

**“COMPREHENSIVE ANALYSIS OF COMPLICATIONS AND  
OUTCOME OF LAPAROSCOPIC CHOLECYSTECTOMY IN K.A.P.V.  
GOVT. MEDICAL COLLEGE & HOSPITAL”**

**Dissertation submitted**

**To**

**THE TAMILNADU DR. M.G.R.  
MEDICAL UNIVERSITY, CHENNAI**



**Registration Number: 221711554**

*With partial fulfilment of the regulations for the award of the degree of*

**M.S (General Surgery)**

**K.A.P.V GOVERNMENT MEDICAL COLLEGE & HOSPITAL,  
TRICHY - 620001.**

**MAY 2020**

## **DECLARATION BY THE CANDIDATE**

I hereby declare that this dissertation titled “**COMPREHENSIVE ANALYSIS OF COMPLICATIONS AND OUTCOME OF LAPAROSCOPIC CHOLECYSTECTOMY IN K.A.P.V. GOVT. MEDICAL COLLEGE & HOSPITAL**” is a bonafide and genuine research work carried out by me under the guidance of Prof. Dr. W. Edwina Vasantha M.S, D.G.O., Department of General Surgery, K.A.P.V government medical College, Trichy-01.

This dissertation is submitted to **THE TAMILNADU DR.M.G.R. MEDICAL UNIVERSITY CHENNAI**, in partial fulfilment of the degree of **M.S. General Surgery** examination to be held in **MAY 2020**.

Date :

**Dr. NR. ARUN BABU**

Place : Trichy

**POST GRADUATE**

**DEPARTMENT OF GENERAL SURGERY**

**M.G.M.G.H, TRICHY 620001**

## **CERTIFICATE BY THE GUIDE**

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**Prof. Dr. EDWINA VASANTHA M.S, DGO.,**  
Professor of the General Surgery,  
Department of General Surgery,  
K.A.P.V Govt. Medical college,  
Trichy – 01.

**Prof. Dr. YEGANATHAN M.S, DA.,**  
Professor & HOD ,  
Department of General Surgery,  
K.A.P.V Govt Medical college,  
Trichy – 01.

**Prof. Dr. A. ARSHIYA BEGUM M.D.,**  
DEAN,  
K.A.P.V Government Medical college,  
Trichy – 01.

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**Dr. NR. ARUNBABU,  
POST GRADUATE,  
DEPARTMENT OF GENERAL SURGERY,  
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GOVT. MEDICAL COLLEGE & HOSPITAL

**PRINCIPAL INVESTIGATOR:** **Dr. NR. ARUN BABU**

Post Graduate,

Department of General Surgery,

K.A.P.V. Govt medical college,

Tiruchirappalli.

**GUIDE/SUPERVISOR** : **Dr. W. Edwina Vasantha MS., DGO.,**

Professor of General Surgery,

Department of General Surgery,

K.A.P.V. Govt. Medical college,

Tiruchirappalli.

**CO-ORDINATOR** : **Dr. T. Durairajan MS.,**

Assistant Professor,

Department of General Surgery,

K.A.P.V. Govt. Medical college,

Tiruchirappalli

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## INTRODUCTION

In this modern era Laparoscopic surgery has evoked marked changes in approach to surgical diseases. The “Minimally invasive surgery “(MIS), now turned into “Minimal Access Surgery” (MAS) has prompted us to scrutinize nearly all operations for possible conversion to Laparoscopic technique<sup>1</sup> Gall stone disease is common in India, that too affecting mostly middle age group men and women. The classical open cholecystectomy and the minimally invasive laparoscopic cholecystectomy are two alternative operations for removal of the gallbladder. In my study I choose this topic as we post graduates and young surgeons of Trichy medical college who are in laparoscopic learning curve, under the guidance of professors and associate professors doing laparoscopic cholecystectomy and proposed for a comprehensive analysis of complications and outcome of Laparoscopic cholecystectomy and comparing the results with existing study. As per available data there are no significant differences in mortality and complications between the laparoscopic and the open techniques. The laparoscopic operation has advantages regarding duration of hospital stay and convalescence. With the advent of laparoscopic cholecystectomy, the scenario of surgical management of cholelithiasis has changed drastically. It has revolutionized the management of gallstones<sup>3</sup>Theoretical benefits of laparoscopic approach include reduced hospitalization and cost, decreased pain, avoidance of large incision with improved cosmetic purpose and reduced post-operative recovery time with an early return to work.

## **AIM OF THE STUDY**

Our aim of the study is to analyse the complications and outcome of laparoscopic cholecystectomy in our teaching institution.

1. Technique of surgery
2. Duration of surgery
3. Complications of surgery
4. Post-operative morbidity
5. Analgesic and antibiotic requirements
6. Hospital stay
7. Return to work

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**Duration of study** : one year

**Study design:** Prospective study

**Sample Size** : 60 cases

**Inclusion criteria:**

- Age between 25 to 70 years
- USG confirmation of GB calculus without obstructive features
- Cholelithiasis without choledocholithiasis or complications
- Cholelithiasis without anomalous biliary tract.

**Exclusion Criteria:**

- Age <25 or >70 years
- Features of obstructive jaundice
- Patient presenting with cholelithiasis and choledocholithiasis
- Patient presenting with gallbladder Malignancy
- Patient presenting with anomalous biliary tract.

**Data collection and methods:**

- History and clinical examination
- Investigations

## **MATERIALS AND METHODOLOGY**

My study is a prospective randomized study included 60 patients with gallstones, who were admitted to K.A.P.V Medical College & Hospital for the period of 15 months. The selection of procedure for laparoscopic cholecystectomy was decided depending up on the inclusion and exclusion criteria, exception when patient consent was not given for a particular procedure. Information was collected from the patients after a written valid informed consent from them. The study was approved by Ethical Committee. Patients between 25 years to 70 years with acute cholecystitis, or chronic cholecystitis and gall stones with or without pain abdomen, were included in the study. Patient's written valid informed consent for the particular procedure was taken. Patients less than 20 years and more than 70 years or those with Gall bladder cancer and Choledocholithiasis were excluded. This study involved preoperative assessment, intra-operative practice and post-operative management and follow up till 3 months. All the patients were studied with reference to duration of surgery, post-operative analgesia, post-operative stay and morbidity, intra operative and post-operative complications.

Patients were admitted for elective cholecystectomy, complete investigations performed required for confirming the diagnosis and surgical and anaesthesia fitness obtained. The investigations include complete Hemogram, Blood sugar level, Urine examination, Liver function test, Blood urea and serum creatinine, Chest x-ray, ECG and Ultrasonography of abdomen were considered. CT abdomen and MRCP is not included in my study as

complicated cases are excluded from the study, patients who requires CT & MRCP where invariable landed up in exclusion criteria. The patients were studied with respect to their clinical presentation and were diagnosed as patients with asymptomatic Gall stones, acute calculus cholecystitis and chronic calculus cholecystitis.

After complete investigations and after satisfying the inclusion and exclusion criteria for my study, patients were subjected to laparoscopic cholecystectomy. First dose of antibiotics administered to the patient just prior to incision, immediately after intubation. General anaesthesia was administered to all the patients. Foleys Catheterization and Ryle's tube insertion was done in all patients. Post-operative management included nil per oral till bowel sounds were heard. Intravenous fluids in the form of crystalloids, Broad-spectrum antibiotics Inj. cefotaxime were administered. Injection Amikacin and Injection Metronidazole were added in cases of bile leak. Analgesics in the form of Injection Tramadol were given. Top-up analgesia in the form of intramuscular Injection Diclofenac Sodium was given, whenever it was required. Discharge after start of oral diet and without any signs of postoperative wound infection after first dressing change. If sign of wound infection were present then pus from wound was taken and sent for microbiological culture and sensitivity testing. Appropriate antibiotics started after reports and wound care taken accordingly. All cases followed up.

## **REVIEW OF LITERATURE**

### **History**

The first clinical description of gallstone disease suggested by Gordon Taylor (1937)

The first successful cholecystectomy was performed by Carl Langebunch in 1882

### **Laparoscopic Cholecystectomy**

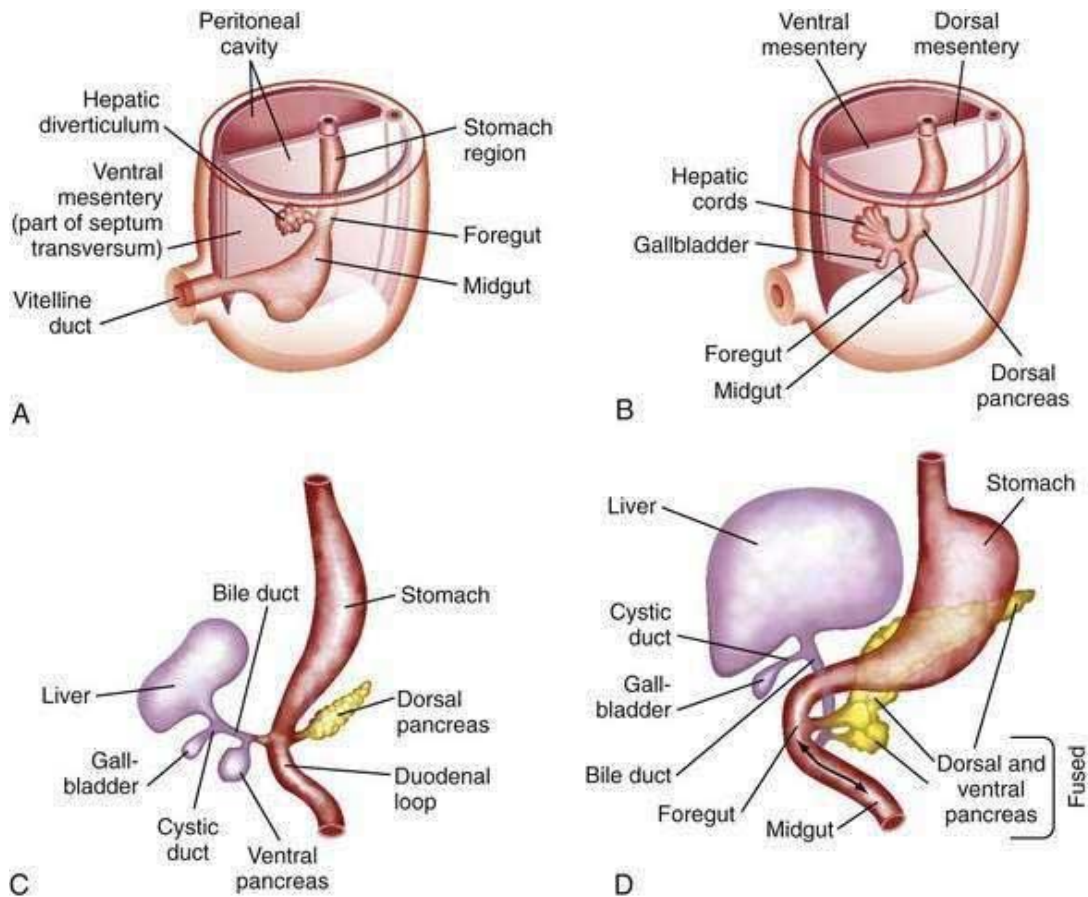
The first laparoscopic cholecystectomy was performed in 1987 by Philippe Mouret.

In India the first laparoscopic cholecystectomy was performed in Mumbai, JJ Hospital 1990. Now laparoscopic Cholecystectomy became the procedure of choice for Gallbladder disease.

### **EMBRYOLOGY OF BILIARY APPARATUS:**

- By 4<sup>th</sup> week of intrauterine life Liver develops from cranial bud of primitive gut. GB and Extra hepatic tracts develop from caudal buds. Pancreas and pancreatic ducts develop from the dorsal surface of the midgut.
- By 8<sup>th</sup> week, hepato biliary system is been formed.
- Physiological & Secretory function starts by 12 weeks of intra uterine life.





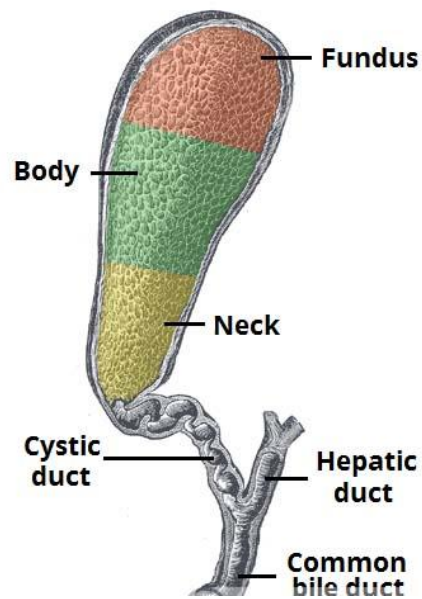
The gallbladder is a pear-shaped organ positioned between segments IV and V, along inner surface of liver.

Length of GB: 7 to 10 cm

Width of GB: 2.5 to 3.5 cm in width.

Gallbladder has been divided into four areas:

- fundus,
- body,
- infundibulum, and neck.
- Hartmann's pouch – A bulge in the infundibulum that lies close to the gallbladder's neck.



The gallbladder wall consists of five layers.

- Epithelium,
- lamina propria,
- smooth muscle,
- peri muscular Subserosal connective tissue, and
- serosa.

Remember: there is no muscularis mucosa or submucosa.

Rokitansky Asch off sinuses: (seen in 40% of individuals) Epithelium projection invaginates into the lamina propria, muscle, and Sub serosal connective tissue. During inflamed conditions they present in abundance

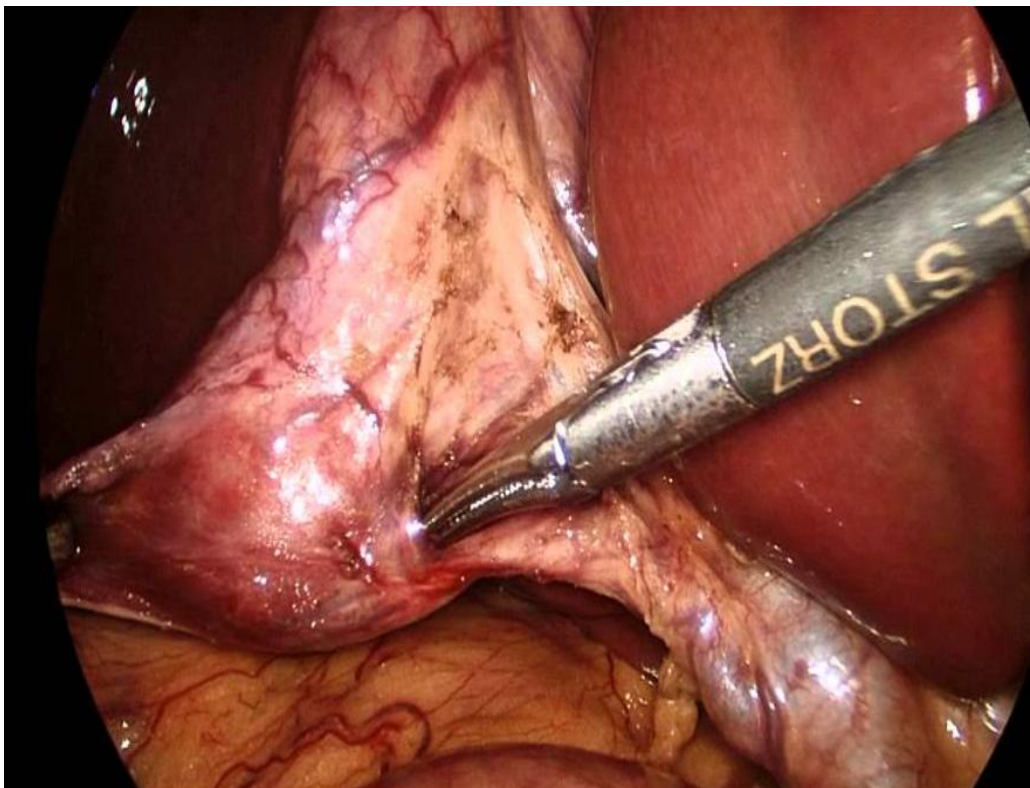
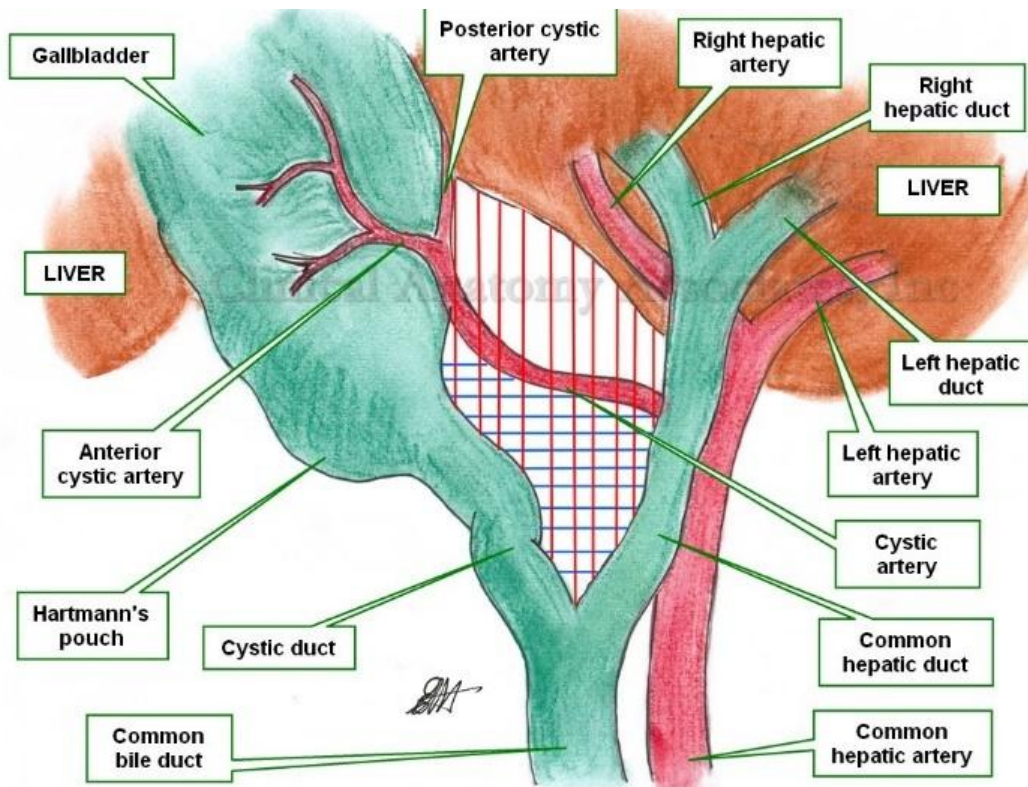
Ducts of Luschka: (10% seen normally) these are tiny bile ducts found in the muscle layer on the of the gallbladder on the hepatic surface. Usually not involved in pathological process. But they result in post-operative biliary leak.

