Gall Stone disease:

Etiology, Clinical features, diagnosis, Complications

Cholecystectomy:

Indications,
Procedure, Complications

What Are Gallstones?

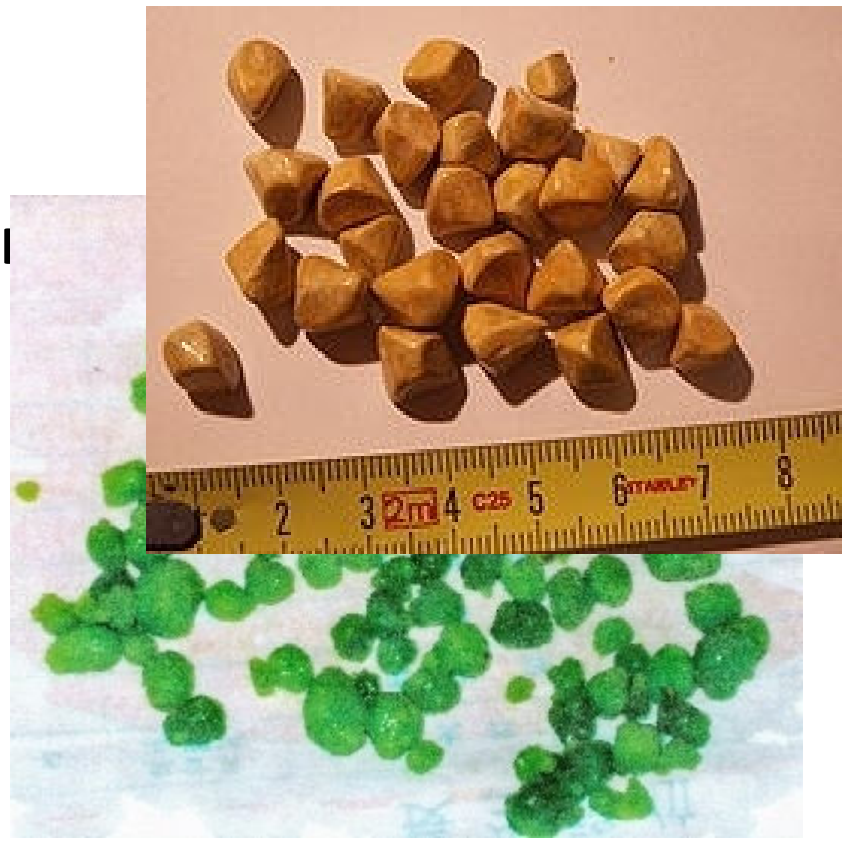
- Small, pebble-like substances
- Multiple or solitary
- May occur anywhere within the biliary tree
- Have different appearance - depending on their contents

Pigment Stones

- Small
- Friable
- Irregular
- Dark
- Made of bilirubin and calcium salts
- Less than 20% of cholesterol
- Risk factors:
  - Haemolysis
  - Liver cirrhosis
  - Biliary tract infections
  - Ileal resection

Cholesterol Stones

- Large
- Often solitary
- Yellow, white or green
- Made primarily of cholester (>70%)
- Risk factors:
  - 4 “F” :
    - Female
    - Forty
    - Fertile
    - Fat
  - Fair (5th “F” - more prevalent in Caucasians)
  - Family history (6th “F”)



Mixed Stones

- Multiple
- Faceted
- Consist of:
  - Calcium salts
  - Pigment
  - Cholesterol (30% - 70%)
- 80% - associated with chronic cholecystitis

Gallstone Prevalence

- 10% of people over 40 yrs.
- 90% “silent stones”
- Risk factors for becoming symptomatic:
  - Smoking
  - Parity

Risk Factors

- Women
- Age > 60 years
- American Indians & Mexican Americans
- Overweight or obese men and women
- People who tend to fast or lose weight quickly
- Family history of gallstones
- Diabetes
- Diet high in cholesterol
- Use of OCPs
- Pregnancy

