



Cholelithiasis & cholecystitis

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Anatomy of biliary tree

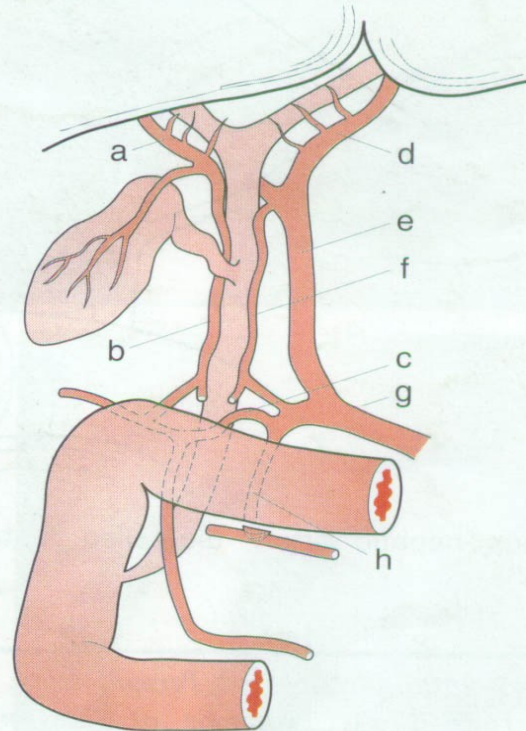


Fig. 54.1 The anatomy of the gall bladder and bile ducts. Note the arrangement of the arterial tree: (a) right hepatic artery; (b) right choledochal artery; (c) retroduodenal artery; (d) left branch of hepatic artery; (e) hepatic artery; (f) left choledochal artery; (g) common hepatic artery; (h) gastroduodenal artery.

Classification of gallstone

1. Cholesterol stones

- Often solitary, large & smooth.

2. Mixed stones

- Cholesterol is the major component.
- Other components include Ca bilirubinate, Ca phosphate, Ca carbonate, Ca palmitate, & proteins.
- Usually they are multiple, & often faceted.

3. Pigment stones

- Ca bilirubinate.
- Mostly small, black, & multiple.