The cystic duct (2 – 4 cm length) usually courses downward in the hepato duodenal ligament and joins at an acute angle on the lateral aspect of the supra duodenal portion of the common hepatic duct.

The cystic duct consists many of spiral mucosal folds called as valves of Heister. Normal variation in length and difference in union with the common hepatic duct should be bear in mind.

Calot (In 1891), described a triangular anatomic region formed by the common hepatic duct medially, the cystic duct laterally, and the cystic artery superiorly, known as Calot's triangle.<sup>5</sup>

Anatomical knowledge of Calot's triangle and demonstration is essential during performance of a cholecystectomy



**Calot's Triangle**

## Sphincter of Oddi

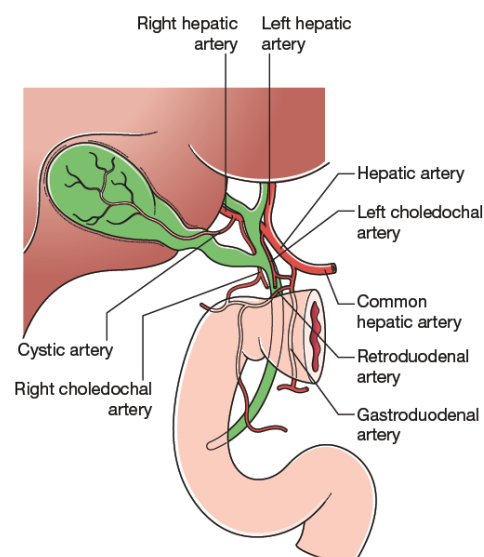
The entire sphincteric system of the distal bile duct and the pancreatic duct is commonly referred to as the sphincter of Oddi.

## Vascular

The blood supply to the right and left hepatic ducts and upper portion of the common hepatic duct is from the cystic artery and the right and left hepatic arteries. The supra-duodenal bile duct is supplied by arterial branches from the right hepatic, cystic, posterior superior pancreatico-duodenal, and retro duodenal arteries. They run parallel to the duct at the 3- and 9-o'clock positions.

Blood supply to the supraduodenal bile duct:

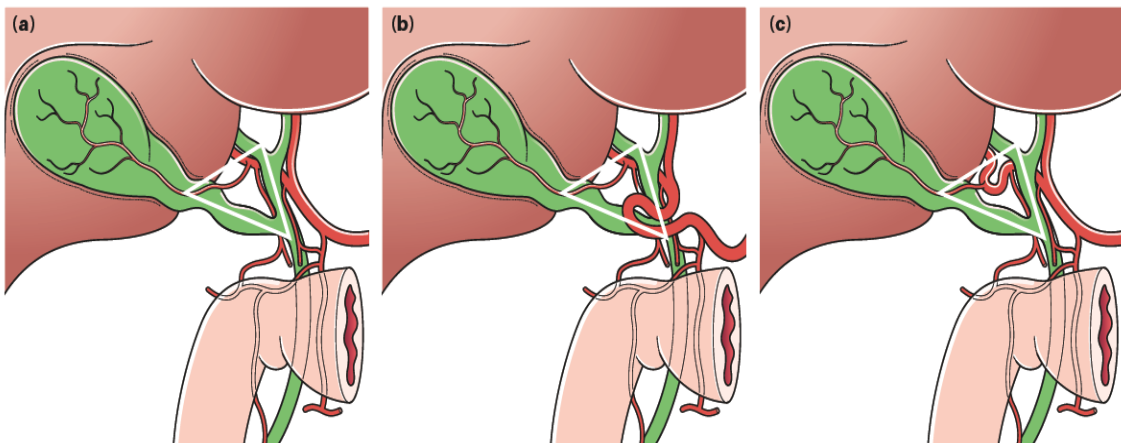
60% (inferiorly) from the pancreatico-duodenal and retroduodenal arteries, 38% (superiorly) from the right hepatic artery and cystic duct artery. Injury to this important axial blood supply may result in the formation of an ischemic ductal stricture. 2% of the supraduodenal bile duct is segmental (nonaxial), and they arise directly from the proper hepatic artery.



## **CYSTIC ARTERY COURSE:**

Within Calot's triangle: The cystic artery usually arises as a single branch from the right hepatic artery. Infrequently, the cystic artery may arise from the left hepatic, common hepatic, gastroduodenal, or superior mesenteric artery.

As it crosses Calot's triangle: Cystic artery often supplies the cystic duct with one or more small arterial branches. Near the gallbladder, the cystic artery usually divides into a superficial branch and a deep branch. The superficial branch of the cystic artery courses along the anterior surface of the gallbladder, whereas the deep branch passes between the gallbladder and liver within the cystic fossa.



## **Lymphatic Drainage**

Hepatic ducts and upper common bile duct: drain into the hepatic lymph nodes, (a chain of lymph nodes that follows the course of the hepatic artery to drain into the celiac lymph nodes)

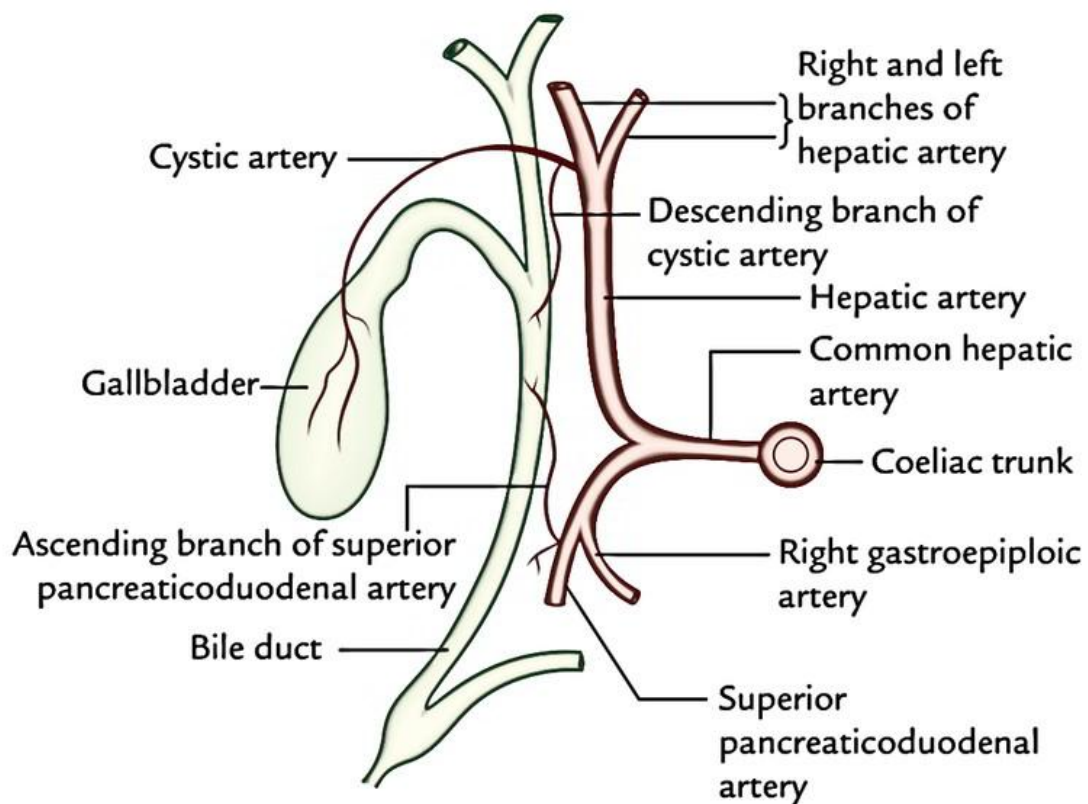
Lower bile duct: drains into the lower hepatic nodes as well as the upper pancreatic lymphnodes.

Gallbladder and cystic duct: drain primarily into the hepatic nodes by way of the cystic duct node, a constant lymph node located at the junction of the cystic duct and common hepatic duct.

Lymphatic vessels from the hepatic surface of the gallbladder may also communicate with lymphatic vessels within the liver.

### Neural Innervation

celiac plexus gives of sympathetic and parasympathetic nerve fibres to The gallbladder and biliary tree.



## **Anomalies of the Gallbladder**

### **Formation**

Phrygian cap

Bi lobed gallbladder

Hourglass gallbladder

Diverticulum of the gallbladder

Rudimentary gallbladder

### **Number**

Absence of the gallbladder (agenesis)

Duplication of the gallbladder

### **Position**

Floating gallbladder

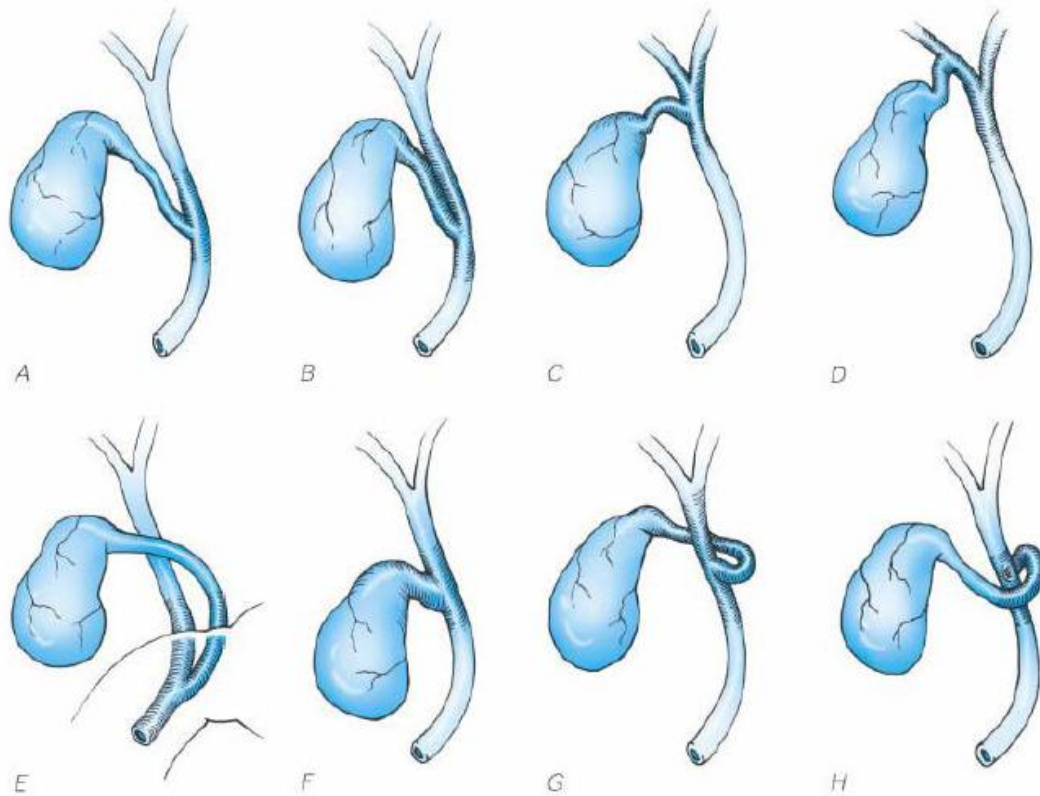
Intra hepatic gallbladder

Left-sided gallbladder

Transverse gallbladder

Retro displaced gallbladder





### **Variations of cystic duct anatomy**

- A. Low junction between the cystic duct and common hepatic duct.
- B. Cystic duct adherent to the common hepatic duct.
- C. High junction between the cystic and the common hepatic duct.
- D. The cystic duct drains into right hepatic duct.
- E. Long cystic duct that joins the common hepatic duct behind the duodenum.
- F. Absence of the cystic duct.
- G. The cystic duct crosses posterior to the common hepatic duct and joins it anteriorly.
- H. The cystic duct courses anterior to the common hepatic duct and joins it posteriorly.

## **PHYSIOLOGY**

### **Bile Formation and Composition:**

The bile is continuously produced in the liver and excreted out into the bile canaliculi.

The normal adult produces within the liver 500 to 1000 mL of bile a day.

The bile secretion is controlled by neurogenic, humoral, and chemical stimuli. Vagal stimulation increases bile secretion, whereas splanchnic nerve stimulation decreases bile flow.

Hydrochloric acid, partly digest proteins, and fatty acids in the duodenum and that stimulate the release of secretin from the duodenum which in turn, increases bile production and bile flow.

Bile flows from the liver to the hepatic ducts, to the common hepatic duct, through the common bile duct, and finally in to the duodenum.

Bile composition:

water,

electrolytes,

bile salts,

proteins,

lipids, and

bile pigments.

Sodium, potassium, calcium, and chlorine have the same concentration in bile as in plasma or extracellular fluid.

The pH of hepatic bile is usually neutral or slightly alkaline, but varies with diet; an increase in protein shifts the bile to a more acidic pH.

The liver synthesizes primary bile salts, cholate and chenodeoxycholate from cholesterol. These are conjugated there with taurine and glycine, and act as anions within the bile (bile acids) that are balanced by sodium.

Bile salts are excreted into the bile by the hepatocyte and aid in the digestion and absorption of fats in the intestines.

About 80% of the conjugated bile acids in the intestines, are absorbed in the terminal ileum. The remainder is dehydroxylated (deconjugated) by gut bacteria and forms secondary bile acids deoxycholate and lithocholate.

These are absorbed in the colon and transported to the liver, conjugated, and secreted in the bile. Eventually, about 95% of the bile acid pool is reabsorbed and returned via the portal venous system to the liver, this is known as entero hepatic circulation. 5% is excreted in the stool, leaving the small amount of bile acids to have maximum effect.

The principal lipids found in bile which are excreted by the liver are cholesterol and phospholipids.

The bile colour is due to the presence of the pigment bilirubin diglucuronide, which is the metabolic product from the breakdown of haemoglobin, and its concentrations in bile is 100 times greater than in plasma.

