

2ND YEAR / GIT BLOCK

MED TEAMS 431

2012

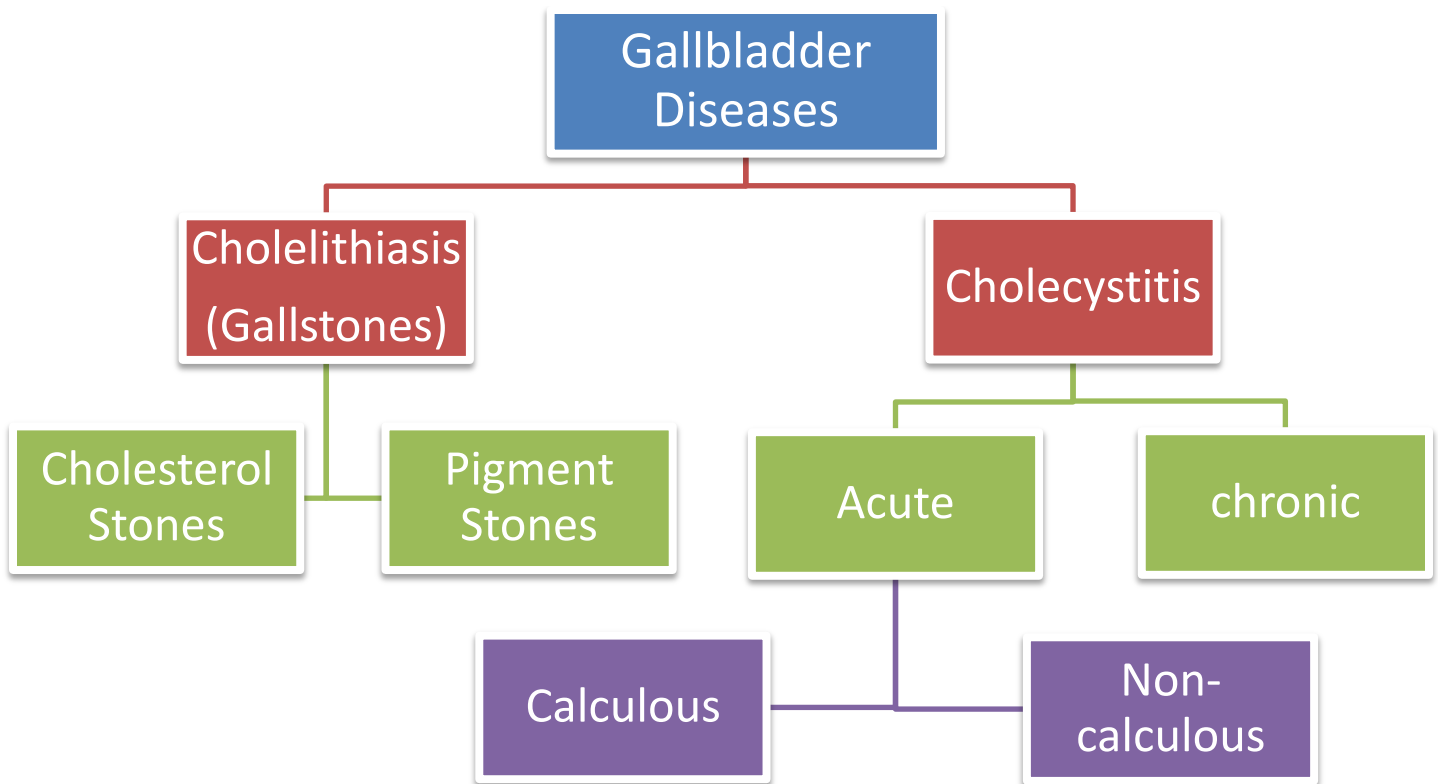
# PATHOLOGY TEAM

Pathology and pathogenesis

# Cholecystitis

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### Disorders of the Gallbladder CHOLELITHIASIS (GALLSTONES)

- Majority of gallstones (>80%) are "silent," and most individuals remain free of biliary pain or stone complications for decades.
- There are two main types of gallstones. About 80% are cholesterol stones, containing more than 50% of crystalline cholesterol monohydrate. The remainder are composed predominantly of bilirubin calcium salts and are designated pigment stones.