Gallstone Pathogenesis

- Bile = bile salts, phospholipids, cholesterol
- Gallstones due to imbalance rendering cholesterol & calcium salts insoluble
- Pathogenesis involves 3 stages:

  Cholesterol supersaturation in bile

  Crystal nucleation

  Stone growth

Definitions

Symptomatic cholelithiasis	Wax/waning postprandial epigastric/RUQ pain due to transient cystic duct obstruction by stone, no fever/WBC, normal LFT
Acute cholecystitis	Acute GB inflammation due to cystic duct obstruction. Persistent RUQ pain +/- fever, ↑WBC, ↑LFT, +Murphy's = inspiratory arrest
Chronic cholecystitis	Recurrent bouts of colic/acute chol'y leading to chronic GB wall inflamm/fibrosis. No fever/WBC.
Acalculous cholecystitis	GB inflammation due to biliary stasis(5% of time) and not stones(95%). Seen in critically ill pts
Choledocho-lithiasis	Gallstone in the common bile duct (primary means originated there, secondary = from GB)
Cholangitis	Infection within bile ducts usu due to obstrux of CBD. Charcot triad: RUQ pain, jaundice, fever (seen in 70% of pts), can lead to septic shock

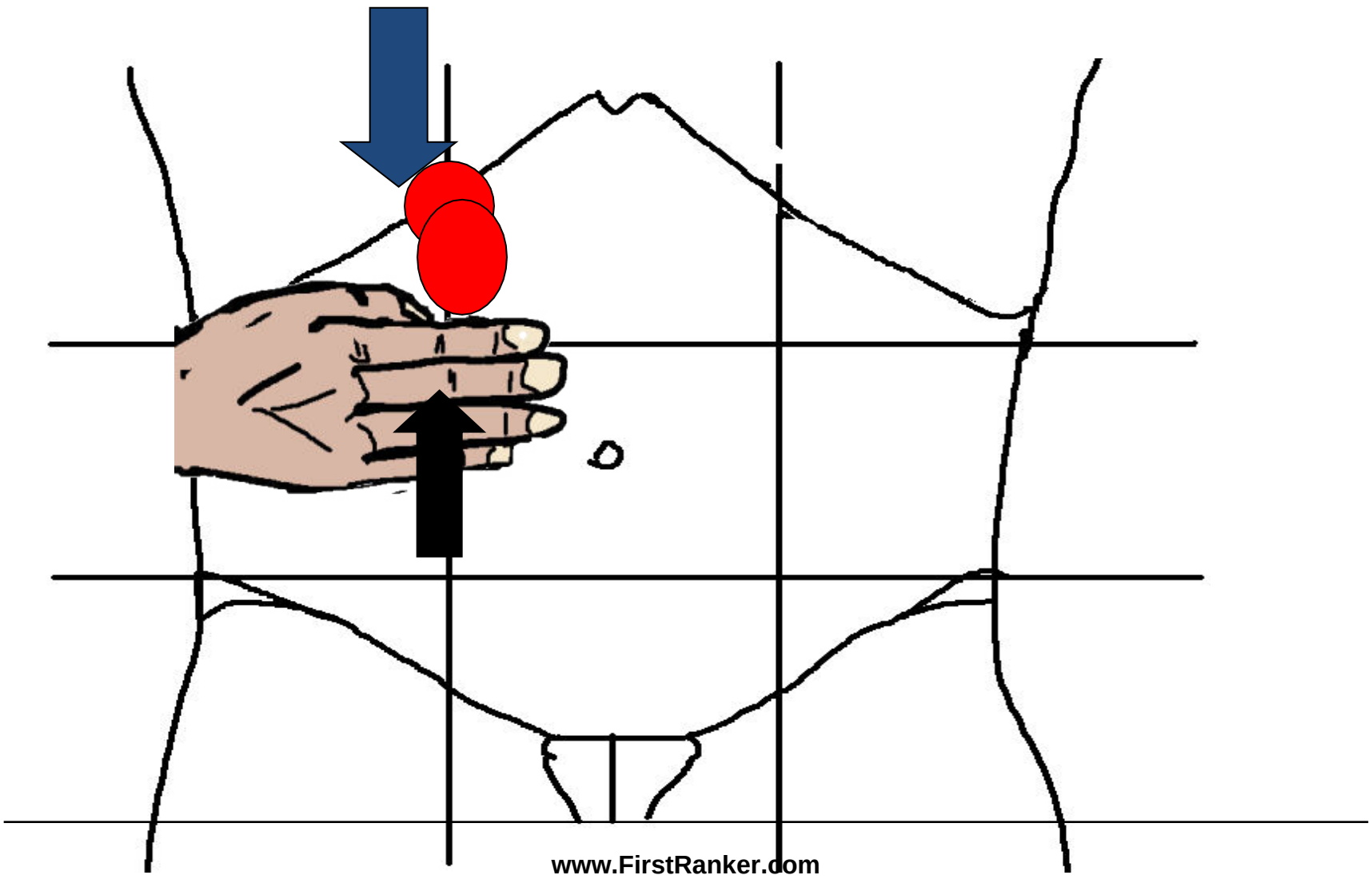
Differential Diagnosis Of RUQ Pain

- **Biliary disease**
  - Acute cholecystitis, chronic cholecystitis, CBD stone, cholangitis
- **Inflamed or perforated duodenal ulcer**
- **Hepatitis**
- **Also need to rule out:**
  - Appendicitis, renal colic, pneumonia or pleurisy, pancreatitis

Symptoms

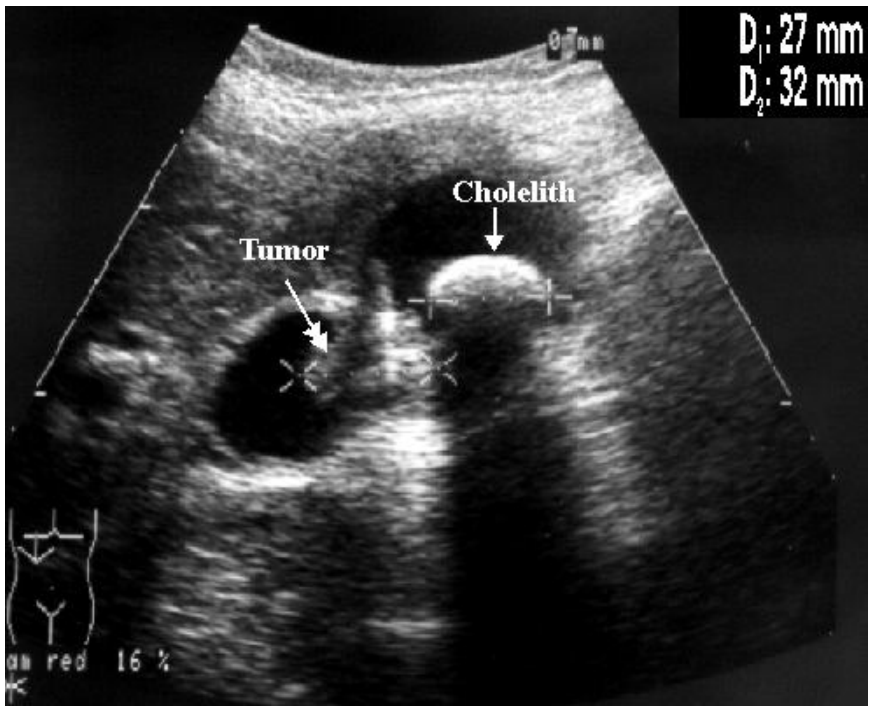
- Pain in the RUQ
  - Most common and typical symptom
  - May last for a few minutes to several hours
  - Mostly felt after eating a heavy and high-fat meal
- Pain under right shoulder when lifting up arms
- Fever, nausea and vomiting
- Jaundice (obstruction of the bile duct passage)
- Acute pancreatitis (gallstone enters the duct leading to pancreas and blocks it)