Once in the intestine, bacteria convert the bile into urobilinogen, a small fraction of which is absorbed and secreted again into the bile.

## **Absorption and Secretion**

In fasting state, approximately 80% of the bile is stored in the gallbladder. This storage is made possible because of the absorptive capacity of the gallbladder, its mucosa has the greatest absorptive power per unit area of any structure in the body.

It rapidly absorbs electrolytes like sodium, chloride, and water against a significant concentration gradient, and the bile is concentrated up to 10-fold and leading to a marked change in the composition of bile.

This rapid absorption prevent rise in biliary pressure within the biliary tree in normal circumstances.

Gradual relaxation and emptying of the gallbladder during the fasting period also plays a role in maintaining a relatively low intra luminal biliary pressure.

## **Motor Activity**

Gallbladder filling is facilitated by the tonic contraction of the sphincter of Oddi, thereby creating a pressure gradient between the bile ducts and the gallbladder.

In association with phase II of the inter digestive migrating myenteric motor complex in the gut, the gallbladder empties small volumes of bile repeatedly into the duodenum. This process is mediated partly by the hormone motilin.

During a meal, the gallbladder empties by a coordinated motor response of gallbladder contraction and sphincter of Oddi relaxation. Cholecystokinin (CCK) is one of the main stimuli responsible for gallbladder emptying. CCK is released endogenously from within the duodenal mucosa in response to a meal.

When stimulated by eating, the gallbladder empties 50 to 70% of the bile within 30 to 40 minutes. Over the 60 to 90 minutes following emptying, the gallbladder refills gradually. This correlates with a reduced CCK level.

Other hormonal and neural pathways also are involved in the coordinated action of the gallbladder and the sphincter of Oddi. Defects in the motor activity of the gallbladder may play an important role in cholesterol nucleation and gallstone formation.

## **GALLSTONES**

### **INCIDENCE:**

The most common biliary pathology are gallstones. The incidence of gallstone disease varies throughout the world. By the age of 70, about 35% of women and 20% of men would have developed gallstones. The incidence of cholesterol gallstones is increasing in Asia which may be related to environmental and dietary habits. Gall stone disease is a relatively common problem in India particularly in North India.

Incidence of asymptomatic gallstones is only about 10% and many patients will have developed symptoms 5 years after discovery. Most of the gallstones are cholesterol stones in a functioning gall bladder.

It is estimated that more than 60% of these patients have cholesterol stones. Recent studies from south India have shown pigment and mixed variety of gall stones to be more common (more than 90 %) as compared to cholesterol stones.

### **PATHOGENESIS:**

Gallstones are mainly composed of cholesterol, bilirubin, and calcium salts, with small amounts of protein and other materials.

In Western countries cholesterol is the main constituent of more than three quarters of gallstones, and these stones many of them are more than 80% cholesterol.

Non-cholesterol stones are categorized as black or brown pigment stones, consisting of calcium salts of bilirubin.

About 15% of gallstones can be seen on a plain abdominal radiograph, and pigment stones constitutes two thirds of it.

Calcification which is visible only on the rim occurs usually in cholesterol stones.

Cholesterol gallstones formation results when the cholesterol concentration in bile exceeds the ability of bile to hold it in solution i.e. reaches its saturation point, so that crystals form and grow as stones. The lithogenicity of bile are affected by various factors.

## **Age**

The prevalence of gallstone disease increases with advancing age, which maybe to increased cholesterol content in bile. Pigment and cholesterol type stones are reported in childhood.

## **Genetics**

There is a familial predisposition to the incidence of gallstones in families with known history of gallstone disease irrespective of their age and weight.

## **Sex and oestrogens**

Gallstones are two times as common in women as in men. There is higher incidence in multiparous than in nulliparous women.

Incomplete emptying of the gallbladder in late pregnancy leads to retention of cholesterol crystals; this favours gallstone formation. Women younger than 30 years, gallbladder stones are commonly associated with pregnancy and obesity.

When women are placed on birth control pills the bile becomes more lithogenic. Women on long-term OCPs have a twice the incidence of gallbladder disease over controls. Postmenopausal women on oestrogen containing drugs have 2.5 times increase in gallbladder disease.

## **Obesity**

There is increased incidence of gallstone disease in obese individuals than in the general population and is particularly an important risk factor in

women less than 50 years old (fat, fertile, female of forty). Obesity is associated with increased cholesterol synthesis and excretion.

### **Dietary factors**

Dietary fibre deficiency is associated with increased incidence of gallstone disease. This is due to increase in secondary bile acids, and render it more lithogenic, carbohydrate in refined form increases saturation of biliary cholesterol.

A moderate amount of alcohol has a protective action against gallstones. Vegetarians have fewer incidence of gallstones.

### **Serum factors**

Low HDL levels and high triglyceride levels have the highest risk of gallstones (both cholesterol and pigment).

### **Pigment gallstones:**

This term is refers to stones containing less than 25% cholesterol. They may be irregular or crystalline or smooth and amorphous on cross-section. They represent 25% of gallstones removed at cholecystectomy.

There are two types of pigmented stones: black and brown.

### **Black pigment stones**

- They are largely composed of an insoluble black pigment polymer mixed with calcium phosphate and carbonate.
- They are usually seen inside the gallbladder.



- They are associated with chronic haemolysis, like hereditary spherocytosis or sickle cell disease, and mechanical prostheses in the circulation.

### **Brown pigment stones**

- They have calcium bilirubinate and are also composed of calcium palmitate and cholesterol as their other major constituents.
- They are usually radiolucent.
- They are usually found in the gallbladder, intra-hepatic and extra-hepatic bile ducts.
- They have a 10% association with stricture, sclerosing cholangitis and Caroli's syndrome.
- Recurrent bile duct stones are usually brown pigment stones.
- In Oriental countries, parasitic infestations of the biliary tract by *Clonorchis sinensis* or *Ascaris Lumbricoides* are associated with brown pigment stones.

### **Cholelithiasis**

- Cholelithiasis is commonly seen in both sexes but female predominance is more and increasing.
- Risk groups are: increasing age; Obesity, female and family history.
- Symptomatic gall stones are: 1-2 % and remains asymptomatic,

- Symptomatic gall stones need - surgical or endoscopic interventions.
- Symptoms -biliary colic, nausea, vomiting. Pain may be referred to back.
- If untreated may results in acute and chronic complications.

**Complications of cholelithiasis:**

- cholecystitis, (m/c) (acute / chronic)
- common bile duct obstruction / impingement (Mirrizzi's syndrome),
- pancreatitis,
- cholangitis, and rarely
- gallbladder cancer.

Cholecystitis is most common complication. It may be acute or chronic cholecystitis. Chronic cholecystitis, which is characterized by fibrosis and inflammatory infiltrate of the gallbladder wall.

Irrespective of cause, symptomatic and complicated cholelithiasis are treated by acholecystectomy.

The technique of minimally invasive and increasing workshops and popularity laparoscopy cholecystectomy is treatment of choice and one of the most commonly performed procedures nowadays.

Although the advantages of laparoscopic cholecystectomy are acknowledged, its limitations and unique complications should also be kept in mind.

Literature says there is increase in incidence of bile duct injuries in laparoscopic cholecystectomy (0.2% to 0.8%) when compared with open cholecystectomy (0.1% to 0.25%) even in experienced hands.

One should remember, conversion to an open cholecystectomy is a reflection of sound surgical judgment in difficult cases and should not be considered a complication. In developed countries the rate of conversion is 5% to 10%.

### **ASYMPTOMATIC CHOLELITHIASIS**

These group without any symptoms are incidentally found to have stones in Gall bladder. And usually they don't require any prophylactic cholecystectomy. However, there are certain instances when a prophylactic cholecystectomy for silent gallstones may be warranted.

### **Relative Indications for Prophylactic Cholecystectomy**

- Cardiac transplant recipients
- Lung transplant recipients
- Patient on Chronic TPN
- Recipients of Bariatric surgery
- Family history of gallbladder cancer and asymptomatic stones
- Children with hemoglobinopathy (sickle cell, thalassemia, spherocytosis)
- Cholelithiasis encountered during elective abdominal procedures

## **ACUTE CHOLECYSTITIS**

### Types

- Acute calculous cholecystitis
- Acute acalculous cholecystitis

### Complications:

- perforation
- Peritonitis
- Pericholecystitis abscess
- Empyema GB
- Cholangitis
- Septicemia

### **Pathogenesis:**

- Initially, Gallstone impacts at the neck of the gallbladder leading to obstruction and wall edema.
- This leads to the formation of lysolecithin, a mucosal toxin.
- Prostaglandin synthesis increases and amplifies the inflammatory response.
- The edema and inflammation can then result in the lifting of the gallbladder wall away from the stone, thereby disimpaction the stone and effecting drainage through the cystic duct.
- In most patients this series of events plays through and conservative management is effective.

- In some patients, however, dis impaction does not occur, and this results in continued cystic duct obstruction and leads to venous congestion, gallbladder ischemia, biliary stasis.
- Systemic inflammatory response sets in that necessitates operative intervention.

### **CALCULUS CHOLECYSTITIS:**

Nearly 90% to 95% of cases of cholecystitis are calculous in origin. Gall stones causes obstruction of the cystic duct results in acute cholecystitis and the inflammatory response sets in locally result in edema and inflammation of the gallbladder.

### **Acalculous cholecystitis:**

Accounts for remaining 5% to 10% of the cases.

The risk groups of Acalculous cholecystitis are

- critically ill trauma
- burn& sepsis patients
- cardiac& diabetic patients
- acquired immunodeficiency syndrome
- Patients who are on TPN, postpartum, on steroids or narcotics,
- patients received multiple transfusions

Acalculous cholecystitishas a higher incidence of gangrene, emphysematous infection, perforation, and mortality. These patients warrant

emergent intervention, either a percutaneous cholecystostomy tube to decompress the gallbladder or cholecystectomy.

## PROGNOSIS

- The prognosis of patients with acalculous cholecystitis is guarded.
- The mortality and morbidity rates associated with acalculous cholecystitis can be high.
- The illness is frequently observed in patients with sepsis or other serious conditions.
- The reported mortality range is 10-50% for acalculous cholecystitis as compared to 1% for calculous cholecystitis

The timing of cholecystectomy during acute cholecystitis has been debated. In the era of laparoscopy, earlier the intervention beneficial results are high.

Studies showing beneficial in terms of hospital stay, return to work, decreased rate of conversion to open, thus decreases overall morbidity. Hence, early surgical intervention for acute cholecystitis has medical, economic, and social benefits that make it there commended approach.

## CHRONIC CHOLECYSTITIS:

This condition usually begins with the formation of gallstones in the gallbladder. There may be sludge or single or multiple gall stones. The presence of gallstones causes pressure, irritation, and may cause infection. In

long standing cases the GB wall thickens and over time inflammatory process sets in and fibrosis occurs which eventually results in gallbladder shrinkage. This interferes in gallbladder function.

In addition to gallstones, cholecystitis can be due to:

- Infection results in obstructing the bile flow
- Stones causing CBD blockage
- Excess cholesterol (altered cholesterol ratio) in the gallbladder
- Decreased blood supply to the gallbladder
- Repeated or prolonged attacks of cholecystitis, it becomes a chronic condition

## SYMPTOMS

- Severe abdominal pains that may feel sharp or dull
- Abdominal cramping and bloating
- Pain radiates to back or below right shoulder blade
- Fever with or without Chills
- Nausea and Vomiting
- Loose stools occasionally
- Jaundice and Itching

A typical attack can last two or three days, but symptoms of cholecystitis vary widely

Complications are

- Pancreatitis
- Perforation of the gallbladder as a result of infection

- Enlarged gallbladder due to inflammation
- Infection and gangrene of GB
- Predisposes to Gallbladder malignancy.

## TREATMENT

In Asymptomatic and patient with mild symptoms the treatment options are conservative management with analgesics, antibiotics if required, avoiding fatty meals, quitting smoking and alcohol and adopting healthy life styles. And they are follow-up.

Surgery is often the course of action in cases of chronic cholecystitis.

## ULTRASOUND ABDOMEN:

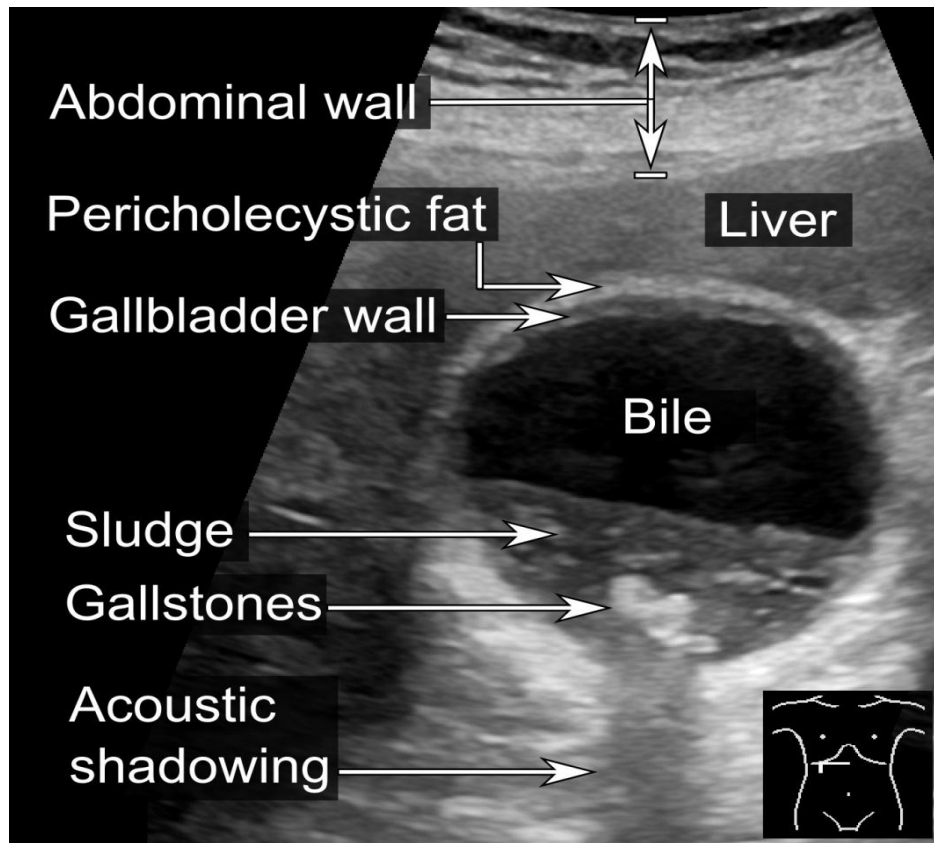
Ultrasound is an excellent and gold standard test for demonstrating gallstones. The term says “*showers of stones*”

USG findings in acute cholecystitis are

- The presence of cholelithiasis in combination with the sonographic Murphy sign.
- Gallbladder wall thickening (>3 mm)
- Pericholecystic fluid are secondary findings.
- Other less specific findings: gallbladder distension and sludge.

Every effort should be made to demonstrate the obstructing stone in the gallbladder neck or cystic duct. The only disadvantage is that it is operator-dependent.





## COMPUTED TOMOGRAPHY OF ABDOMEN

Although less sensitive than ultrasound, CT findings include

- Cholelithiasis: isodense to bile will be missed on CT
- Gallbladder distension
- Gallbladder wall thickening
- Mural or mucosal hyper density
- Pericholecystic fluid and inflammatory fat stranding
- Enhancement of the adjacent liver parenchyma due to reactive hyperaemia
- Tensile gallbladder fundus sign.

Diagnostic criteria on CT as proposed by Mirvis et al include:

<b>Minor Criteria</b>	<b>Minor Criteria</b>
Gallstones	Gallbladder Distention
Thickened Gallbladder Wall	Sludge
Pericholecystic Fluid Collections	
Subserosal Oedema	

diagnosis of acute cholecystitis can be supported if one major and two minor criteria are present

## **MAGNETIC RESONANCE CHOLANGIOPANCREATOGRAPHY**

### **(MRCP)–**

An MRI / MRCP provides high-resolution images of the bile ducts, pancreas, and gallbladder. Aids in further management.