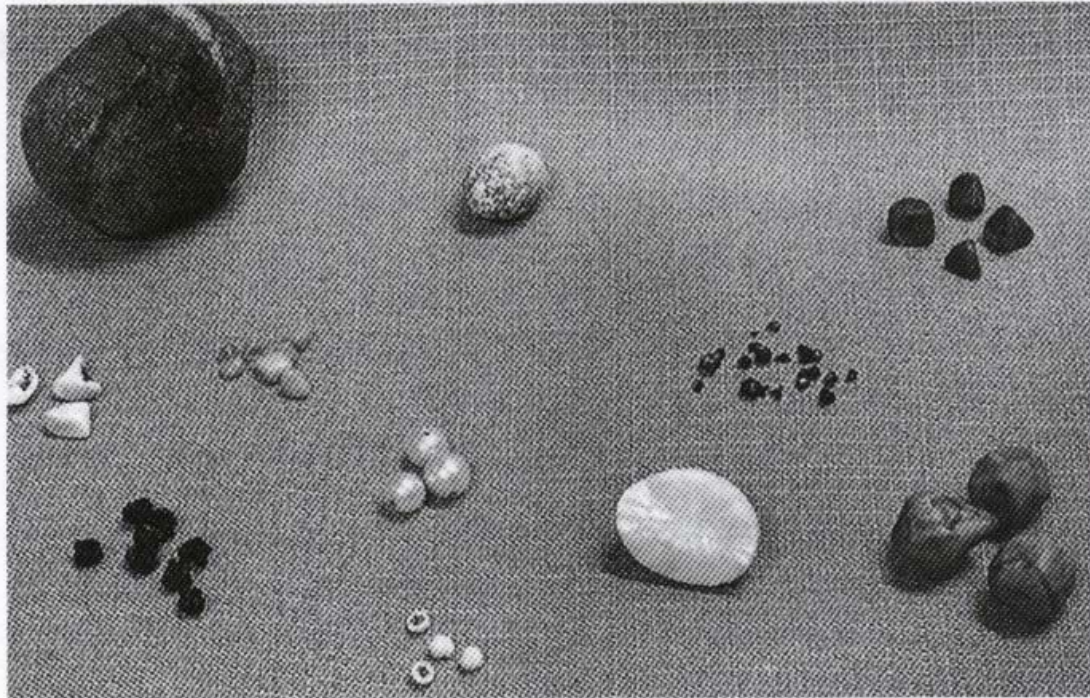


Fig. 54.30 Gallstones. Note, however, the three pearls, which are usually formed of calcium carbonate in the oyster around a parasite or a grain of sand.

Etiology

Predisposing Factors

1. Fat
2. Fertile
3. Flatulent
4. Female
5. Fifty

Exciting factors for cholesterol & mixed stones

- Metabolic (supersaturated or lithogenic bile)
 - Conditions increasing bile cholesterol
 - Aging
 - Women, esp. those taking contraceptive pills
 - Obesity
 - Clofibrate
 - Conditions decreasing bile salts in bile
 - Estrogen
 - Ileal disease
 - Resection or bypass of ileum
 - Cholestyramine therapy
- Infection
- Bile stasis
 - Estrogens
 - Pregnancy
 - Truncal vagotomy
 - Long-term parenteral nutrition

Exciting factors for pigment stones

- **Hemolytic disorders**
 - Hereditary spherocytosis.
 - Sickle-cell anemia.
 - Thalassemia.
 - Malaria.
 - Mechanical destruction of RBCs by prosthetic heart valves.
- **Cirrhosis.**
- **Strictures of biliary ducts**
 - Benign
 - Malignant
- **Infestation of biliary tree**
 - *Ascaris lumbricoides*
 - *Clonorchis sinensis*.
- **E coli infection**
 - β -glucuronidase converts bilirubin into unconjugated, insoluble form.

Pathogenesis

Pathogenesis of stone formation is different for cholesterol stones, soft brown stones, and pigment stones