Murphy's Sign: Inspiratory arrest with manual pressure below the gallbladder



Complications Of Gallstones

- In the GB:
  - Biliary colic
  - Acute and chronic cholecystitis
  - Empyema
  - Mucocoele
  - Carcinoma
- In the bile ducts:
  - Obstructive jaundice
  - Pancreatitis
  - Cholangitis
- In the gut:
  - Gallstone ileus



Mirizzi syndrome

0.1–0.7% of patients who have gallstones

Csendes classification :

- **Type 1:** external compression of the common bile duct – 11%
- **Type 2:** cholecystobiliary fistula is present involving <1/3 rd the circumference of the bile duct – 41%
- **Type 3:** a fistula is present involving upto 2/3 the circumference of the bile duct – 44%
- **Type 4:** a fistula is present with complete destruction of the wall of the bile duct – 4%

Diagnosis

- **Ultrasound**
- Computerized tomography (CT) scan
  - May show gallstones or complications, such as infection and rupture of GB or bile ducts
- Cholescintigraphy (HIDA scan)
  - Used to diagnose abnormal contraction of gallbladder or obstruction of bile ducts
- Endoscopic retrograde cholangiopancreatography (ERCP)
  - Used to locate and remove stones in bile ducts
- Blood tests
  - Performed to look for signs of infection, obstruction, pancreatitis, or jaundice

USG

CT Scan

Management

- Asymptomatic gallstones do not require operation
- Whilst awaiting for surgery
  - Low fat diet
  - Dissolution therapy (ursodeoxycholic acid) generally useless

Surgical options

- Cholecystostomy
- Subtotal cholecystectomy
- Open cholecystectomy
- Laparoscopic cholecystectomy

Cholecystostomy

- Patients at high risk related to multisystem organ failure
- Severe pulmonary, renal, or cardiac disease
- Recent myocardial infarction
- Cirrhosis with portal hypertension
- Acalculus cholecystitis after severe trauma, burns, or surgery
- Empyema or gangrene of the gallbladder