Advantages of MRCP: as bile itself acts as contrast medium and no usage of external contrasts, even in obstructive conditions the results won't be affected. And it is advised to do MRCP in all contracted Gall bladder to rule out congenital absence of gall bladder, which is a very rare circumstances (0.5 – 0.7 %) gives unpleasant surprise to surgeon intra operatively.

### **EUS (Endoscopic ultrasound)**

superior to Trans abdominal USG but mostly the later is sufficient and routinely performed.

## **MANAGEMENT OF GALLSTONE DISEASES**

✓ **SURGICAL MANAGEMENT**

✓ **MEDICAL MANAGEMENT**

### **SURGICAL MANAGEMENT**

Cholecystectomy can done by

1. Open methods
2. Laparoscopic methods

In General, the indications are the same for both techniques. These are

1. Symptomatic gallstones causing

Mucocele of the gallbladder

Repeated episodes of biliary pain

Biliary pancreatitis

Choledocholithiasis with extra-hepatic cholestasis

Gallstone ileus.

2. Cholecystitis and its complications like

Acute acalculous cholecystitis

Acute calculous cholecystitis

Chronic cholecystitis

Gangrenous cholecystitis

Gallbladder perforation

Empyema gallbladder.

3. Asymptomatic cholelithiasis: only for selective indications, like:

Diabetics.

Patients undergoing bariatric surgery.

Children.

Renal transplantation

Those with haemolytic diseases.

4. Gallstone dyspepsia

5. Gallbladder polyps.

## **LAPAROSCOPIC INSTRUMENTS <sup>15</sup>**

It is important to have a knowledge on instrumentation, mechanism and working principle, use of appropriate instruments, regular maintenance, sterilisation property of laparoscopic instruments and also should update on newer things.

### **OPERATING ROOM SETUP**

Proper positioning of equipment

Properly positions the patient.

Operative laparoscopic and video equipment and

well-coordinated team including assistant and scrub nurse with technical member.

Anaesthesiologist trained in recognising complications of laparoscopy.

### **ESSENTIAL EQUIPMENTS**

- Optic Equipments
  - Laparoscope 5mm, 10mm
  - Computed chip video camera
  - Light source
  - Video monitors and video recorder
- Abdomen Access Equipment
  - Veress needle
  - Hasson cannula

- Gas cylinder (CO<sub>2</sub>)
- Trocar and cannulas
- Insufflators
- Laparoscopic Instruments
  - Atraumatic grasping forceps
  - Bipolar coagulation forceps
  - Dissecting forceps – Maryland
  - Scissors
  - Clip applicators
  - Staplers
  - Endo pouches (or) Sacs
  - Sutures and needles
  - Needle holder
  - Suction and irrigation system

## **LIGHT SOURCE**

- For adequate illumination of peritoneal cavity High intensity light source (Xenon) is used.
- The light source is connected to the laparoscope by either fibre optic cable (or) fluid filled cable.
- The fiberoptic cables consist of an inner core of glass that has a high refractive index which absorbs much of the light input.

## **VIDEO CAMERA**

- The video camera is attached directly to the eye piece of the laparoscope and contains both manual focus mechanism and zoom capability.
- The essential part of video camera is a solid-state chip sensor or charged coupled device (CCD).
- The degree of resolution determines resolving power required and should be 400 lines of resolution per inch.

## **VIDEO MONITOR**

- The resolution capability of the monitor should match that of video camera such that one-chip camera is best coupled with a monitor that provided at least 400 lines of resolution per inch.
- Three chip cameras require expensive monitors with 700 lines of resolution<sup>16</sup>.

## **LAPAROSCOPES**

- Commonly used laparoscopes are rigid instruments that employ the Hopkins rod lens system of optics.
- It comes in sizes ranging between 3mm to 10mm in diameter and variety of viewing angles.
- The 0 degree or end/ forward viewing is easy to use and results in least amount of image distortion.

- Angled scopes (30°, 45°) provide greater versatility by following the operator to look around corners and solid organs but needs experience.
- Recently, flexible scopes have been developed.

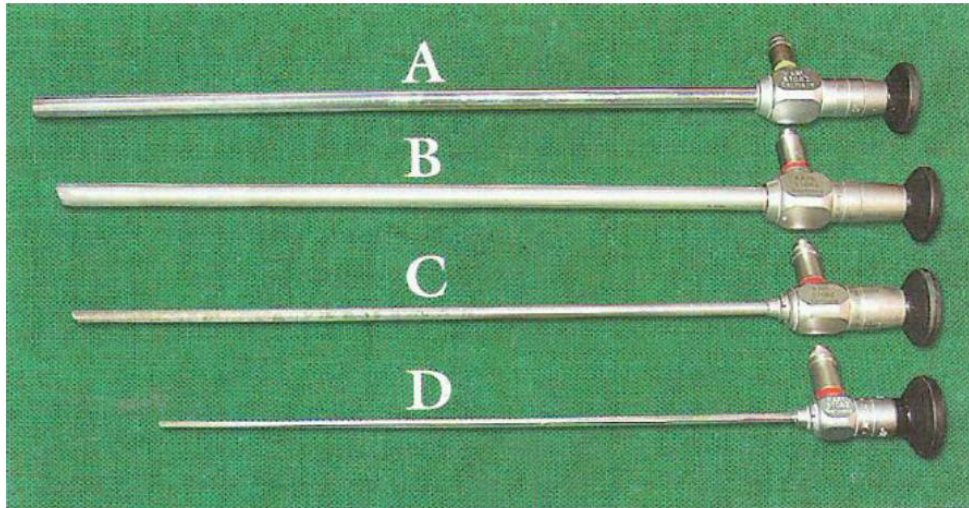


Figure 35: Laparoscopes

## INSUFFALATORS

- Used to create working space within the abdominal cavity by delivering CO<sub>2</sub> via an automatic high flow pressure – regulator system.
- CO<sub>2</sub> is currently the agent of choice because of low toxicity, low risk of gas embolism, rapid re-absorption, low cost and ease of use<sup>28</sup>.
- Ideal insufflator should be able to deliver 8 to 10L/min with a minimum acceptable flow rate of 6L/min.
- The system auto regulates the flow rate, monitors intra abdominal pressure and stops delivering CO<sub>2</sub> whenever the pressure exceeds predetermined level of 12 to 15mm Hg.

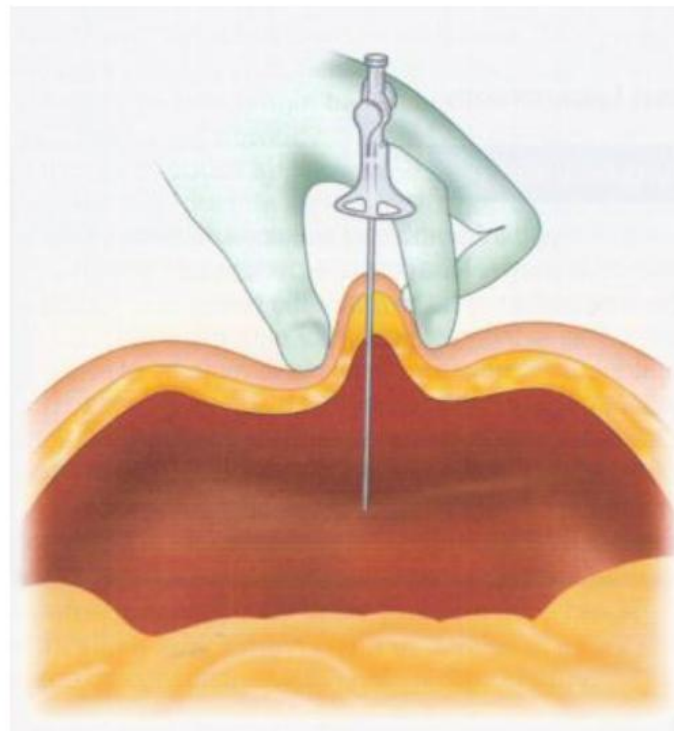




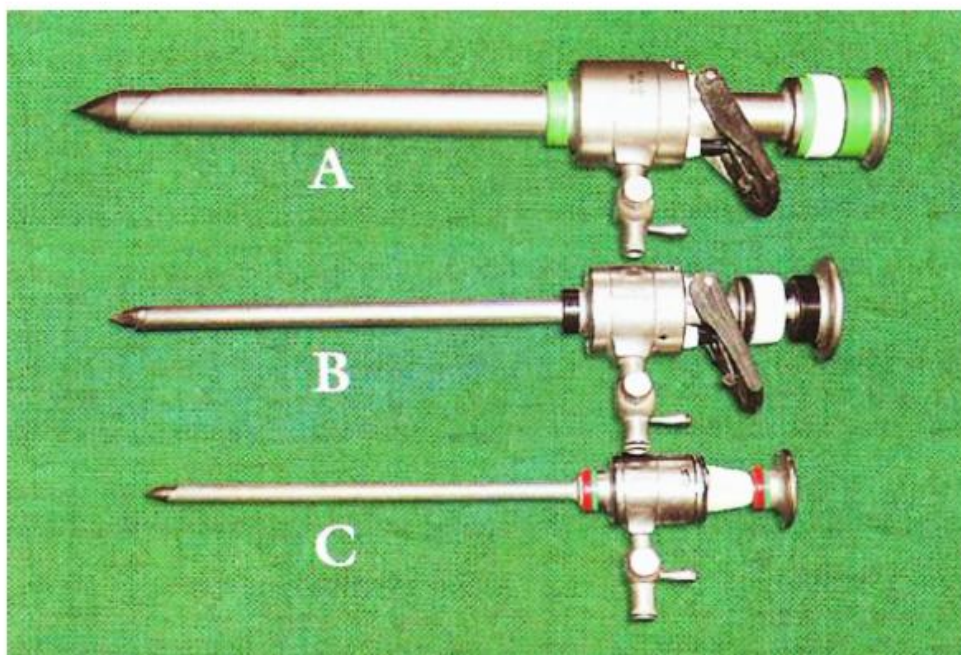
## **PUNCTURE INSTRUMENTS**

To gain access to the peritoneal cavity,

1. Veress needle
2. Laparoscopic trocar – sheath assemblies



- Veress needle achieve pneumo peritoneum in a “Closed” fashion.
- It has outer sharp cutting needle and inner blunt spring-loaded obturator.
- Once cutting needle enter peritoneal cavity blunt stylet springs forward thereby reducing injury.
- Hasson cannula is used to create pneumoperitoneum in a “opened” fashion.
- By using this we may avoid inadvertent injury to the bowel and vessels which may occur occasionally.
- The basic laparoscopic port consists of an outer hollow sheath or cannula that has a valve to prevent CO2 escape, side port for insufflation of gas and a portal for instrument access.
- The commonly used trocars in adults are are 5 mm and 10 mm in diameter.



## **SURGICAL INSTRUMENTS**

They are modification of standard surgical instruments, shaft of these may be insulated with non-conductive material and the working tips are metal to allow use with electrocautery.

- a) Dissecting forceps**
- b) Grasping forceps**
- c) Scissors**
- d) Clip appliers**
- e) The Push rod and suture loop**



## **THERMAL INSTRUMENTS**

The two modalities used for coagulation and the haemostasis are the laser and electrocautery – monopolar or bipolar. The entire tip of the instrument must be well visualized to avoid contact with other structures there by avoiding thermal injuries.

## **COMPLICATIONS OF LAPAROSCOPY**

### **A. Abdominal Wall**

- a. Trocar site infection and Hernia

### **B. Fluid Overload**

### **C. Subcutaneous and subfascial emphysema and edema.**

### **D. Inadvertent traumatic perforation to the bowel**

- a. incidence increases during previous abdominal surgeries)

### **E. Inadvertent abdominal wall vessels or large vessel injury**

### **F. Non-Trocar Injury**

- a. During adhesiolysis despite the application of traction and counteraction to each adhesion few bowel punctures are inevitable.

### **G. zone 3 thermal injuries.**

- a. It results from traumatic perforation not recognized during the procedures or from thermal damage from any source. With traumatic perforation symptoms of peritonitis occurs within 24 to 48 hrs but in thermal injury presents between 4 to 10 days.

## H. Bladder and Ureter Injury

## I. Retained Foreign Bodies

- a. Inorganic: Clips, Needle, Suture material
- b. Organic: Lost gallstones, Tissue fragments, Blood clots.

## J. Pneumoperitoneum

- a. Cardiopulmonary distress
- b. Renal failure
- c. Venous thrombosis
- d. Hypothermia

## **LAPAROSCOPIC CHOLECYCTECTOMY**

### **Indications:**

As discussed earlier the indications for laparoscopic cholecystectomy is the same as for open procedure.

### **Contra-indications:**

1. Patients unfit for general anaesthesia.
2. Un correctable coagulopathy.
3. Significant portal hypertension.
- 4.. Surgeon inexperienced in laparoscopic surgery.
5. Patients with proven or suspected gallbladder malignancy.

### **Pre-operative Work-up:**

1. Routine blood investigations, including liver function tests.
2. Ultrasonography / CT scan of the abdomen.
3. Upper GI endoscopy - to rule out acid peptic disease or hiatus hernia.
4. DVT prophylaxis in patients with high risk.

### **Patients likely to require conversion:**

- It is better to identify conditions in which the surgeon should expect a difficult laparoscopic procedure and therefore should have a low threshold for conversion to open surgery.
- It is very important that the surgeon should realize when he or she has reached their limit of expertise and recognize early on the proper time to convert from laparoscopic cholecystectomy to an open cholecystectomy.
  1. Acute severe cholecystitis- difficult dissection due to inflammation and adhesion.
  2. Multiple prior operations- difficulty in safe access to peritoneal cavity.
  3. Abnormal anatomy - higher likelihood of biliary/ vascular injury.
  4. Acute pancreatitis - difficult visualisation due to oedematous pancreatic head
  5. Third trimester pregnancy - higher chance of uterine injury during access.

6. Cirrhotic liver - higher likelihood of liver injury and haemorrhage.
7. Evidence of generalized peritonitis.
8. Morbid obesity - Difficulty in access and dissection.
9. Septic shock from cholangitis.

**Disadvantage of laparoscopic cholecystectomy:**

1. The incidence of bile duct injuries is higher as compared to open procedure.
2. The operating time is increased as compared to open method.

**Advantages:**

1. Postoperative pain is less.
2. Hospital stay is shorter.
3. Post-operative pulmonary function was less impaired.
4. Laparoscopic cholecystectomy has a lower risk of surgical site infection than open procedure.

**LAPAROSCOPIC CHOLECYSTECTOMY**

Laparoscopic cholecystectomy remains the Gold standard technique.

**INDICATIONS**

- Symptomatic cholelithiasis
- Acute cholecystitis

- Acalculous cholecystitis
- Asymptomatic stones with certain indications
- Porcelain GB, cholesterosis
- GB polyp
- GB pancreatitis

### **ABSOLUTE CONTRAINDICATIONS**

- Patient unfit for general anaesthesia
- Uncorrectable coagulopathy
- Significant portal hypertension
- GB carcinoma

### **RELATIVE CONTRAINDICATIONS**

- Cirrhotic liver
- Unclear anatomy
- Acute pancreatitis
- Generalised peritonitis
- Multiple previous abdominal operations.

