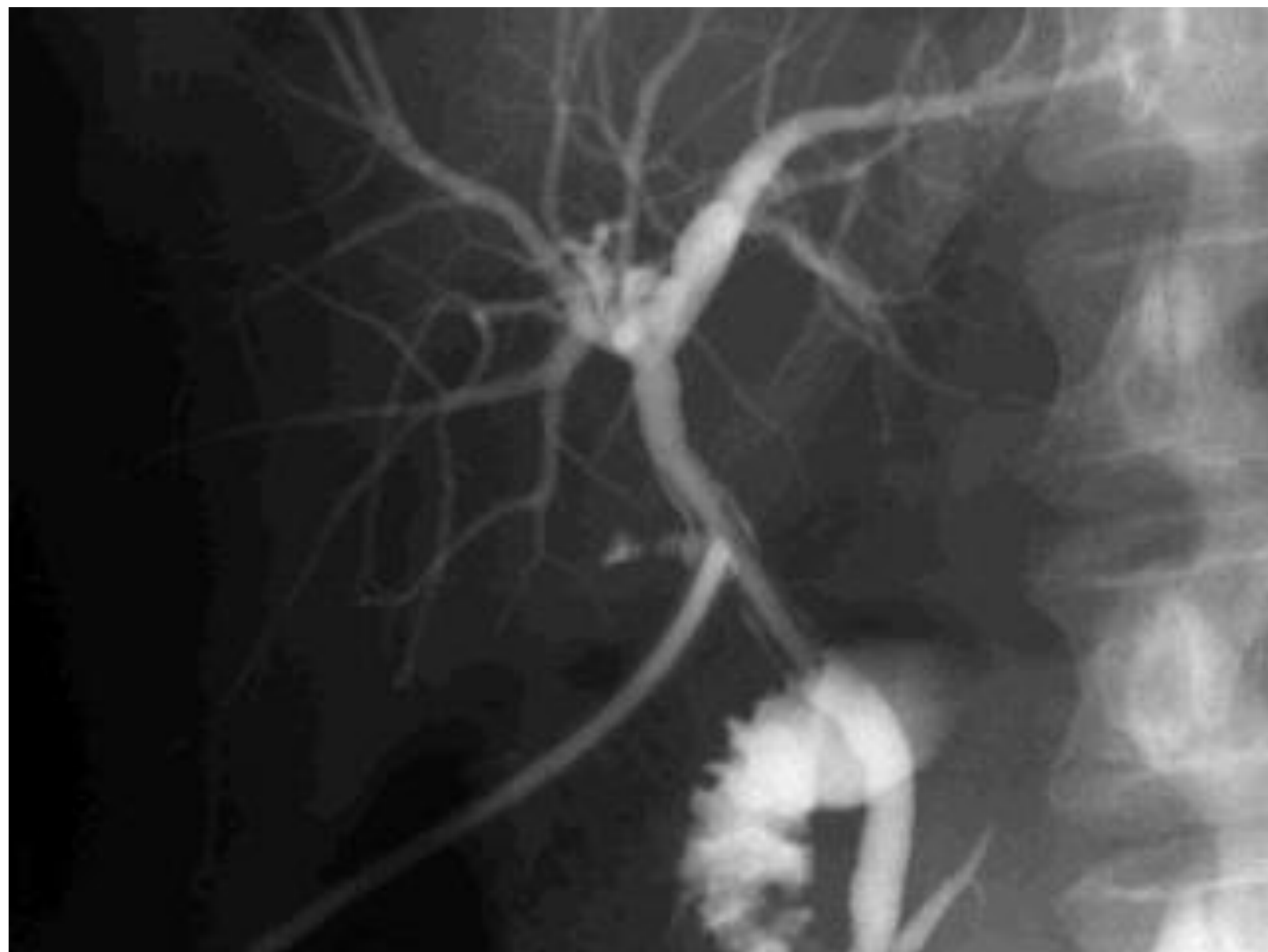












Further Outpatient Care

- Afebrile, normal VS
- Minimal pain and tenderness.
- No markedly abnormal labs, normal CBD, no pericholecystic fluid.
- No underlying medical problems.
- Next day follow-up visit.
- Discharge on oral antibiotics, pain meds.

