

A Brief Concept of Gallstones Diseases

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The Anatomy

- The gallbladder lies on the under surface of the liver
- It is a pea shaped structure
- That has a capacity of up to 50 ml
- Its divided into a fundus, a body, a neck and infundibulum
- It`s muscles are in a criss cross manner
- It is connected to the common hepatic duct by the cystic duct which is usually about 3 cm long with a luminal diameter of about 2mm to form the common bile duct
- The wall of the cystic duct is surrounded by the sphincter of lutken`s
- The common hepatic duct is formed by the union of the left and right hepatic duct
- The common bile duct is about 7.5 cm long and is formed by the junction of the cystic duct and the common hepatic duct
- The common bile duct is divided into four parts according to its relationship to the duodenum
 1. Supraduodenal part running in the lesser omentum
 2. Retroduodenal part
 3. Infraduodenal part running on the posterior surface of the pancreas
 4. Intraduodenal part which enters the second part of the duodenum and is surrounded by the sphincter of Oddi

Blood supply of the gallbladder

- It is supplied by the cystic artery which is a branch of the right hepatic artery
- It passes behind the common hepatic duct
- It may arise from the gastroduodenal artery
- The cystic artery may cross in front of the common hepatic duct in 15% of people
- The Caterpillar turn is of great clinical importance as it represents technical difficulty in cholecystectomy, it is a condition in which the hepatic artery takes a tortious course at the origin of the cystic duct

Lymphatic drainage

- The gallbladder drains into the cystic lymphnode of Lund which arise at the junction of the cystic and the common hepatic duct, then it drains to the lymph nodes at the porta hepatis and to the celiac lymphnodes
- It is also connected to the subcapsular liver lymphnodes

The physiology of the gallbladder

- The functions of the gallbladder are
 1. Storage of bile
 2. Concentration of bile
 3. Secretion of mucous
- If a person is fasting then the sphincter of Oddi is contracting making it difficult for bile to get into the duodenum so bile will be diverted into the gallbladder where it will be stored
- When that person is eating a hormone known as CCK (cholecystokinin) will be secreted from the duodenal mucosa and it is going to contract the gallbladder and relax the sphincter of Oddi giving bile a way to get into the duodenum
- The gallbladder concentrates bile 5 – 10 times
- It also secretes about 20 ml of mucous
- Bile is composed of
 1. 97% water
 2. Bile salt
 3. Bile pigment
 4. Cholesterol and fatty acid

Epidemiology of gallstone diseases

- It affects 10 -15 % of people
- It is commonly asymptomatic
- And it results in cholecystectomy being the most commonly performed operation in general surgical practice