### **INSTRUMENTS REQUIRED**

- 10 mm direct laparoscope
- Two 5 mm and two 10 mm trocars
- Two 5 mm forceps



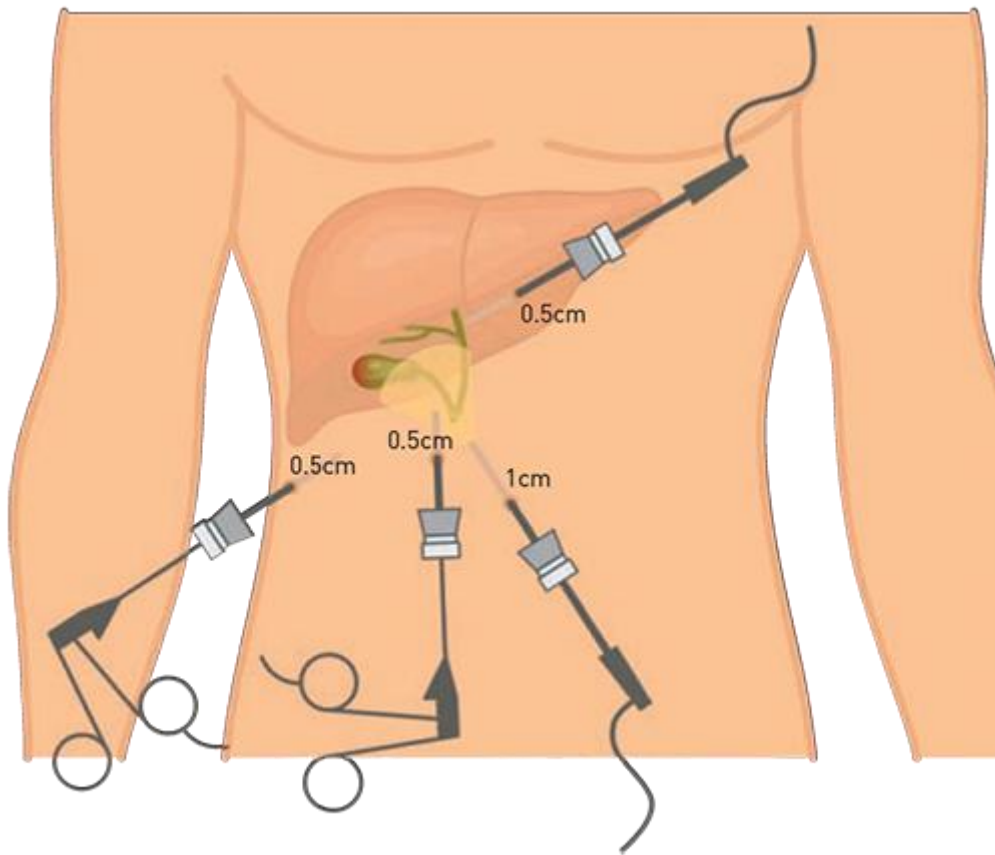
- One 10 mm grasping ‘Crocodile’ forceps
- One 10 mm curved dissector
- One 5 mm irrigation – suction cannula
- One bipolar electrocautery forceps
- One dissecting hook with monopolar cautery
- One 100 mm clip applier

## **POSITIONING**

- The patient is firmly strapped on the table to permit rotation of the table with reverse Trendelenburg position and table tilted towards the surgeon.
- The surgeon stands on the left side of the patient and with first assistant on the right side of the patient.
- Person handling camera stands adjacent and caudally to the surgeon.

## **PORTS**

- Umbilical 5 or 10mm - Camera port
- Epigastric 10mm - Working port
- Right subcostal 5 mm - Infundibulum grasper(Midclavicular line)
- Right ant. axillary 5 mm - Cranial traction on fundus of GB.



## **OPERATIVE TECHNIQUE –**

After creating pneumoperitoneum by Veress needle, first umbilical trocar introduced then all other trocars introduced one by one.

The following steps are done,

- I. Adhesion release & Exposure of porta hepatis
- II. Decompression
- III. Dissection of Calot's triangle
- IV. Cystic pedicle skeletonization
- V. Clipping and division of cystic pedicle
- VI. GB dissection from its bed

- VII. Haemostasis and drain placement
- VIII. Extraction of GB.
- IX. Peritoneal lavage.
- X. Closure of the ports.
- XI. Conversion to laparotomy.
- XII. Postoperative Care.

## **STEPS IN DETAIL**

### **Adhesion Release**

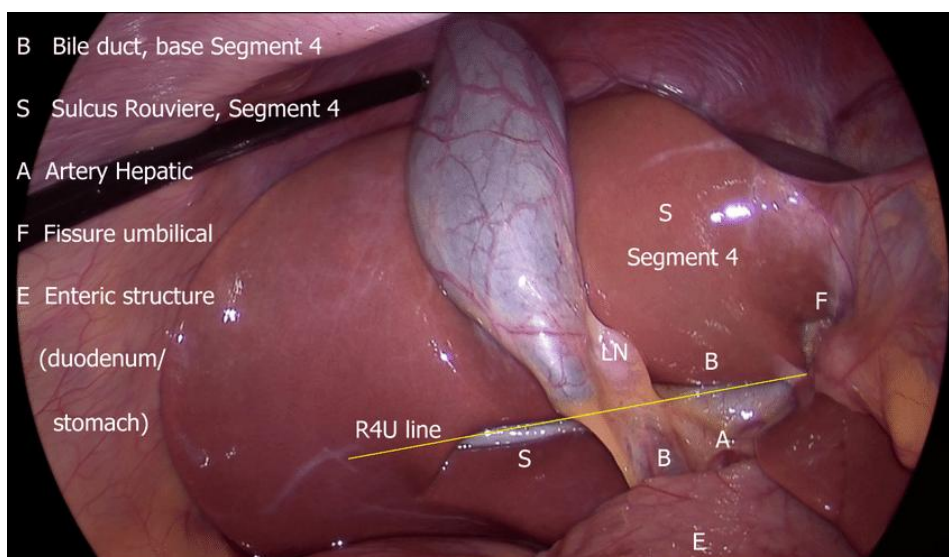
- The first assistant grasps the GB at its fundus with a grasping forceps & directed anteriorly & superiorly, reflecting liver with it to reveal the porta hepatis and the peritoneum covering the cystic pedicle.
- If the omentum and duodenum are adherent to the GB, they are dissected free at this time, taking care to avoid burn injury to the duodenum if electrocautery is used.

### **Decompression**

- Not routinely recommended but in patients with acute cholecystitis and hydrops, it is helpful to decompress the GB using electrocautery and suction – irrigation system to properly grasp the GB.

## Dissection of Calot's triangle

- Once the cystic structures are evident the surgeon grasps the infundibulum of the GB with the grasping forceps and applies countertraction towards downward and outward direction. The surgeon starts the dissection to display the cystic duct, cystic artery and Calot's triangle.
- Countertraction stretches the cystic duct towards the GB. So that common duct can be tented into the area of dissection particularly with short cystic duct. So, it is important to stay as close as possible to the GB.
- Generally, the cystic duct is oriented in an oblique direction from left to right. If the orientation and the exact identity of the structures are still unclear begin dissection of the GB from its fossa just above the cystic duct.
- This creates an inferior window, in which one can exclude any other ductal structure existing into the GB fossa or from the GB itself.



### **Clipping and division of cystic pedicle.**

- Ligation and division of the cystic duct is performed with clips using a special clip applicator.
- The applicator is used to place two clips on the cystic duct stump and one on the GB side.
- The clips must be aligned to completely cross the cystic duct and do not overlap.
- Commonly used clips are LT 300 & LT 400 in adults
- The cystic artery is then identified, clipped and divided.
- The cystic duct is prominent and its division allows better access to the cystic artery.
- The cystic artery is isolated with the right angle and doubly clipped proximally, singly clipped distally and divided.

### **GB dissection from its bed.**

- Further traction on the GB brings into view the proper plane for dissection between liver and gallbladder.
- The dissection can be done using disposable scissors which has a slight curve and when closed, it has a narrow tip so that electrocautery can be guided. It can also be done using hook scissors and a dissecting hook.
- The grasping forceps on the neck of the GB can be maneuvered into various positions, to maintain proper countertraction and display the plane between the GB and the liver.
- The GB fossa is best cauterized to achieve haemostasis.

### **Haemostasis and drain placement.**

- Perfect haemostasis is achieved using electrocautery taking care not to injure CBD and duodenum.
- The placement of subhepatic drain is needed in the following situations.
  - Infected or inflamed GB – where cystic stump is fragile and high risk of post-operative leakage.
  - Injury to the liver parenchyma
- Drainage permits the exterior diversion of an early bile leak, transforming it into a biliary fistula, which spontaneously resolves in some patients thereby avoiding a biliary peritonitis and its complications.

### **Extraction of the GB**

- Once the GB is free and it is solid, supple, not damaged by the dissection, if the stones are few and smaller than 5 mm and the bile is liquid,
  - the GB is grasped at its neck using 10mm claw grasper and extracted through the epigastric port.
- If the GB wall is supple and not damaged by the dissection, if the calculi are more than 10mm, if the bile is fluid and there is a long neck,
  - Hartmann's pouch is directly exteriorized with the crocodile forceps, GB opened and the bile aspirated.

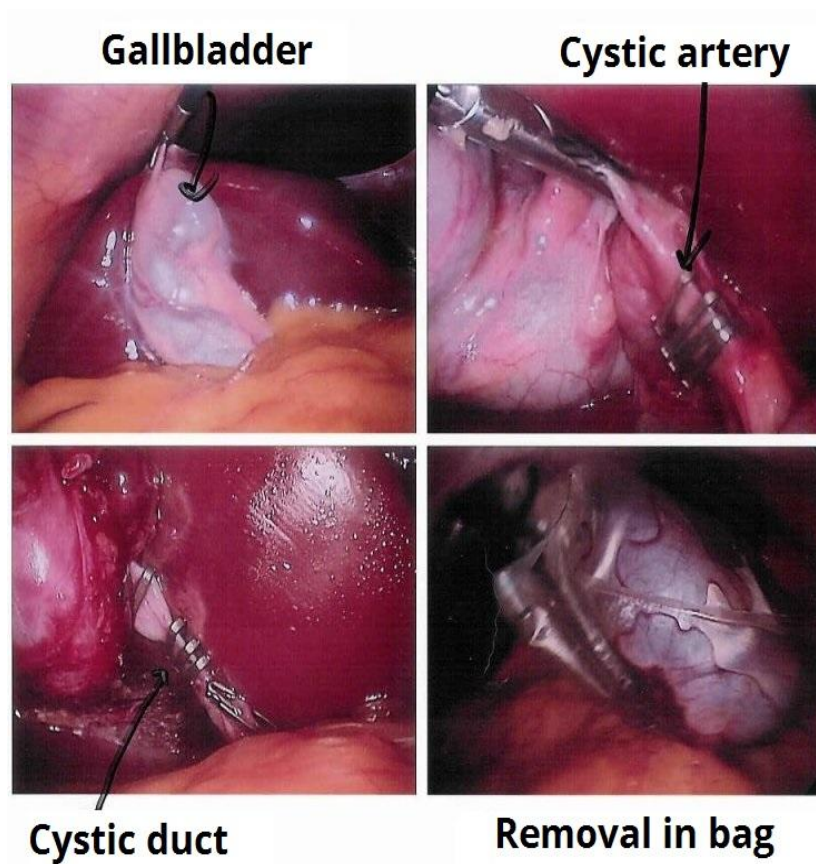
- Calculi that cannot pass through are either crushed with Kocher's forceps or the facial defect is widened by spreading the fascia with the Kelly clamp or sharply with a scalpel.
- If the GB wall is infected, thickened or damaged by the dissection, if the bile is thick, or if there is an empyema or a gangrenous GB,
  - The "bag extractor" technique is used.
  - The GB is widely opened inside the bag and the bile aspirated. The bag is then brought outside of the abdominal cavity and easily pulled outside of the abdomen.

### **Peritoneal Lavage**

- A peritoneal lavage is then performed if there is bile spillage, infected (or) gangrenous gall bladder.
- The laparoscope is placed through the umbilical port and the irrigation suction cannula is placed through epigastric port.
- The subhepatic and sub diaphragmatic spaces are washed with abundance of warm saline. The table is rotated into the Trendelenburg position and to the right, to collect all the fluids in the patient's right hypochondrium.
- In this position the laparoscope can be turned to check the right paracolic gutter and the pouch of Douglas. The lavage is continued until it runs clear.

## Closure of the ports

- Each trocar is removed within direct view while retaining the pneumoperitoneum.
- The camera is then removed.
- The abdomen is deflated by keeping the umbilical trocar.
- The anaesthesiologist is then asked to perform a few Valsalva manoeuvres with ventilation bag to remove as much CO<sub>2</sub> as possible there by avoiding post-op shoulder pain. All port sites are usually injected with local anaesthetic drug to minimize post-operative pain.
- 10mm port facial defect is usually closed using 1-0 prolene, then skin closed using 3-0 silk stitches. All other ports, skin is closed directly using 3-0 silk.





## **Conversion to Laparotomy**

The indications for conversion fall into two categories.

- I. Conversion for necessity
- II. Conversion for prudence

### **CONVERSION FOR NECESSITY**

- A complication may occur at any step of the laparoscopic cholecystectomy.
- The bowel can be damaged, perforations, hematoma or electric burns can occur.
- The omentum and small and large vessels such as venacava or portal vein can be traumatized.
- Bleeding can occur from the liver after GB removal or from the liver pedicle.
- All of these complications can be repaired unless if they are major which needs an open procedure.

### **CONVERSION FOR PRUDENCE**

- Any event that endangers patient's life requires conversion.
- Any mechanical or instrument failure like poor lighting, bad image transmission, defective insufflators, malfunctioning electrocautery and insulation instrument defects.

- If the surgeon, after his laparoscopic dissection cannot accurately identify the vascular and biliary component of Calot's triangle, clip should never be applied and no structures divided.
- If available, intra-operative cholangiography must be performed through a puncture of the GB if not conversion is needed.
- Laparoscopic cholecystectomy is a safe procedure only when performed by a surgeon experienced in open biliary procedures.

### **Post-Operative care:**

- The post-op. routine is similar to that of open gallbladder surgery.
- Analgesics and antibiotics for first 24 hours.
- Oral fluids after 24 hours
- If there is appropriate surveillance at home the patients can be discharged on the next day.

### **Complication**

#### **a. Intra Operative:**

- Bleeding - trocar site - Omental Vessels, Cystic Artery while dissecting at Calot's triangle, from GB fossa
- Perforation of GB and contamination of peritoneal cavity with infected bile.
- Bile duct injuries
- Partial or total transaction of the CBD during difficult dissection at Calot's triangle.

- Narrowing or obstruction of the CBD by inadvertent placement of clip.

b. Post-Operative

- Bile leak and fistula
- Bile peritonitis
- Biliary stricture
- Thermal injuries to bowel
- Port site hernia
- Port site metastasis in carcinoma GB

## **OPEN CHOLECYSTECTOMY**

In the era of Laparoscopy and robotics minimally invasive procedures are over seeded. But there is still a role for open cholecystectomy in complicated cases of gallstone disease.

There are a number of clinical situations where if present difficulty might be encountered in laparoscopic approach and open cholecystectomy should be considered.

Difficult laparoscopic cholecystectomy with increased risk are:

- morbid obesity,
- cirrhosis,
- previous surgery,
- portal hypertension,
- severe obstructive lung disease and
- pregnancy.

In addition, open cholecystectomy should prefer in patients with

- severe cholecystitis,
- acute cholangitis,
- gallbladder perforation,
- empyema of gallbladder or
- suspected gallbladder neoplasm

### Technique

Four incisions can be used for open cholecystectomy:

1. A right subcostal incision gives the best exposure of the biliary tract.
2. A transverse incision gives a better cosmetic result
3. A midline incision is useful when the diagnosis is not definite.
4. A right para median incision.

A mini-cholecystectomy is performed through a very short subcostal incision. Choice of incision depends partly on surgeon preference as well as patient factor like patients built and expected pathological condition.

### **Dissecting Calot's triangle**

- The operative field is properly exposed by retraction of the liver upwards using an appropriate retractor,
- Neck of the gallbladder is retracted anteriorly using suitable forceps while the assistant retracts the colon and the duodenum inferiorly using a damp pack

- By sharp dissection the peritoneum over the neck of the gallbladder is incised and the contents of Calot's triangle displayed by a combination of blunt and sharp dissection.
- The operation may be made easier by aspiration of the gallbladder contents if the gallbladder is tense and difficult to grasp.
- Positive identification of the cystic duct by meticulous dissection at its junction with the CBD and the cystic artery are absolutely crucial and reduces incidence of bile duct injuries significantly.
- After identification of the cystic duct and the artery, these structures are ligated in continuity and divided.
- Adequate length of the cystic duct is left for easy cannulation if operative cholangiography is planned.
- Any stones present in the cystic duct are milked back into the gallbladder.
- The cystic duct is then ligated close to the gallbladder.
- Cholangiography if planned is to be performed at this stage.
- Gallbladder dissection can begin from the fundus or in the cystic duct region.
- Dissection should be done as closely to the gallbladder wall as possible and proper use of diathermy to achieve adequate haemostasis.
- A drain can be placed at the gallbladder bed if required.

## **Complications:**

1. Arterial haemorrhage during cholecystectomy from a torn cystic artery.
2. Pulmonary complications (most common).
3. Wound infections
4. Deep-vein thrombosis,
5. Cardiovascular problems

The mortality of open cholecystectomy is 1% and the morbidity about 5%.