### **Pathogenesis of Cholesterol Stones:**

Cholesterol is rendered soluble in bile by aggregation with water-soluble bile salts and water-insoluble lecithins, both of which act as detergents.

When cholesterol concentrations exceed the solubilizing capacity of bile (supersaturation), cholesterol can no longer remain dispersed and nucleates into solid cholesterol monohydrate crystals.

## Cholesterol gallstone formation involves four simultaneous defects:

- 1-**Supersaturation** of bile with cholesterol is the result of hepatocellular hypersecretion of cholesterol.
- 2-**Gallbladder hypomotility ensues**. It promotes nucleation typically around a calcium salt crystal nidus.
- 3-Cholesterol nucleation (**formation of crystals**) in bile is accelerated.
- 4-**Mucus hypersecretion** in the gallbladder traps the crystals, permitting their aggregation into stones.

prolonged fasting, pregnancy, rapid weight loss, total parenteral nutrition, and spinal cord injury also promote stone formation.

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<b>Risk factors</b>	<b>Demography: Northern Europe, North and South America, Native Americans, Mexican Americans</b>
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**Advancing age**

Female sex hormones

**Female gender**

Oral contraceptives

Pregnancy , **Obesity**, Rapid weight reduction  
Gallbladder stasis , Inborn disorders of bile acid metabolism ,  
Hyperlipidemia syndromes

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## Pathogenesis of Pigment Stones:

Pathogenesis of pigment stones is based on the presence in the biliary tract of **unconjugated bilirubin** (which is poorly soluble in water) and precipitation of **calcium bilirubin salts**.

Thus, infection of the biliary tract, such as: bacterial infections; **E.coli infection** (the most common one) or parasitic infections; **Ascaris lumbricoides** or by the liver fluke *Opisthorchis sinensis* (parasitic in the liver and biliary tract), increases the likelihood of pigment stone formation.

**Chronic hemolytic** conditions also promote formation of unconjugated bilirubin in the biliary tree.


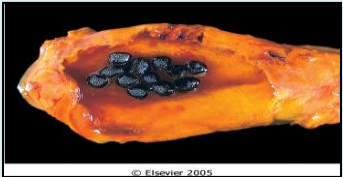
**Risk factors**      **Demography: Asian more than Western, rural more than urban**

**Chronic hemolytic syndromes**

**Biliary infection**

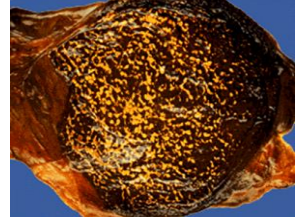
Gastrointestinal disorders: ileal disease (e.g., Crohn disease), ileal resection or bypass, cystic fibrosis with pancreatic insufficiency

### Cholelithiasis

Type	cholesterol	pigment
color	pale yellow	black and brown
location	gallbladder	"Black" pigment stones are found in sterile gallbladder. "Brown" pigment stones are found in <b>infected</b> intrahepatic or extrahepatic bile ducts.
Composed of	cholesterol ranging from 100% pure (which is rare) down to around 50%.	unconjugated bilirubin, calcium carbonates and phosphates
Features	<ul style="list-style-type: none"><li>- round to ovoid to faceted,</li><li>- finely granular</li><li>- <b>hard external surface.</b></li></ul>	<ul style="list-style-type: none"><li>- Both are <b>soft and usually multiple.</b></li><li>- Brown stone are greasy.</li></ul>
Grossly		

## Cholesterolosis:

An incidental finding, **cholesterolosis** is **Cholesterol hypersecretion by the liver** promotes excessive accumulation of cholesterol esters within the lamina propria of the gallbladder. The mucosal surface is studded with minute yellow flecks, producing the "**strawberry gallbladder**".