Causes of gallstones

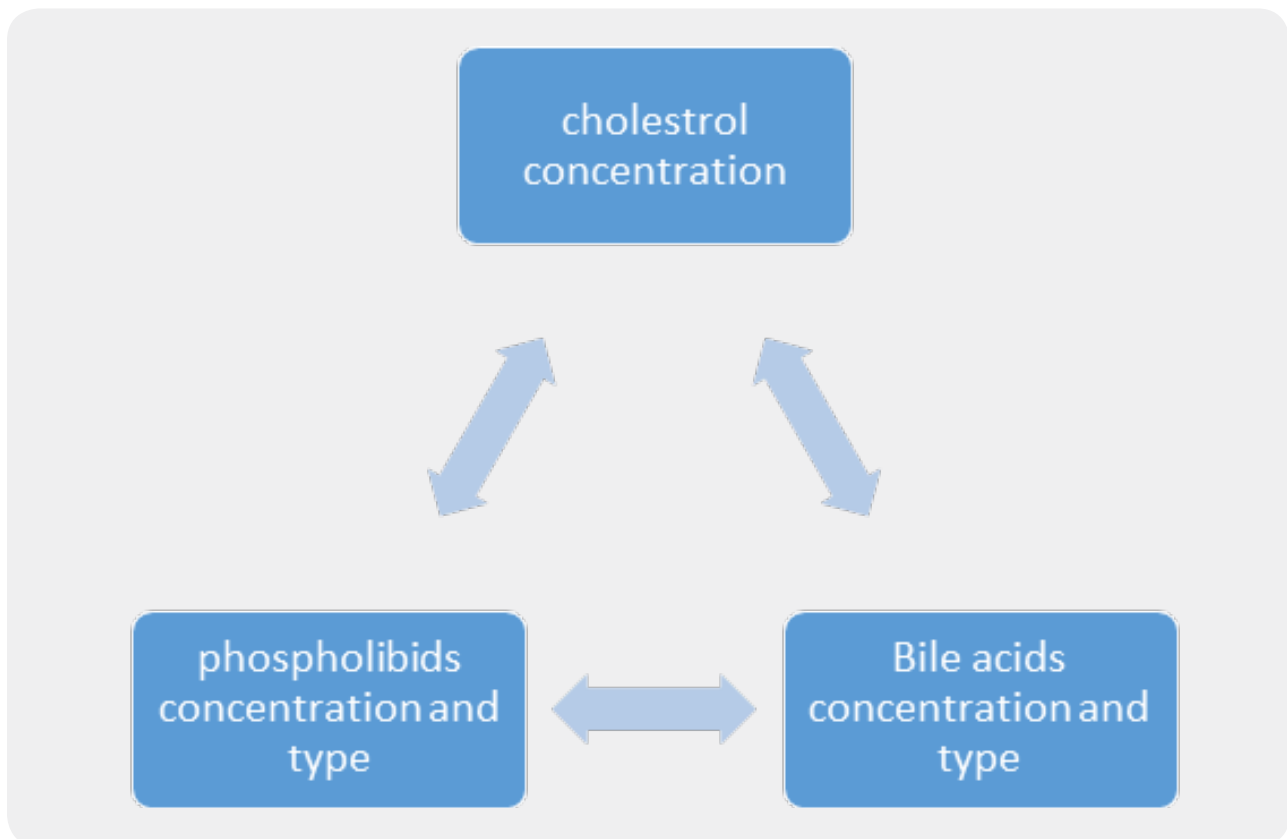
There are principally three types of gallstones

1. Cholesterol stones
2. Pigment stones
3. Mixed stones

How cholesterol gallstones are formed?

Formation of cholesterol gallstones depends on a delicate balance between the Concentration of Bile Acid and Phospholipids and the Type of Phospholipids and Bile Acids.

So if cholesterol concentration is high and bile salt is low cholesterol precipitates and forms crystals.



What are the factors that increase cholesterol concentration?

1. Obesity
2. High calorie diet
3. Medications
4. Abnormal gall bladder emptying

How pigment stones are formed?

- It is due to bacterial deconjugation of bilirubin diglucuronide
- Pigment stones are stones that contain less than 30% cholesterol
- They are of two types Black and Brown
- Black stones are formed from bilirubin and calcium phosphate and calcium bicarbonate
- Brown stones are formed from calcium bilirubinate calcium plamitate and calcium stearate

What are the factors associated with pigment gallstones formation?

1. Hemolysis (hereditary spherocytosis, sickle cell anemia)
2. Bile stasis and infected bile (brown stones)
3. Foreign bodies in the bile (stents and parasite)

How do patient with gallstone disease present?

It is not uncommon for gallstone disease to go unnoticed for quite some time before it causes significant symptoms to bring the patient to the hospital because more than 80% are asymptomatic, but when it becomes symptomatic it usually presents with

- Colicky right upper quadrant pain that radiates to the back
- Dyspepsia
- Gases
- Intolerance to fatty food
- Alteration in bowel habits

What is biliary colic and how is it different from cholecystitis?

It is a severe colicky upper quadrant abdominal pain that is associated with nausea and vomiting, it comes and goes that last from minutes or hours, it is due to increased gallbladder motility trying to get rid of the stones, the episode usually resolves and the patient eats and drinks normally.

When it does not resolve and is associated with Fever and High leucocyte count then it is a Cholecystitis.