## **MEDICAL MANAGEMENT**

### **1. Dissolution Therapy**

- Therapy aims in reversing the super saturation of bile with cholesterol.
- Oral dissolution therapy is used only on cholesterol stones.
- The main mechanism is making the cholesterol stones more soluble by addition of certain agents.
- The two most commonly used agents are chenodeoxycholic acid and ursodeoxycholic acid which dissolve gallstones by desaturating bile and decreasing biliary cholesterol secretion.
- These agents via micellar solubilisation encourage the removal of cholesterol from stones or encourage the formation of a liquid crystalline phase, or both.

- Ursodeoxycholic acid is more commonly used now and is well tolerated. Patients with uncomplicated cholelithiasis should be considered for oral dissolution therapy.
- Ursodeoxycholic acid - Dosage is 10 to 15 mg/kg of body weight per day. Night time dosing is preferred. Treatment should continue until documentation of stone dissolution by two consecutive negative ultra sonograms one month apart is done.
- It is also important that the gallbladder function should be normal and the cystic duct is patent to allow unobstructed passage of unsaturated bile and stones to pass out from the gallbladder.

## **2. Extracorporeal shock wave lithotripsy (ESWL)**

In 1985 Sauer Bruch was the first to apply the application of extracorporeal shock-wave lithotripsy to gallstone disease.

- Diminishing the surface-to-volume ratio of a stone is the rationale behind this, thereby increasing the efficacy of oral dissolution.
- This in turn decreases stone size and allows it and the debris to pass directly unhindered from the gallbladder into the intestine.
- It involves delivery of focused high-pressure sound waves to the gallstones. Passage of the shock wave causes cavitations at the anterior surface of the stone by liberating compressive and tensile forces on the stone, thereby leading to stone fragmentation. Size, architecture and microcrystalline structure are the factors that influence fragmentation.
- Criteria for selection of patients for ESWL are:

1. Normal gallbladder function
2. Cystic duct patency
3. Mild uncomplicated biliary pain
4. Cholesterol stones

Contraindications:

1. Pregnant patients
2. Bleeding disorders
3. Patients on anti-coagulants
4. Large stones

Side effects are:

1. Exposure site Petechiae due to shock-wave delivery (8%)
2. Haematuria (4%), and
3. Liver hematomas (<1%)
4. Biliary pain
5. Cystic duct obstruction (5%)
6. Biliary pancreatitis (< 2%).

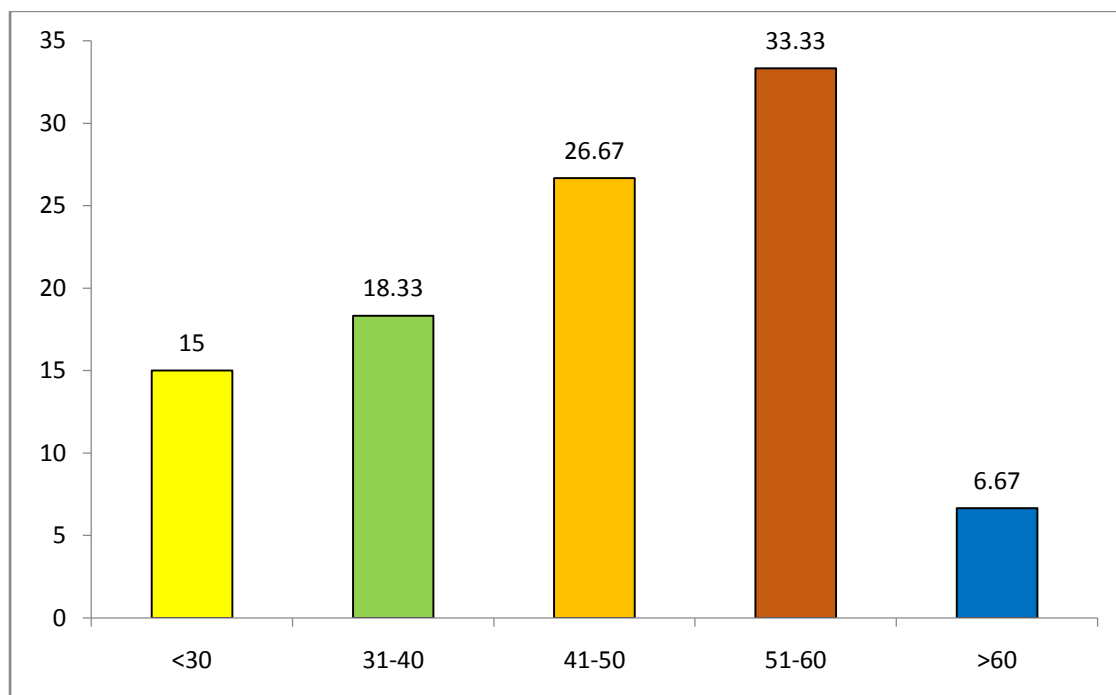


## OBSERVATION AND RESULTS

### Distribution of study population according to age group

Age group	Frequency	Percentage
<30	9	15
31-40	11	18.33
41-50	16	26.67
51-60	20	33.33
>60	4	6.67
<b>Total</b>	<b>60</b>	<b>100</b>

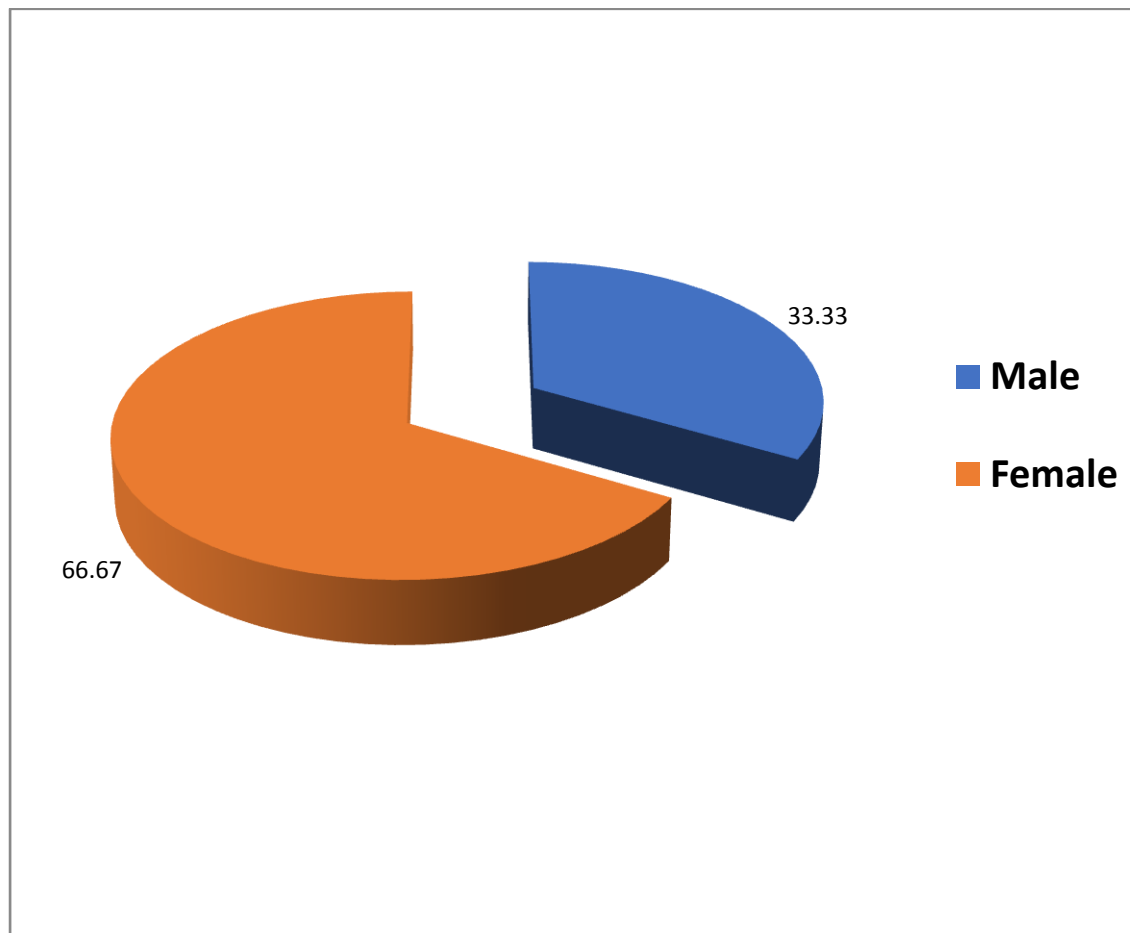
Around 60% of the study population were in the age group of 41-60.



### Distribution of study population according to gender

Gender	Frequency	Percentage
Male	20	33.33
Female	40	66.67
<b>Total</b>	<b>60</b>	<b>100</b>

Around 66 % of the study population were females



**Distribution of study population according to history of referred pain to back**

<b>Referred pain to the back</b>	<b>Frequency</b>	<b>Percentage</b>
Present	25	41.7
Absent	35	58.3
<b>Total</b>	<b>60</b>	<b>100</b>

Around 41% of the study population had referred pain the back.

**Distribution of study population according to history of nausea and vomiting.**

<b>Nausea and vomiting</b>	<b>Frequency</b>	<b>Percentage</b>
Present	50	83.3
Absent	10	16.7
<b>Total</b>	<b>60</b>	<b>100</b>

Around 83 % of the study population who had cholelithiasis had nausea and vomiting

**Distribution of study population according to presence of Jaundice**

<b>Nausea and vomiting</b>	<b>Frequency</b>	<b>Percentage</b>
Present	15	25
Absent	45	75
<b>Total</b>	<b>60</b>	<b>100</b>

25 % of study population had jaundice.

All of them were completely evaluated to rule out obstructive jaundice and other cause of jaundice before taken up for surgery.

**Distribution of study population according to USG finding of thick wall gall bladder**

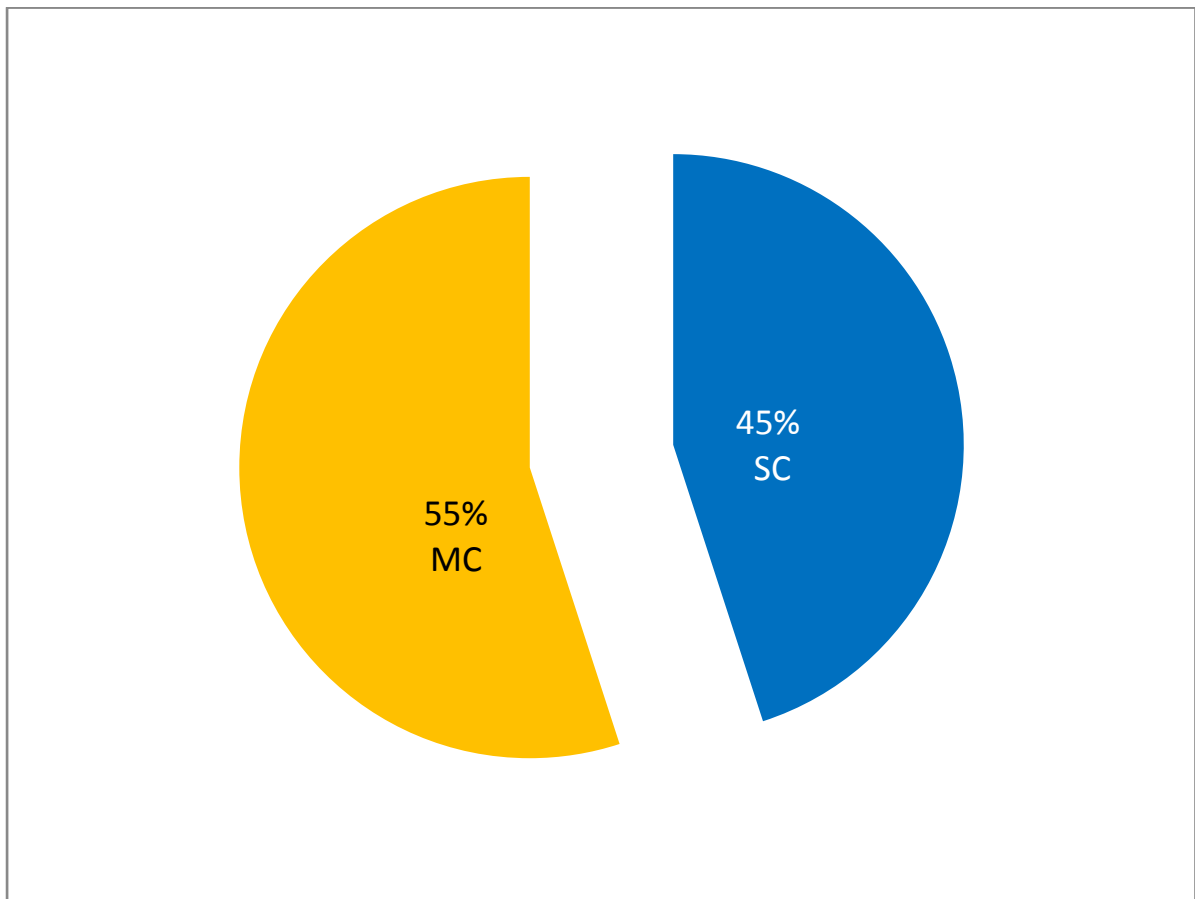
<b>Previous history</b>	<b>Frequency</b>	<b>Percentage</b>
Present	14	23.3
Absent	46	76.7
<b>Total</b>	<b>60</b>	<b>100</b>

23% of the study population had thick walled gall bladder

### Distribution of study population according to USG finding of calculi

Previous history	Frequency	Percentage
Single stones SC	27	45
Multiple stones MC	33	55
<b>Total</b>	<b>60</b>	<b>100</b>

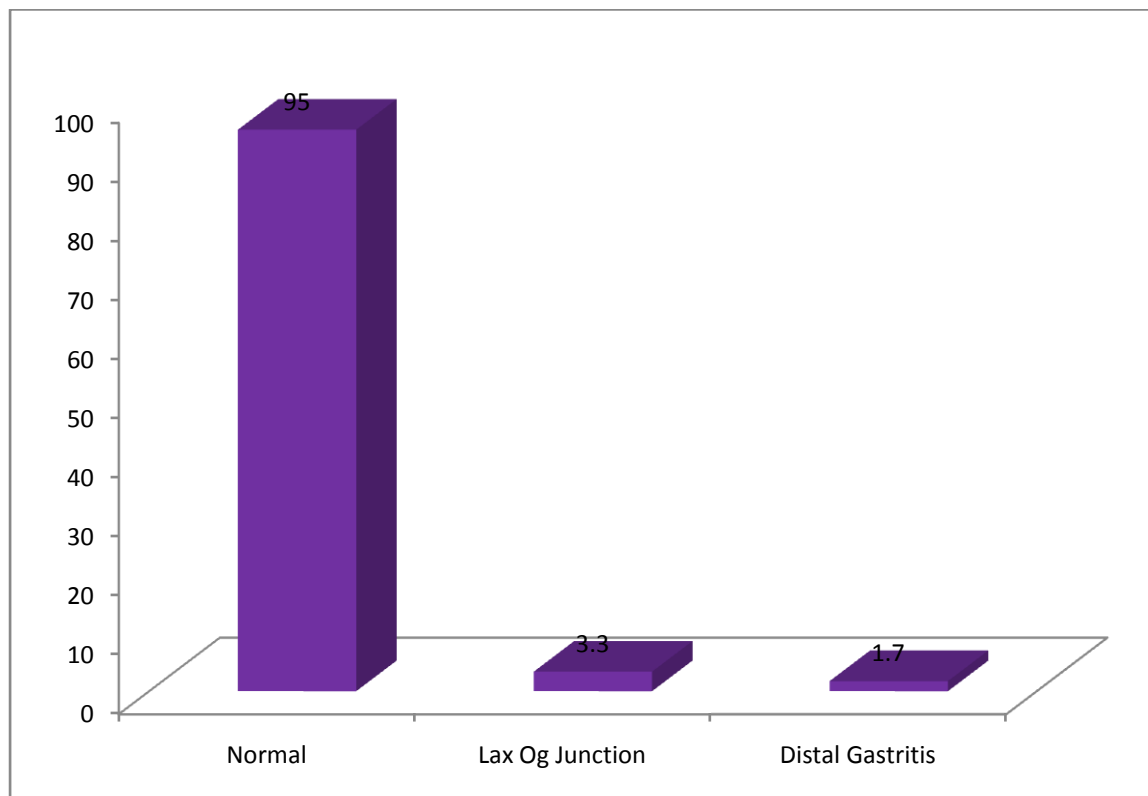
Around 45% of study population had Single Calculi in the gall bladder & remain 55% had multiple stones in the Gall bladder