Cholesterol stones

Reduced antinucleating factors in bile

Excess cholesterol in bile

Western diet
Obesity
Pregnancy
Oral contraceptive

Reduced bile salt excretion

Terminal ileal Crohn's
Ileal resection

Crystal formation

Growth into stones

Reduced gallbladder motility

Vagotomy
Octreotide
Prolonged fasting

Mixed or soft stones

Cholesterol crystals or other debris

Bacterial colonization

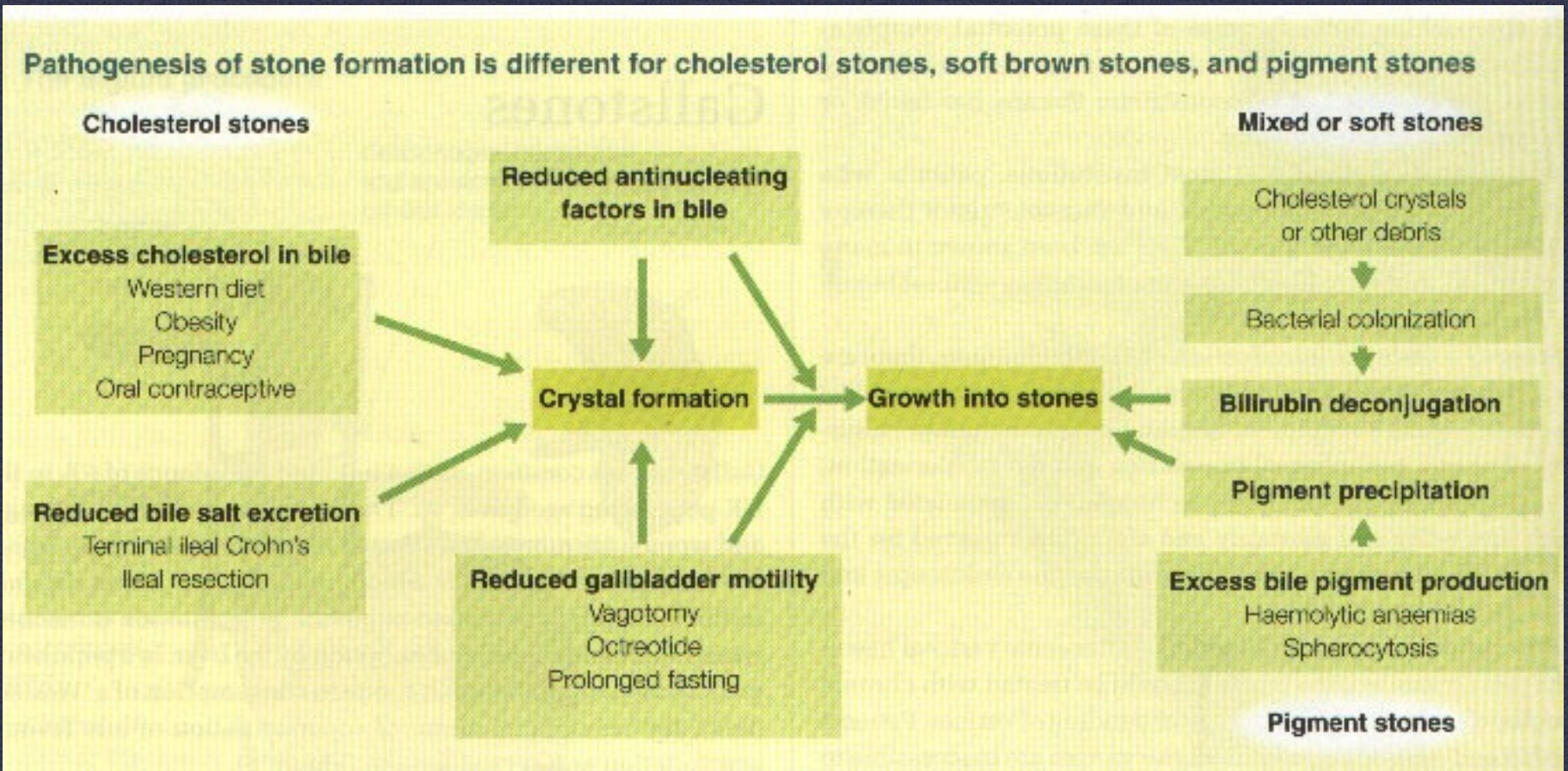
Bilirubin deconjugation

Pigment precipitation

Excess bile pigment production