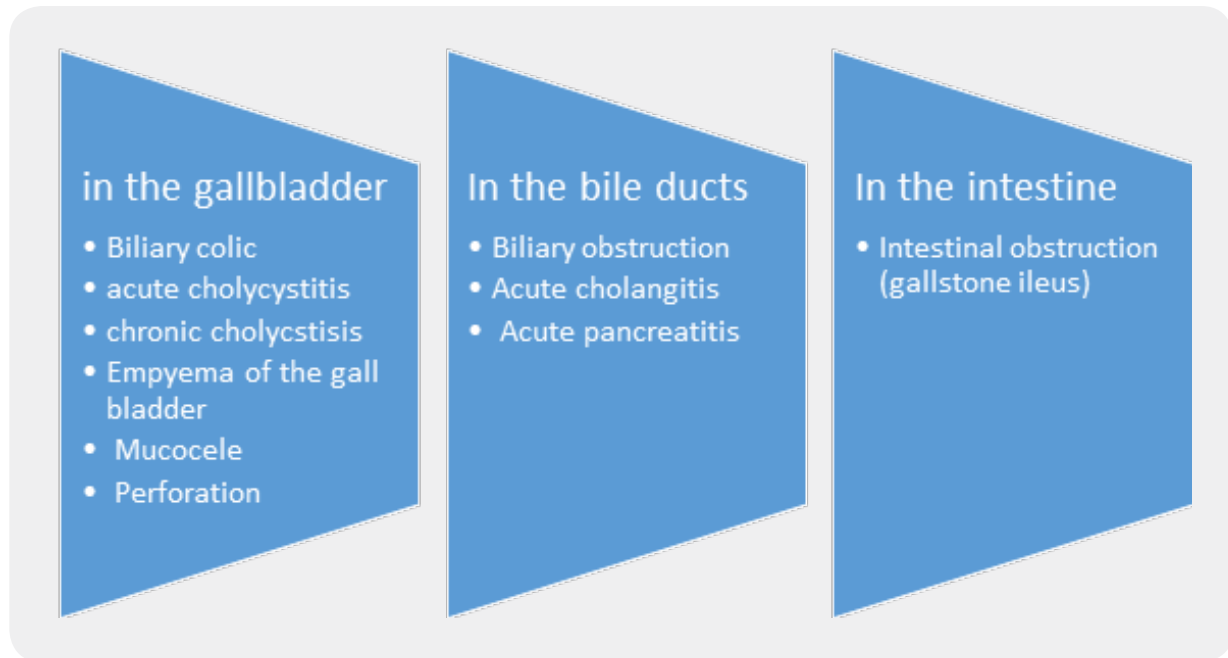
What is Murphy`S sign?

It is an upper quadrant abdominal tenderness that is brought on by palpating the right upper quadrant of the abdomen while asking the patient to take a deep breath, what happens is that when the patients breathe in the diaphragm pushes the liver with gallbladder downwards towards the examiner`s hand and when the inflamed gall bladder touches the it, the patient feels pain and holds his breath, it indicates acute inflammation of the gallbladder.

What is empyema of the Gallbladder and how do we treat it?

It is a complication of gallstone, in which the stone obstructs the neck of the gallbladder as the gallbladder starts to secrete mucous and since the way out is closed by the stone, the gallbladder starts to distend, sometimes it can distend to an enormous size. The treatment is drainage and later cholecystectomy.

What are the complications of gallstone?



What is Courvoisier's law?

It states that a palpable non tender gall bladder is unlikely to be due to gallstone, because the inflammation caused by the stone will make the gallbladder fibrosed and shrunken, Courvoisier's law suggest that a more serious cause is causing the gallbladder to distend, most likely a distal ductal obstruction like pancreatic carcinoma.

How to investigate patients with gallstone disease?

- Abdominal ultrasound it is the initial investigation of choice as it is inexpensive and non-invasive, but it has limitations
 1. It is operator dependent
 2. Cannot be relied on in fatty patients
 3. And when the bowl is full of gas
- Ultrasound will show the presence of gallstones, size of the gallbladder, thickness of the gallbladder and if it is inflamed or not, it can show stones in the CBD

- Radioisotope scan
- FBC for evidence of leukocytosis
- LFT
- Lipid profile
- Hemolytic anemia screen with pigment stones

How do we treat gallstone disease?