**Distribution of study population according to oesophago-gastroduodenoscopy (OGD) findings**

<b>Previous history</b>	<b>Frequency</b>	<b>Percentage</b>
Normal	57	95
Lax OG Junction	1	3.3
Distal Gastritis	2	1.7
<b>Total</b>	<b>60</b>	<b>100</b>

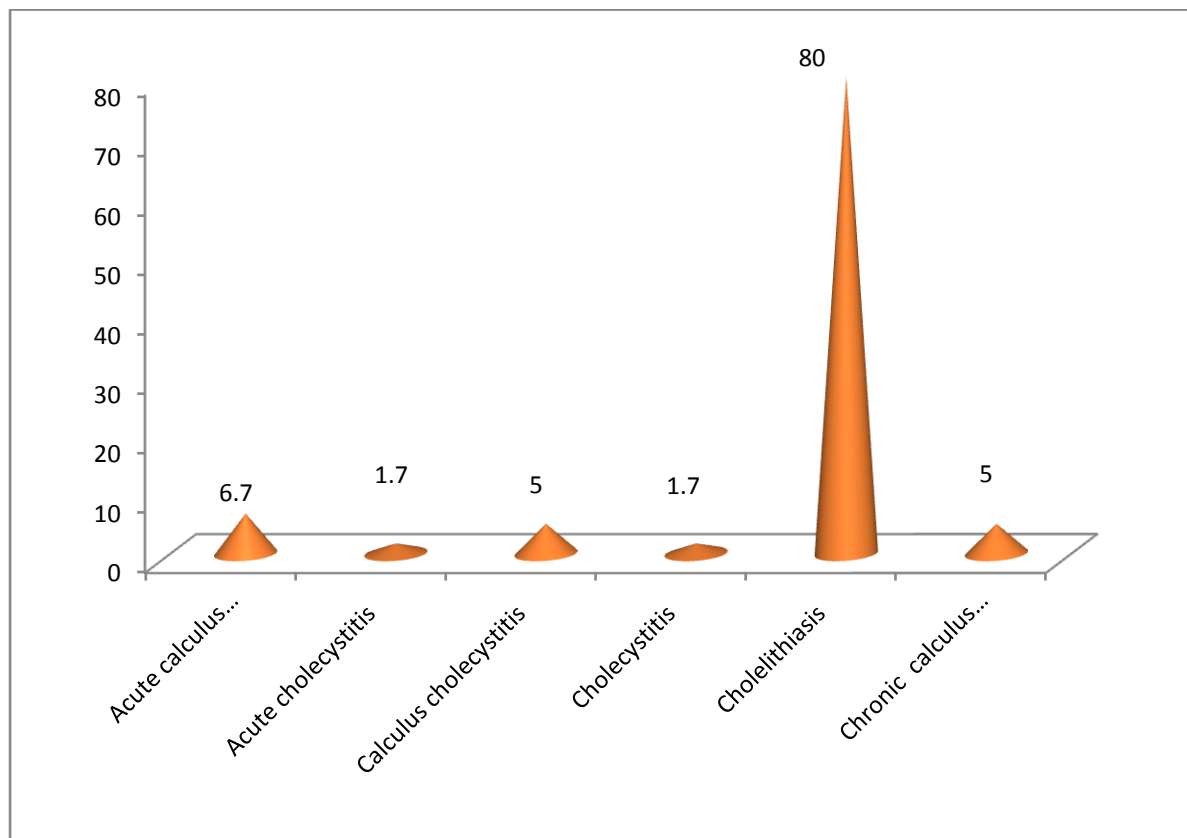
95 % of the study population had normal OGD findings. Around 3 % had lax OG junction and around 2% had distal gastritis



### Distribution of study population according to Diagnosis

Previous history	Frequency	Percentage
Acute calculus cholecystitis	4	6.7
Acute cholecystitis	1	1.7
Calculus cholecystitis	3	5
Cholecystitis	1	1.7
Cholelithiasis	48	80
Chronic calculus cholecystitis	3	5
<b>Total</b>	<b>60</b>	<b>100</b>

80 % had cholelithiasis. Around 7% had acute cholecystitis.



### Distribution of study population according to Duration of surgery

Previous history	Frequency	Percentage
1 – 2 hours	44	73.3
2-3 hrs	15	25
>3 hrs	1	1.7
<b>Total</b>	<b>60</b>	<b>100</b>

The surgery duration was less than 2 hours in 73% of study population

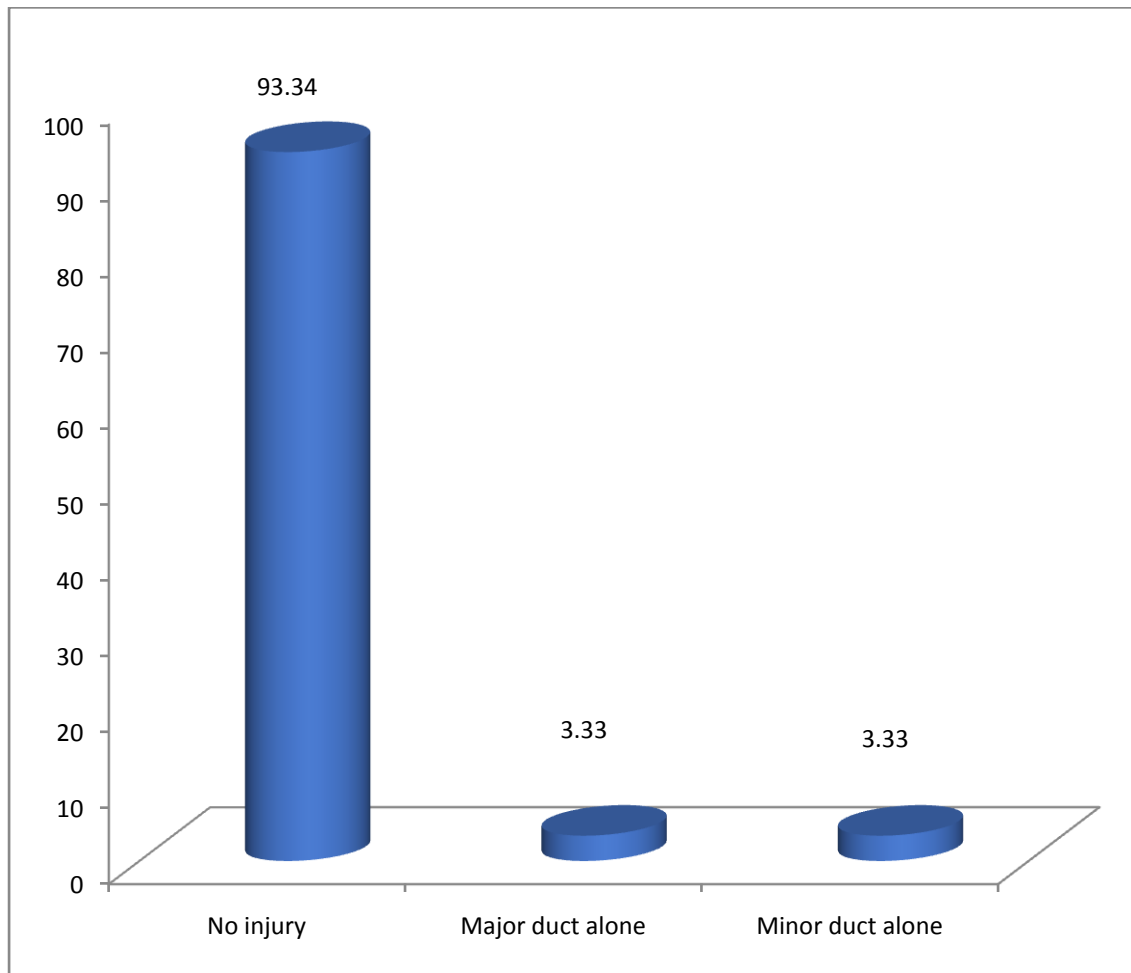
### Distribution of study population according to bile duct injury

Previous history	Frequency	Percentage
No injury	56	93.34
Major duct	2	3.33
Minor duct	2	3.33
<b>Total</b>	<b>60</b>	<b>100</b>

Around 93% of study population did not have any bile duct injury while 3.3 % had bile duct injury in the major bile duct and minor bile duct respectively. Individuals with Major bile duct injury has been referred to Hepato biliary surgeon's opinion and further management.



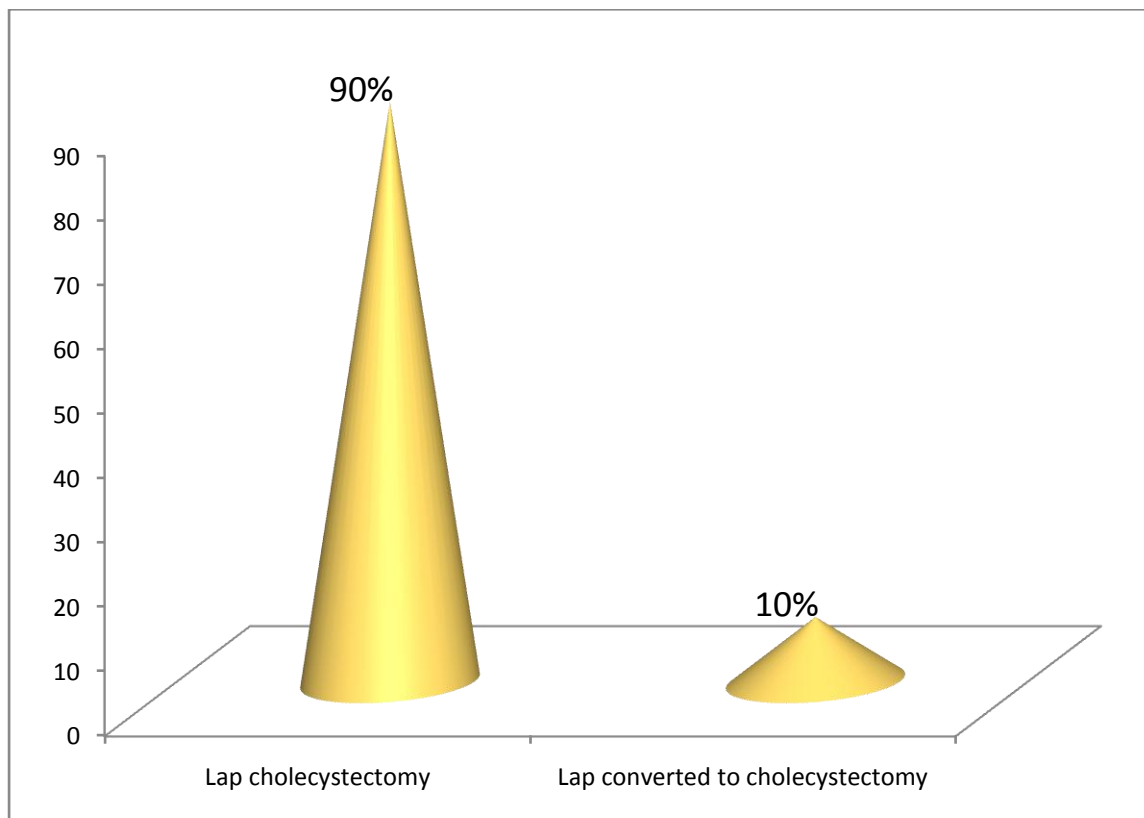
### Distribution of study population according to bile duct injury



### Distribution of study population according to surgical procedure followed

Previous history	Frequency	Percentage
Lap cholecystectomy	54	90
Lap converted to Open cholecystectomy	6	10
<b>Total</b>	<b>60</b>	<b>100</b>

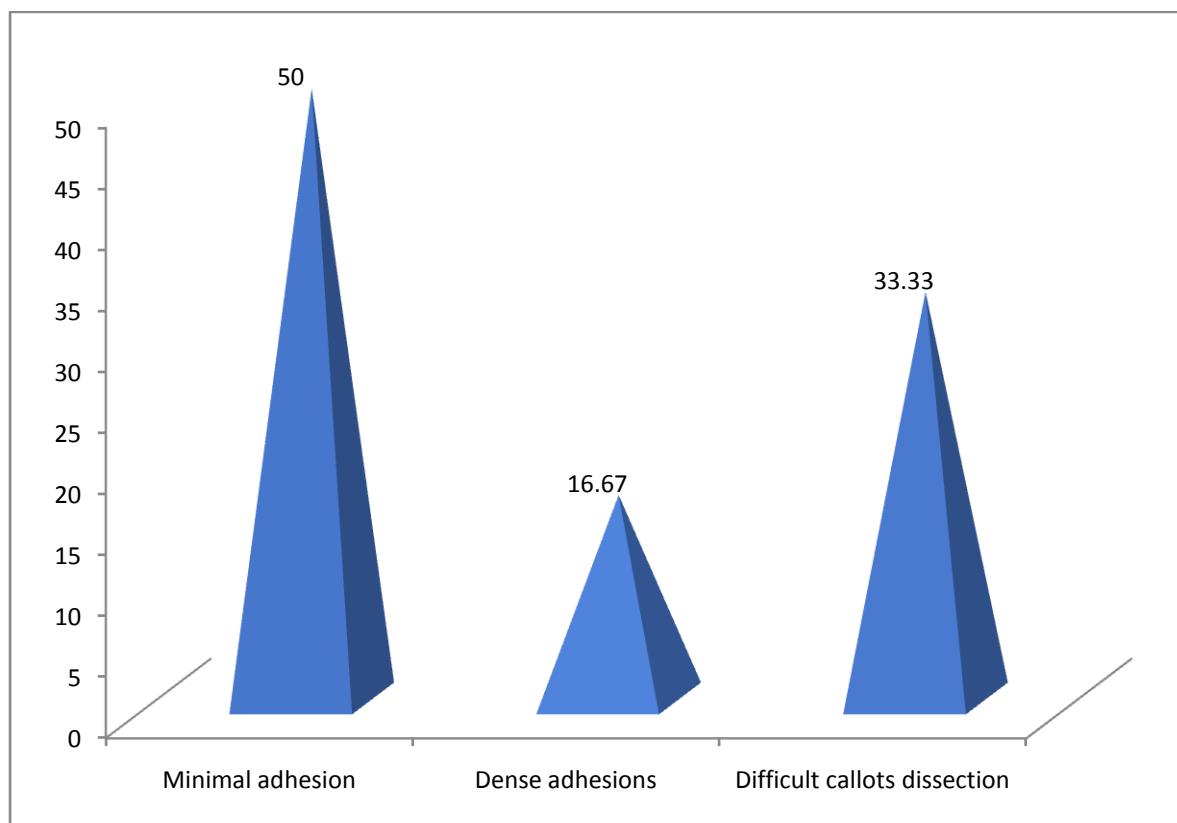
All surgeries were posted for lap cholecystectomy. But due to few reasons, 10 % of the surgeries were converted to open cholecystectomy.



**Distribution of study population according to reasons for conversion of lap cholecystectomy to open cholecystectomy**

<b>Previous history</b>	<b>Frequency</b>	<b>Percentage</b>
Minimal adhesion	3	50
Dense adhesions	1	16.67
Difficult Calot's dissection	2	33.33
<b>Total</b>	<b>60</b>	<b>100</b>

Adhesion was the common reason in around 67% of study population for conversion of lap cholecystectomy to open cholecystectomy. Difficult Calot's dissection was the reason for conversion in about 33% of study population



### Distribution of study population according to Presence of infection

Previous history	Frequency	Percentage
Present	10	16.7
Absent	50	83.3
<b>Total</b>	<b>60</b>	<b>100</b>

But as a protocol invariably all patients received pre-op and post-op antibiotics and those 16.7 % of the individuals received antibiotics even after 1-week course.