Haemolytic anaemias
Spherocytosis

Pigment stones

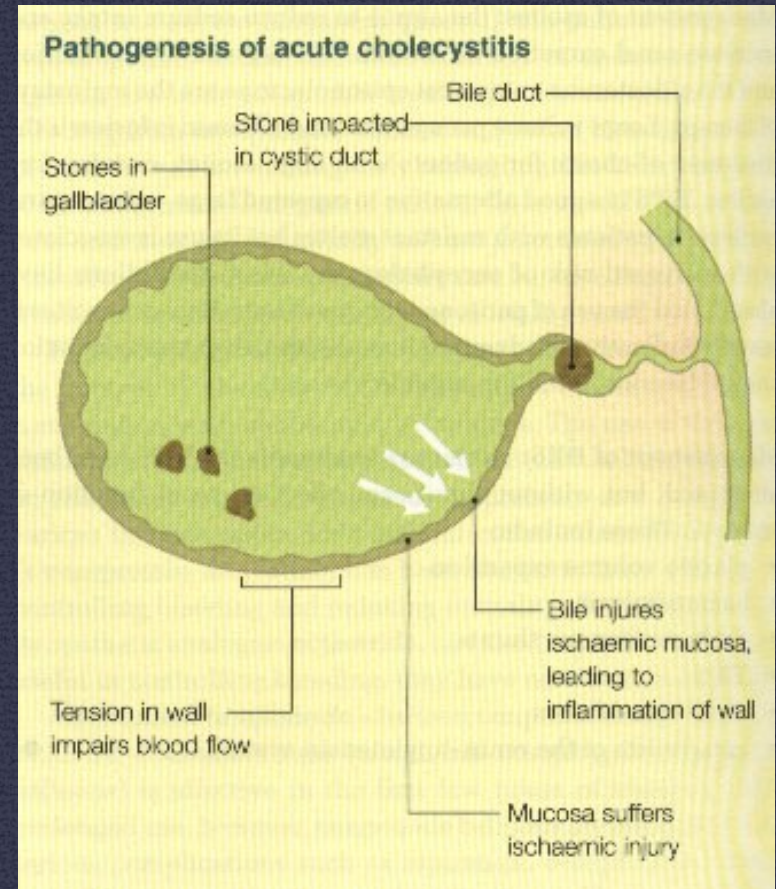


Clinical presentation

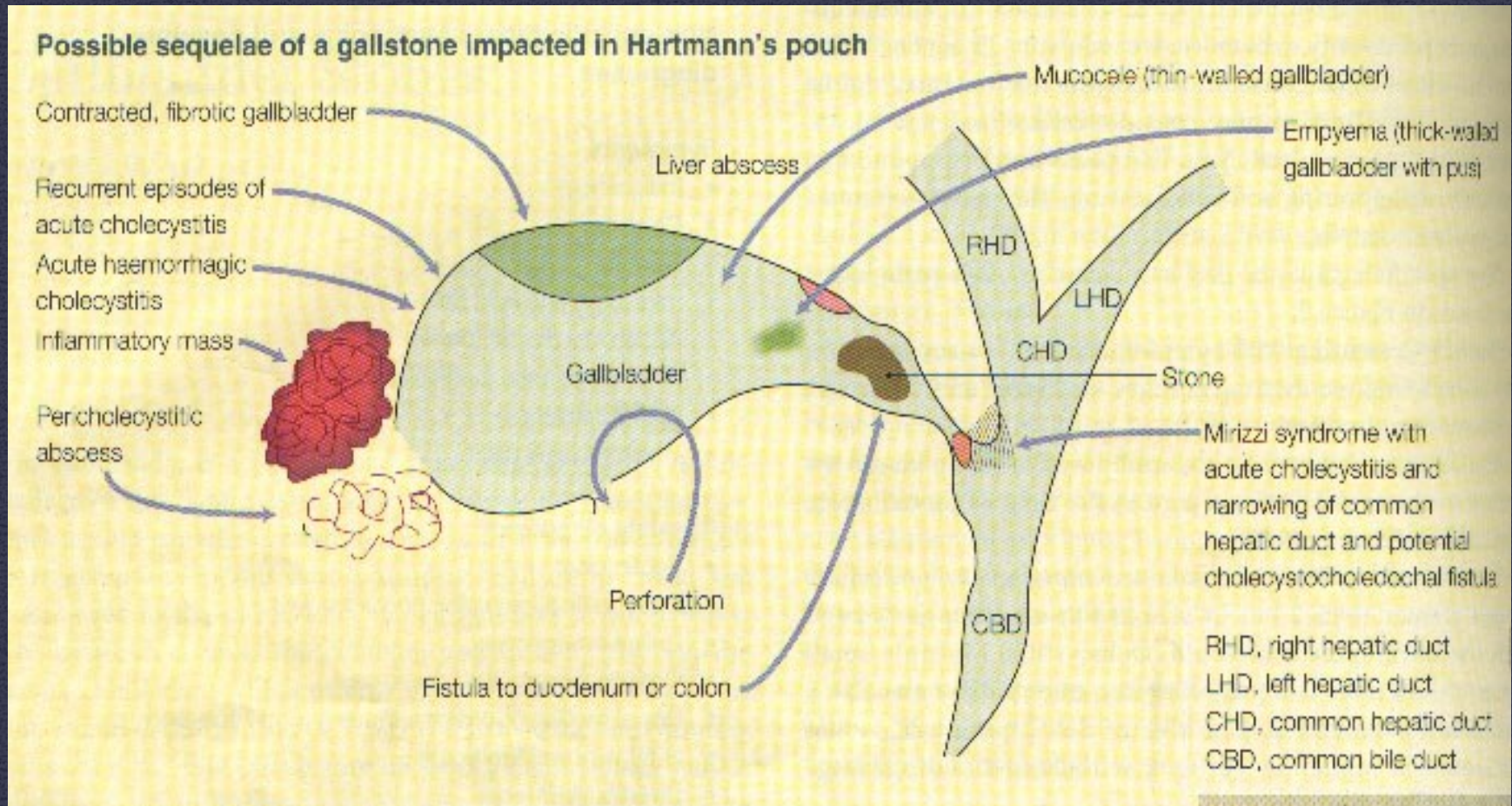
- **In the gallbladder**
 - Silent stones
 - Chronic cholecystitis
 - Acute-on-chronic cholecystitis
 - Acute cholecystitis
 - Gangrene
 - Perforation
 - Empyema
 - Mucocele
 - Carcinoma of gallbladder
- **In the bile ducts**
 - Obstructive jaundice
 - Cholangitis
 - Acute pancreatitis
- **In the intestine**
 - Acute intestinal obstruction (gallstone ileus)