Complications

- Cholangitis, sepsis
 - Pancreatitis
 - Perforation (10%)
 - GS ileus (mortality 20% as diagnosis difficult).
 - Hepatitis
 - Choledocholithiasis
-
- How to diagnose Cholangitis ? By Charcot's triads (RUQ pain, jaundice and Fever) MCQ !! We don't need for it any investigation !

Prognosis

- Uncomplicated cholecystitis as a low mortality.
- Emphysematous GB mortality is 15%
- Perforation of GB occurs in 3-15% with up to 60% mortality.
- Gangrenous GB 25% mortality.

MCQs !!!!

❖ What is the most common cause of chronic pancreatitis?

- a) Gall stones > (80%) gall stones is the cause either in acute or chronic pancreatitis
- b) Alcohol

❖ Which of the following is not an ultrasonic finding in acute cholecystitis?

- a) sonographic Murphy's sign > Distended gall bladder and thickening of the wall
- b) Pericholecystic fluid
- c) Gall bladder wall thickening more than 6 mm
- d) Absences of gall stones

❖ How much bile produced by the liver?

- a) 100 – 200 ml/day
- b) 300-400 ml/day
- c) 500-1000 ml/day (1Liter)

MCQs !!!!

- ❖ In Endoscopic ERCP stone extraction from common bile duct (CBD) is not possible in all except ?
 - a) Multiple stones in CBD > it's possible !
 - b) Intrahepatic stone
 - c) Multiple gall stones
 - d) Pt has CBD stone with prior gastrectomy

- ❖ Patient had CBD stones but he had prior gastrectomy (or post gastric resection B2 “ **Billroth's operation II**”)?
 - No gastric → we cannot reach the duodenum → never do ERCP
 - So open the abdomen → open the CBD and extract the stones (intraoperative cholangiogram)

- ❖ Patient had post gastric resection B1 “**Billroth's operation I**” ?
 - We can do ERCP b/c duodenum is still open

From wiki ☺ B1: an operation in which the pylorus is removed and the distal stomach is anastomosed directly to the duodenum.

B2: an operation in which the greater curvature of the stomach is connected to the first part of the jejunum in a side-to-side manner. This often follows resection of the lower part of the stomach (antrum). The antrectomy (resection of the stomach antrum) is not part of the originally described procedure. The surgical procedure is called gastrojejunostomy

MCQs !!!!

❖ Abdominal pain, increase WBCs and increase amylase?

a) Acute pancreatitis

❖ A 45 Y/O obese female with cholelithiasis, presents to the ER complaining of N/V & severe continuous abdominal pain, high grade fever, slightly elevated WBC (12,000), & increased serum amylase... What's her most likely Dx.?

a) Acute Pancreatitis

❖ 70 years old male come with progressive **painless** jaundice?

It could be:

- Head of pancreas cancer
- ampulla of Vater cancer
- Distal CBD cancer

MCQs !!!!

- ❖ 70 years old male with progressive painless jaundice is referred to your clinic. You order LFT that shows abnormal pattern of obstruction jaundice, US shows dilated CBD 2 cm, which procedure you suggest to do?

a) ERCP

- b) Laparoscopic Cholecystectomy
- c) Modified barium swallow
- d) Laparoscopic abdominal exploration
- e) Upper GI endoscopy

- ❖ You suspect patient to have gall stone as a cause of chronic nausea and mild right upper quadrant pain what is the **best** image study in this case?

a) CT

- ❖ You suspect patient to have gall stone as a cause of chronic nausea and mild right upper quadrant pain what is the **first** image study in this case?

a) US

- ❖ Which of the following structure does not found in hepatodeudenal ligament?

a) Hepatic vein

- b) Hepatic artery
- c) CBD
- d) Portal vein