Surgical treatment is usually preserved for symptomatic patients, but there are some instances in which Prophylactic cholecystectomy is performed like

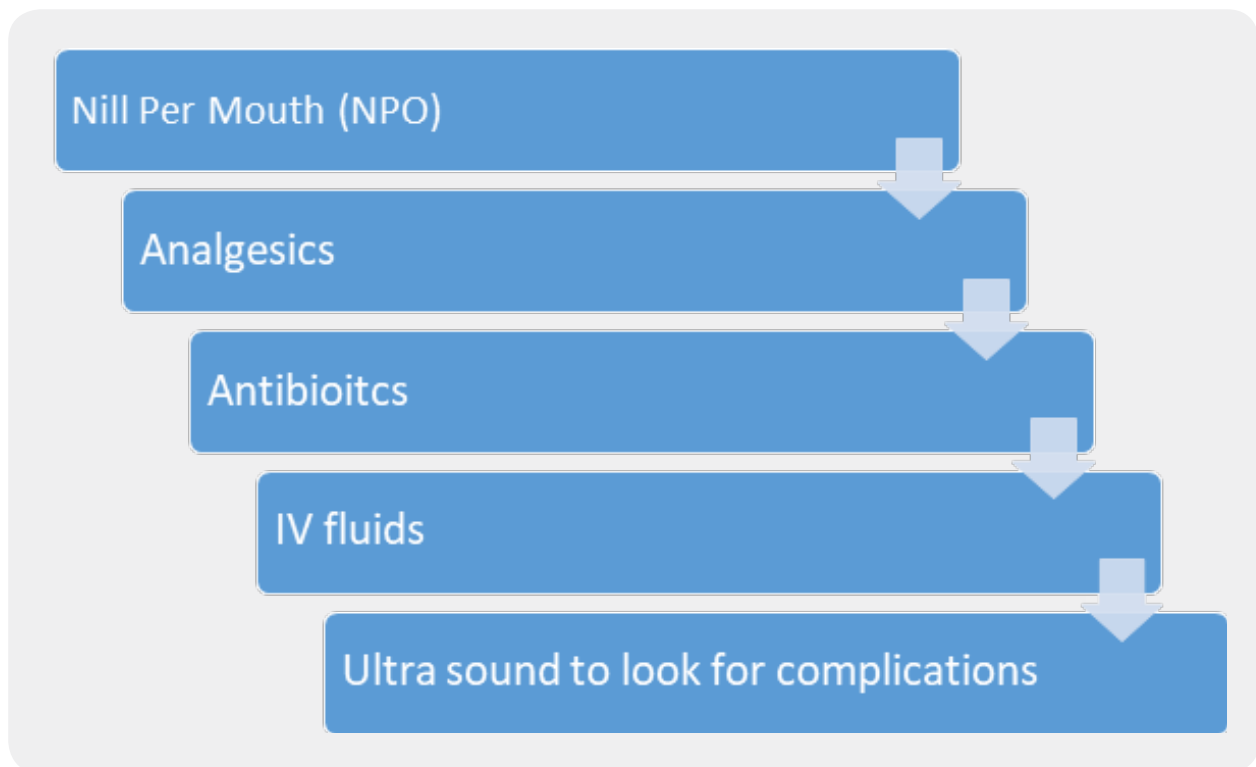
- Diabetic patients
- Congenital hemolytic anemia
- Planned for weight reduction surgery

Cholecystectomy is contraindicated in

- Active liver pathology
- Coagulation problem

What is the conservative treatment of acute cholecystitis?

- It is effective in 90% of patients
- It involves the following



When should the conservative management be changed to surgery?

If despite the conservative management pain and tenderness persist

Surgical management (cholecystectomy)

Preoperatively patients should have

- Proper history
- Cardiovascular respiratory system assessed
- FBC to check for anemia
- Blood coagulation checked
- Prophylactic antibiotic
- Renal profile
- Chest x Ray
- ECG
- Heparin and ant embolic stockings prescribed
- Informed consent

There are two types of cholecystectomy

1. Laparoscopic
2. open