Cholecystitis

- Chronic & acute calculous cholecystitis are part of the same spectrum of disease & are caused by inflammation within the gallbladder secondary to obstruction of the cystic duct by stones.



Complications



Clinical features of cholecystitis

Symptoms

- **Pain**

- Right hypochondrium, radiating to back & shoulder.
- **Onset:**
 - Chronic attack begins gradually 15-30 min. after meal & last for 30-90 min.
 - Acute attack begin suddenly, or superimposed on chronic cholecystitis.
- **Duration:**
 - Chronic attack lasts for less than 12 hours.
 - Acute attack lasts for more than 12 hours.
- **Precipitated by:** Fatty food (chronic), & movement & breathing (acute).
- **Relieved by:** Nothing, except analgesic drugs.
- **Associated factors:** Nausea & vomiting; fever in acute attack.

- **Flatulent dyspepsia**

- Feeling of fullness after food associated with belching & heartburn.
- Brought on by a large or a fatty meal.

Signs

- **General signs (in acute cholecystitis)**

- Patient is distressed, & lies quietly, breathing shallowly.
- Tachycardia: 90-100 beats/min.
- Pyrexia: 37.8-38.8 °C, & there may be rigors.

- **Local signs**

- **Tenderness** in RHC (at gallbladder point).
- **Rigidity** in RHC (acute).
- **Murphy's** sign may be positive.
- A **mass**, consisting of inflamed gallbladder with adherent omentum attached, may be felt (acute).
- **Boas's** sign may be present (hyperesthesia between 9th & 11th ribs posteriorly on right side).

Sequelae of acute cholecystitis

- **Resolution**

- With certain degree of GB distension, mucosa is lifted away from sides of stone
 - Stone slipped back into body, & any mucoid or mucopurulent contents escape.

- **Impaction** persists leading to pyoceles

- **Perforation** of gallbladder

- Local abscess
- Generalized peritonitis

Investigations

- Blood CP
- LFTs
- Ultrasound
 - Show stones (acoustic shadow), pericholecystic fluid, biliary calculi & dilatation of biliary tree.
- OCG
 - Gallstones can be detected (filling defects).
- **Cholescintigraphy or HIDA Scan**
 - hepatobiliary iminodiacetic acid
- MRCP
- CT
 - Useful for patients in whom U/S is difficult eg, obese or those with excessive bowel gas.



Fig. 54.3 Plain radiograph showing radio-opaque stones in the gall bladder. Radio-opaque stones are rare (10 per cent).