## Clinical Features:

70% to 80% of patients remain asymptomatic throughout their lives.

Symptoms: spasmodic or "**colicky**" **fight upper quadrant pain**, which tends to be excruciating and often **will radiate to the right shoulder**. It is usually due to obstruction of bile ducts by passing stones.

More severe **complications include empyema**, perforation, fistulae, inflammation of the biliary tree (cholangitis), and obstructive cholestasis or pancreatitis with ensuing problems. The larger the calculi, the less likely they are to enter the cystic or common ducts to produce obstruction; **it is the very small stones, or "gravel," that are the more dangerous**. Occasionally, a large stone may erode directly into an adjacent loop of small bowel, generating intestinal obstruction ("gallstone ileus"). Most notable is the increased risk for carcinoma of the gallbladder.

## 2. Cholecystitis:

**Definition:** inflammation of the gallbladder that may be acute, chronic, or acute superimposed on chronic.

It almost always occurs in association with gallstones.

### **Acute Cholecystitis:**

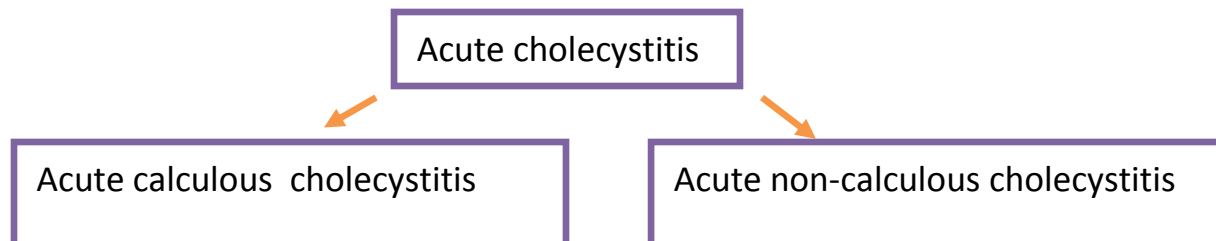
Acute calculous cholecystitis is an acute inflammation of the gallbladder, precipitated 90% of the time **by obstruction of the neck or cystic duct**.

**It is the primary complication of gallstones** and the most common reason for emergency cholecystectomy.

Acute acalculous cholecystitis occurs in the absence of gallstones, generally in severely ill patient.

### Most cases of occur in the following circumstances:

- (1) the postoperative state after major, nonbiliary surgery
- (2) severe trauma (motor vehicle accidents, war injuries)
- (3) severe burns
- (4) multisystem organ failure
- (5) sepsis
- (6) prolonged intravenous hyperalimentation
- (7) the postpartum state.



### Acute calculous cholecystitis:

results from chemical irritation and inflammation of the obstructed gallbladder. These events occur in **the absence of bacterial infection**; only later in the course may bacterial contamination develop.

### Acute non-calculous cholecystitis :

5%-12% of gallbladder removed from acute cholecystitis **contains NO gallstone**

### Acute Cholecystitis Morphology:

In **acute cholecystitis**, the gallbladder is usually enlarged and tense, and bright red to green-black. The serosal covering is frequently layered by fibrin and, in severe cases, by exudate.

There are no morphologic differences between acute acalculous and calculous cholecystitis, except for the absence of macroscopic stones in the former. In the latter instance, an obstructing stone is usually present in the neck of the gallbladder or the cystic duct.

The gallbladder lumen is filled with a cloudy or turbid bile that may contain fibrin and frank pus, as well as hemorrhage. When the contained exudate is virtually pure pus, the condition is referred to as **empyema of the gallbladder**.

In mild cases, the gallbladder wall is thickened, edematous, and hyperemic.

In more severe cases, it is transformed into a green-black necrotic organ, termed **gangrenous cholecystitis**, with small-to-large perforations.



### Clinical Features:

**Progressive right upper quadrant or epigastric pain**, frequently associated with mild fever, anorexia, tachycardia, sweating, and nausea and vomiting. The upper abdomen is tender. Most patients are free of jaundice

Acute calculous cholecystitis may appear with remarkable suddenness and constitute an acute surgical emergency or may present with mild symptoms that resolve without medical intervention.