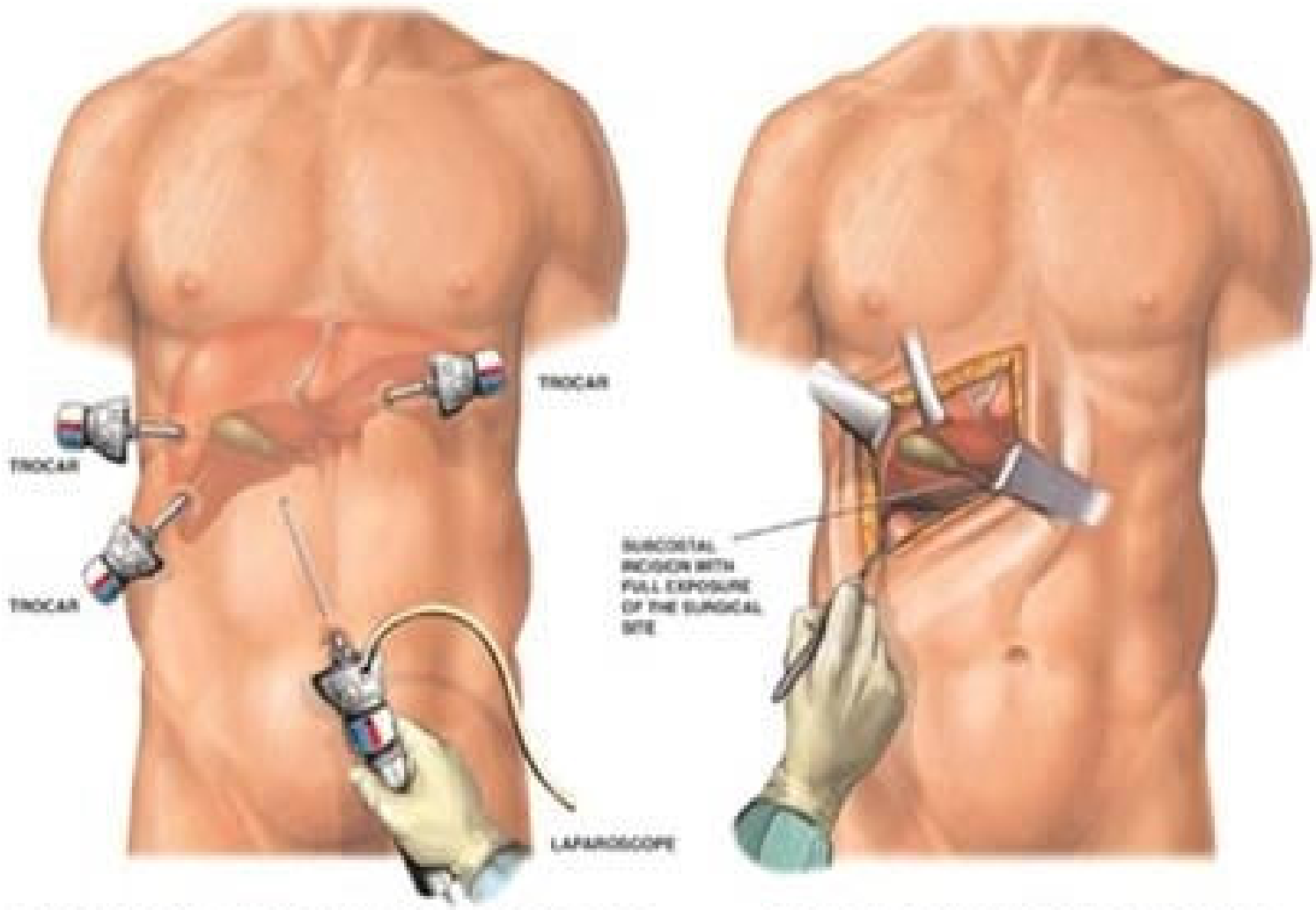
Subtotal Cholecystectomy

- Severe inflammation renders identification of the anatomy impossible, eg. Gangrenous cholecystitis
- Scarred partially intrahepatic gallbladder
- Severe cirrhosis and portal hypertension

Cholecystectomy

Laparoscopic Surgery

- Advantages:
  - Less post-op pain
  - Shorter hospital stay
  - Quicker return to normal activities
- Disadvantages:
  - Learning curve
  - Inexperience at performing open cholecystectomies



LAPAROSCOPIC CHOLECYSTECTOMY PROCEDURE OPEN CHOLECYSTECTOMY PROCEDURE

Cholecystectomy when to perform?

- After acute cholecystitis, cholecystectomy traditionally performed after 6 weeks
- Arguments for 6 weeks later
  - Laparoscopic dissection more difficult when acutely inflammed
  - Surgery not optimal when patient septic/dehydrated
  - Logistical difficulties (theatre space, lack of surgeons)
- Arguments for same admission
  - Research suggests same admission lap chole as safe as elective chole (conversion to open maybe higher)
  - Waiting increases risk of further attacks/complications which can be life threatening
  - Risk of failure of conservative management and development of dangerous complication such as empyema, gangrene and perforation can be avoided
- National guidelines state any patient with attack of gallstone pancreatitis should have lap chole within 3 weeks of the attack

Complications of Lap Cholecystectomy

- Trocar/Veress needle injury
- Hemorrhage
- Wound infection and/or abscess
- Ileus
- Bile leak
- Gallstone spillage
- Deep vein thrombosis
- Retained common bile duct (CBD) stone
- CBD injury & stricture
- Pancreatitis
- Conversion to open procedure

- **Nonsurgical treatment:**
  - Only in special situations
    - When a patient has a serious medical condition preventing surgery
    - Only for cholesterol stones
  - Oral dissolution therapy
    - Ursodeoxycholic acid - to dissolve cholesterol gallstones
    - Months or years of treatment may be necessary before all stones dissolve
  - Contact dissolution therapy
    - Experimental procedure
    - Involves injecting a drug directly into the gallbladder to dissolve cholesterol stones

Prevention

A sensible diet is the best way to prevent gall stones

Avoid crash diet or very low intake of calories

Eat good sources of fiber