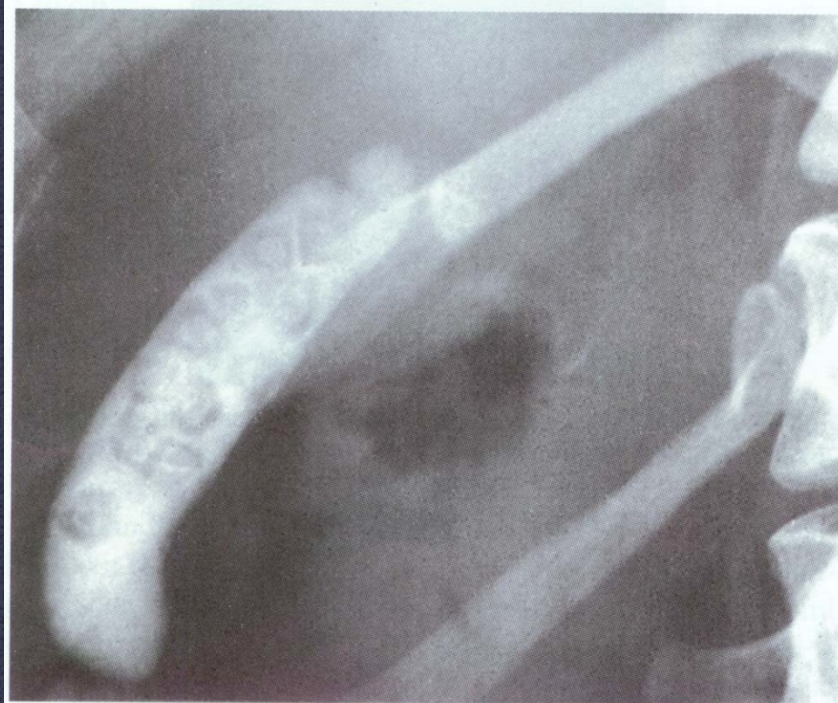


Fig. 54.5 Plain radiograph showing a gall bladder filled with limey bile. Gallstones are also present.

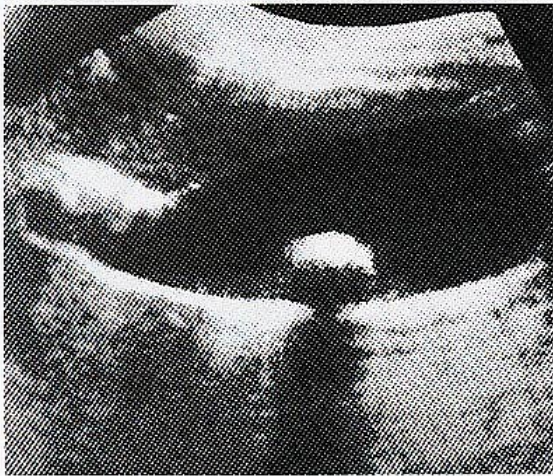


Fig. 54.9 Ultrasound examination. Single large gallstone casting an 'acoustic shadow' (courtesy of James McIvor, FDS, FRCR, London, England).



Fig. 54.8 Ultrasound examination. Multiple small gallstones filling part of the body and infundibulum of a large gall bladder (courtesy of James McIvor, FDS, FRCR, London, England).



Fig. 54.6 Nonopaque stones rendered visible by oral cholecystography.

(a)



(b)



Fig. 54.7 (a) A normal cholecystogram; (b) same gall bladder after a fatty meal.



Fig. 54.20 ERC: small, multiple stones in a dilated common bile duct following cholecystectomy.