Clinical symptoms of **acute acalculous cholecystitis** tend to be more **insidious**, since symptoms are obscured by the underlying conditions precipitating the attacks. A higher proportion of patients have no symptoms referable to the gallbladder. The incidence of gangrene and perforation is much higher than in calculous cholecystitis.

### Chronic cholecystitis:

Chronic cholecystitis may be a sequel to repeated bouts of mild to severe acute cholecystitis, but in many instances, it develops in the apparent absence of antecedent attacks.

**It is associated with cholelithiasis in over 90% of cases.**

The symptoms of calculous chronic cholecystitis are similar to those of the acute form and range from biliary colic to indolent right upper quadrant pain and epigastric distress.

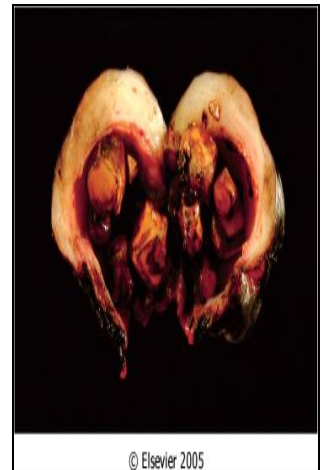
Patients often have intolerance to fatty food, belching and postprandial epigastric distress, sometimes include nausea and vomiting.



## Morphology:

The morphologic changes in chronic cholecystitis are extremely variable and sometimes minimal. Gall bladder may be contracted (**fibrosis**), normal in size or enlarged (from obstruction). The wall is variably thickened. Stones are frequent.

- On histology, the degree of inflammation is variable. Outpouchings of the mucosal epithelium through the wall (**Rokitansky-Aschoff sinuses**) may be quite prominent.
- Rarely, extensive dystrophic calcification within the gallbladder wall may yield a **porcelain gallbladder**, notable for a markedly increased incidence of associated cancer.
- **Xanthogranulomatous cholecystitis** is also a rare condition in which the gallbladder is shrunken, nodular, fibrosed and chronically inflamed with abundant lipid filled macrophages.
- Finally, an atrophic, chronically obstructed gallbladder may contain only clear secretions, a condition known as **hydrops of the gallbladder**.



## Complications: acute and chronic cholecystitis

1. **Bacterial superinfection with cholangitis or sepsis**
2. GB perforation & local abscess formation
3. GB rupture with diffuse peritonitis
4. Biliary enteric (cholecystenteric) fistula with drainage of bile into adjacent organs, and potentially gallstone-induced intestinal obstruction (ileus)

Fistula between gallbladder and small intestine leading to air in the biliary tree if gallstone obstructs ileocecal valve (gallstone ileus )

5. Aggravation of pre-existing medical illness, with cardiac, pulmonary, renal, or liver decompensation

Most often cause of cholecystitis ?

Gallstones

Biliary stone can obstruct the common bile duct and may present without pain (like MD patients)



summary Robbins :

Gallbladder disease include cholelithiasis and acute and chronic cholecystitis

Gallstone formation is a common condition in western countries the greater majority of gallstones are cholesterol stones pigmented stones containing bilirubin and ca are most common in asian countries

Risk factors for the development of cholesterol stones are advancing age female gender estrogen use obesity and heredity

Cholecystitis almost always occur in association with cholelithiasis although in about 10%of cases it occur in the absence of gallstone

Acute calculous cholecystitis is most common reason for emergency cholecystectomy

### Questions:

**What's the primary complication of obstruction in the cystic duct by gallstones?**

- 1- Ascending cholangitis
- 2- Acute cholecystitis
- 3- Cancer of gallbladder

**Khalid diagnosis with cholecystitis when they remove the gallbladder they found thickening of submucosa and mucosa this morphology can seen in:**

- 1-chronic cholecystitis
- 2- Acute cholecystitis
- 3-pigment gallstone

Answers :2,1