Treatment

Treatment of acute cholecystitis

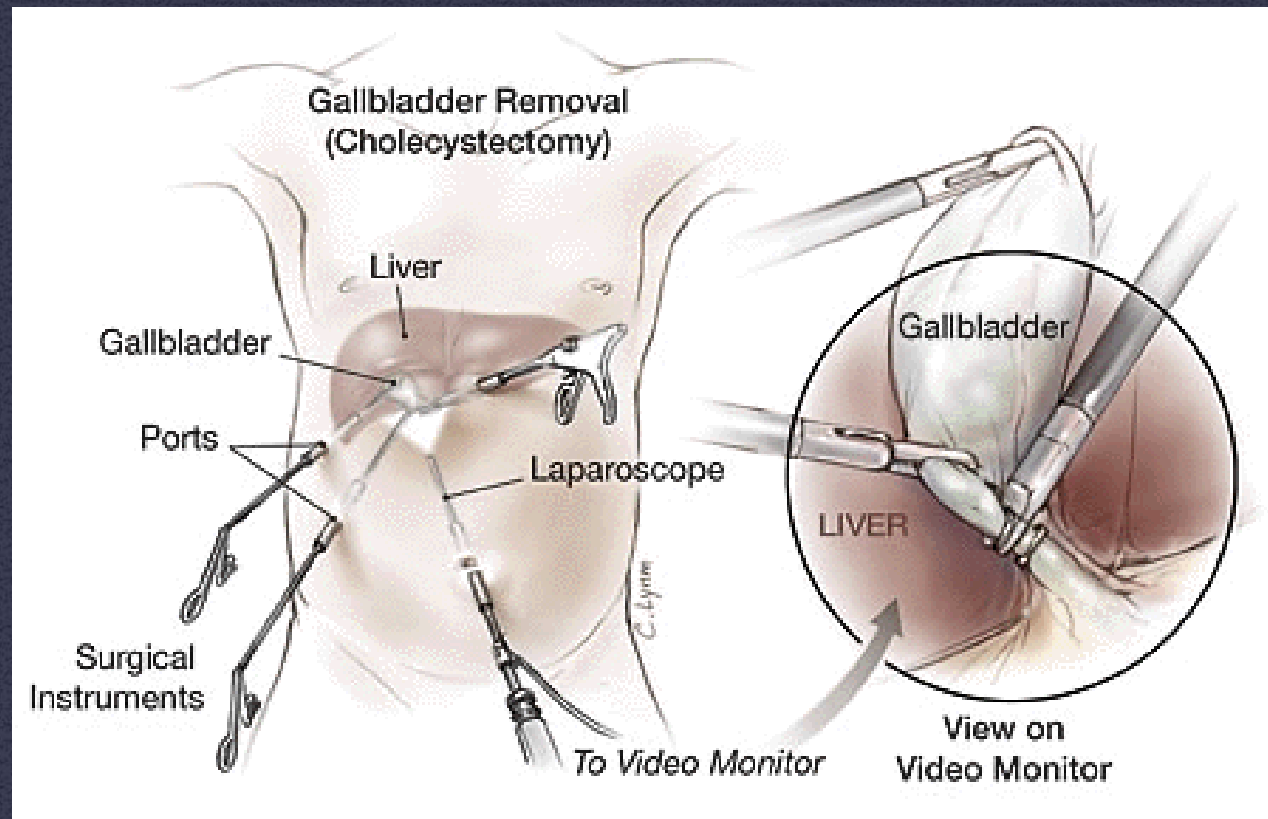
- **Conservative treatment followed by cholecystectomy**
 - Nasogastric aspiration.
 - Intravenous fluids.
 - Analgesics.
 - Antibiotics.
 - Cholecystectomy may either be performed on the next available list, or 6 weeks later.
- **Routine early operation**

Treatment of cholelithiasis & chronic cholecystitis

- Non-surgical treatment
 - No treatment if asymptomatic or very frail
 - Analgesics & low-fat diet (for pain).
 - Medical dissolution of gallstones
 - Bile acids, Chenodeoxycholic acid, Ursodeoxycholic acid.
 - Local dissolution of gallstones
 - Methyl ter-butyl ether (MTBE).
 - Lithotripsy

Treatment of cholelithiasis & chronic cholecystitis

- Surgical treatment
 - Open cholecystectomy
 - Laparoscopic cholecystectomy
 - Minicholecystectomy
 - Cholecystostomy
 - Percutaneous cholecystolithotomy



The End!