### Distribution of study population according to the duration of postoperative stay

Duration of hospital stay	Lap cholecystectomy		Lap converted to open		Fischer exact Value	Significance
	No	%	No	%		
Less than 1 week	1	1.85	0	0	38.633	0.000
1 week to 2 weeks	49	90.75	0	0		
2 weeks to 3 weeks	4	7.4	5	83.33		
More than 3 weeks	0	0	1	16.67		

Only 7 % of study population had a post-operative bed stay of 2 – 3 weeks in lap cholecystectomy group. While all the study population in lap converted group had a post-operative hospital stay for more than two weeks. The results are statistically significant.

**Distribution of study population according to the time taken to resume the normal work**

Duration	Lap cholecystectomy		Lap converted to open		Fischer exact Value	Significance
	No	%	No	%		
Less than 2 weeks	1	1.85	0	0	39.696	0.000
2 to 4 weeks	52	96.3	0	0		
4 to 6 weeks	1	1.85	4	80		
➤ 6 weeks	0	0	1	20		

Only 2 % of study population resumed to normal work after 4 weeks in lap converted to open cholecystectomy group. While all the study population in the group resumed to normal work after 4 weeks only. The results are statistically significant.

## CONCLUSION OF THE STUDY

Around 60% of the study population were in the age group of 41-60 years. Among them 66 % of the study population were females. Most of the patient diagnosed cholelithiasis had nausea, vomiting and 41% of patients, pain referred to back.

One fourth of study population had mild jaundice but on consecutive blood and sonological investigations where found normal.

It is noted that the surgery duration was less than 2 hours in 73% of study population and this signifies the learning laparoscopic curve of young surgeons and potentiates the need of laparoscopic training. About 10 % of the surgeries were converted to open cholecystectomy. And this data corresponds to existing data of 0.6 to 1.2 % of standard conversion rates. Adhesion in 67% of study population and Difficult Calot's dissection in 33% was the reason for conversion of Laparoscopic cholecystectomy to open cholecystectomy.

Bile duct injury is the major dreaded complications seen more in Laparoscopic cholecystectomy and this steadily decrease on proper pre-operative evaluation, clinical examination, knowing anatomy during surgery, meticulous surgery, necessary open conversion. Under the expert guidance intra-operatively only 3.3 % had bile duct injury and they were managed conservatively. Other 3.3 % of study group had Major bile duct injury has been referred to Hepato-biliary surgeon's opinion and further management.

Invariably all patients in the study group received pre-op and post-op antibiotics.

All cases of study population underwent Laparoscopic Cholecystectomy were discharged early within 10 days and only 7 % of study population had a post-operative bed stay of 2 – 3 weeks in lap cholecystectomy group. During follow-up, it is noted that these patients resumed to work less than a month and results are statistically significant.

Study population in Lap converted to open cholecystectomy group had a post-operative hospital stay for more than two weeks. And they resumed to normal work after 4 weeks only. These results are statistically significant.

Study population underwent Laparoscopic procedure alone were Cosmetically benefited.

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## PROFORMA

- 1) Name:
- 2) Age / Sex:
- 3) Occupation:
- 4) IP No:
- 5) Date of admission:
- 6) Date of Surgery
- 7) Date of Discharge:
- 8) Complaints:
- 9) Clinical examinations:
- 10) Investigations:
- 11) Diagnosis:
- 12) Procedure and details:
  - Anaesthesia                      Duration                      Co2 used
  - No. of ports
  - Findings
    - i. Spillage
    - ii. Bleeding – Cause / Management
    - iii. Others
    - iv. Drain
  - Conversion: Yes / No
- 13) Post-operative period
  - Pain
  - Analgesic & Antibiotic used
  - Drugs
  - Dose
  - Duration
  - Oral feeds
  - Drain removal
  - Ambulation
- 14) Complications – Post-operative
- 15) Hospital Stay
- 16) Condition at discharge
- 17) Follow -up

## நோயாளியின் ஒப்புதல் படிவம்

COMPREHENSIVE ANALYSIS OF COMPLICATIONS AND OUTCOME

OF LAPAROSCOPIC CHOLECYSTECTOMY IN K.A.P.V. GOVT.

MEDICAL COLLEGE & HOSPITAL

நோயாளியின் பெயர்:

வயது / பாலினம்

பெற்றோர் / கார்டியன் பெயர்:

முகவரி:

ஆய்வின் விவரங்கள் என் சொந்த மொழியில் எழுதி எனக்கு விளக்கினார். நான் மேலே குறிப்பிட்ட படிப்பைப் புரிந்து கொண்டேன் என்பதை உறுதிப்படுத்தி, மதிப்பீடு மற்றும் எனக்கு வழங்கப்படும் நுட்பங்களைப் பற்றி கேள்விகளைக் கேட்பதற்கான வாய்ப்பு இருந்தது. ஆய்வில் பங்கேற்பது தன்னார்வத் தொண்டு என்று நான் புரிந்து கொண்டேன் மற்றும் எந்தவொரு காரணமும் இல்லாமல் எந்த நேரத்திலும் நான் விலகிச் செல்ல எனக்கு சுதந்திரம் இருக்கிறது மருத்துவமனையால் வழங்கப்படும் மருத்துவ பராமரிப்பு பாதிக்கப்படுவதில்லை. ஆய்வுகளில் ஈடுபட்டுள்ள டாக்டர் என்னை கண்காணிக்க மற்றும் பல்வேறு மருத்துவ அளவுருக்கள் மதிப்பீடு செய்ய என அனுமதி தேவையில்லை. இந்த ஆய்வில் இருந்து எழும் எந்தவொரு தரவு அல்லது முடிவுகளின் பயன்பாட்டைக் கட்டுப்படுத்த வேண்டாம் என நான் ஒப்புக் கொள்கிறேன், அத்தகைய பயன்பாடு விஞ்ஞான நோக்கத்திற்காக மட்டுமே. ஏதாவது சிக்கல் ஏற்பட்டால், நான் மருத்துவக் குழுவினரால் போதுமான அளவிற்கு கவனித்துக் கொள்வேன் என்று புரிந்து கொள்கிறேன்.

நாள் :

நோயாளியின் கையொப்பம் \ கட்டைவிரல் அச்சு

இடம்: திருச்சி

ஆராய்ச்சியாளர் கையொப்பம்

## **PATIENT INFORMATION SHEET**

Title of the study

“COMPREHENSIVE ANALYSIS OF COMPLICATIONS AND OUTCOME OF LAPAROSCOPIC CHOLECYSTECTOMY”

Aim of the study:

Our aim of the study is to analyse the complications and outcome of laparoscopic cholecystectomy

Study procedure:

After getting admitted in ward relevant investigations will be done to confirm the diagnosis and exclude other pathologies. Clinical history and findings will be recorded, blood investigations will be done, USG and if necessary CT / MRCP will be taken according to confirm diagnosis and to exclude the anomalous tracts. All cases OGD done to look for normal ampulla and any defect in duodenum. If required biopsy will be taken and sent for HPE. This helps in planning the line of management and excluding anomalous tract which aids in surgery.

You're Rights in the Study:

Your medical records will be maintained confidential. The results of the study may be published in journals, but will not disclose the identity of the participants. Your participation in this study is voluntary and not under any compulsion and you are free to withdraw from the study without giving any reasons, without affecting the medical care which will be provided to you normally. If in case any complication arises, you will be adequately taken care of by the medical crew.

Date:

**Signature/Thumb Impression of the patient**

Place: Tiruchirappalli

**Signature of the Observer**

# MASTER CHART

Sl.no	Name of the patient	Age	sex	Ip.no	Chief complaints				Duration of complaints	Co-morbidities	Previous Abdominal surgeries	PREOP WORKUP				Diagnosis	procedure	outcome								
					Pain							USG	OGD	Duration of surgery (min)	Bile Duct injury			conversion to open	reason for conversion	In fection	Antibiotic requirements	Post operative hospital stay (days)	Return to work (days)			
					Localised to RHC	referred to back	Nausea & Vomiting	Jaundice							major									minor		
																									+	-
1	MUMTAJ	60	F	30953	+	+	+	+	1 week	DM	-	+	+	M	NORMAL	ACUTE CHOLECYSTITIS	Lap cholecystectomy	160	-	-	yes	DENSE ADHESIONS	+	yes	22	50
2	GOWTHAMI	24	F	181987	+	-	+	-	1 month	-	-	-	-	S	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	100	-	-	No	-	-	yes	6	20
3	MUTHU LAKSHMI	55	F	186188	+	-	+	-	6 months	-	LSCS	-	+	M	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	110	-	-	No	-	-	yes	12	16
4	CHITRA	31	F	31390	+	+	+	-	3 months	-	-	-	-	S	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	90	-	-	No	-	-	yes	12	18
5	RAJENDRAN	48	M	30336	+	+	+	-	2 months	SHTN	-			M	DISTAL GASTRITIS	CHOLELITHIASIS	Lap cholecystectomy	100	-	-	No	-	+	yes	15	27
6	SHANTHI FERNANDAZ	53	F	131024	+	-	+	-	2 months	DM	PS			M	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	90	-	-	No	-	-	yes	14	17
7	SUBRAMANIYAN	70	M	31385	+	+	+	+	2 weeks	DM	-	+		M	NORMAL	CHOLECYSTITIS	Lap cholecystectomy	150	+	-	No	-	-	yes	11	12
8	NILAVATHY	37	F	35835	+	-	-	-	1 year	-	PS	-	+	M	NORMAL	CHRONIC CALCULUS CHOLECYSTITIS	Lap cholecystectomy	120	-	-	No	-	-	yes	13	21
9	AROCKIYA MARY	26	F	36160	+	+	-	-	2 months	-	-	-	-	S	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	80	-	-	No	-	-	yes	12	19

10	BALA SUBRAMANYAM	45	M	36276	+	+	+	-	3 months	CAD	-	-	-	S	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	110	-	-	No	-	-	yes	12	16
11	LAKSHMI	42	F	29445	+	-	+	+	2 months	-	LSCS	-	+	M	NORMAL	CALCULOUS CHOLECYSTITIS	Lap cholecystectomy	160	-	-	YES	DIFFICULT CALLOTS DISSECTION	-	yes	19	32
12	DHANAVEL	36	M	38912	+	-	+	-	4 months	-	-	-	-	S	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	90	-	-	No	-	yes	9	15	
13	MANTVEL	47	M	36109	+	-	+	-	6 months	DM	-	-	-	S	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	90	-	-	No	-	yes	10	18	
14	RAJA	50	M	39207	+	+	-	+	8 months	SHTN	-	-	-	S	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	100	-	-	No	-	yes	8	18	
15	DHANABACKIYAM	58	F	40901	+	-	+	+	1 month	CAD	PS	+	-	M	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	140	-	+	No	-	yes	13	23	
16	VIJAYAKUMAR	56	F	35918	+	+	+	+	4 months	-	LSCS	-	-	M	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	120	-	-	No	-	yes	12	19	
17	KUBRAN SHEK	50	M	40125	+	+	-	-	2 months	-	-	-	-	S	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	90	-	-	No	-	yes	15	22	
18	PANJAVARNAM	48	F	137768	+	-	+	-	2 months	SHTN	PS	-	-	S	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	90	-	-	No	-	yes	12	21	
19	CHITRA	59	F	47645	+	+	-	-	5 months	-	-	-	-	S	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	100	-	-	No	-	yes	11	26	
20	MARIYAPPAN	58	M	43369	+	-	+	+	2 years	DM	-	+	+	M	NORMAL	CALCULOUS CHOLECYSTITIS	Lap cholecystectomy	120	-	-	No	-	yes	13	27	
21	CHINNAIYA	70	M	48611	+	-	+	-	1 year	SHTN	-	-	-	S	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	120	-	-	No	-	yes	12	23	
22	AMUTHA	55	F	48384	+	+	+	-	5 months	-	PS	-	-	S	LAX OG JUNCTION	CHOLELITHIASIS	Lap cholecystectomy	110	-	-	No	-	yes	10	20	
23	REKHA	31	F	51094	+	+	+	+	2 months	-	LSCS	-	-	M	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	90	-	-	No	-	yes	11	23	
24	NATHIYA	29	F	50338	+	-	+	+	3 months	-	-	-	-	M	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	100	-	-	No	-	yes	9	19	
25	KANAN RAJ	47	M	50097	+	+	+	-	1 year	-	-	-	-	M	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	90	-	-	No	-	yes	10	20	
26	RAMU	45	M	52092	+	-	-	-	9 months	SHTN	-	+	-	S	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	110	-	-	No	-	yes	8	23	

27	NASRUDEEN	50	M	54894	+	-	+	-	1 year	-	-	-	-	S	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	120	-	-	No	-	-	yes	12	24
28	ANJALAI	33	F	54683	+	-	+	-	2 months	-	PS	+	+	S	NORMAL	CALCULOUS CHOLECYSTITIS	Lap cholecystectomy	180	-	-	yes	ADHESIONS	+	yes	18	28
29	BHUVANESHWARI	28	F	55612	+	+	+	-	3 months	-	-	-	-	M	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	100	-	-	No	-	-	yes	10	17
30	KALAISELVI	24	F	57316	+	-	+	-	4 months	-	-	-	-	S	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	100	-	-	No	-	-	yes	10	19
31	NANDHINI	21	F	62501	+	-	+	-	2 months	-	-	-	+	S	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	90	-	-	No	-	-	yes	8	16
32	AROCKIYA MARY	44	F	60890	+	+	+	+	7 months	DM	LSCS	-	-	M	LAX OG JUNCTION	CHOLELITHIASIS	Lap cholecystectomy	90	-	-	No	-	+	yes	17	28
33	PANNEER SELVAM	55	M	60383	+	-	+	-	9 months	-	-	-	-	M	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	120	-	-	No	-	-	yes	14	23
34	SIVANESAN	42	M	63279	+	+	+	-	1 year	-	-	-	-	S	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	120	-	-	No	-	-	yes	13	19
35	GANESAN	59	M	60663	+	+	+	-	4 months	SHIN	-	+	-	M	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	130	-	-	No	-	-	yes	11	20
36	LAKSHMI	56	F	64460	+	-	+	+	1 month	-	PS	-	-	M	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	130	-	-	No	-	-	yes	9	17
37	NARAYANAN	60	M	62639	+	+	+	-	3 months	CAD	-	-	+	M	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	90	-	-	No	-	-	yes	11	24
38	MUTHULAKSHMI	56	F	66379	+	-	+	-	2 months	-	PS	-	-	S	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	150	-	-	No	-	-	yes	12	25
39	ANURADHA	38	F	66439	+	-	+	-	5 months	-	-	-	-	M	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	140	-	-	No	-	-	yes	10	21
40	MALATHY	43	F	66276	+	-	+	+	4 months	-	LSCS	-	-	M	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	130	-	-	No	-	-	yes	8	19
41	SATHYA	28	F	66365	+	-	+	-	2 months	-	-	+	+	M	NORMAL	ACUTE CALCULUS CHOLECYSTITIS	Lap cholecystectomy	190	-	-	yes	ADHESIONS	+	yes	18	30
42	KRISHNAVENI	40	F	69906	+	+	+	-	5 months	-	LSCS	-	-	S	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	90	-	-	No	-	-	yes	10	19
43	GANDHIMATHI	58	F	71985	+	+	-	-	1 month	DM	-	-	-	M	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	120	-	-	No	-	+	yes	14	28
44	VASANTHA	60	F	75911	+	-	+	-	1 month	DM	-	+	-	M	NORMAL	ACUTE CALCULUS CHOLECYSTITIS	Lap cholecystectomy	180	-	-	YES	DIFFICULT CALLOTS DISSECTION	+	yes	20	31



45	RANI	40	F	77643	+	-	+	-	4 months	-	LSCS	-	-	S	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	110	-	-	No	-	-	yes	13	20
46	UMA	52	F	67859	+	+	+	+	7 months	-	PS	-	+	M	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	100	-	-	No	-	-	yes	11	17
47	YASOTHA	65	F	71486	+	-	+	-	1 month	-	-	+	-	M	NORMAL	ACUTE CALCULUS CHOLECYSTITIS	Lap cholecystectomy	160	-	-	No	-	-	yes	9	19
48	INDRANI	37	F	80926	+	-	+	-	5 months	-	LSCS	-	-	M	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	90	-	-	No	-	-	yes	14	25
49	DARANI	55	M	81746	+	+	+	-	9 months	SHTN	-	-	-	S	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	120	-	+	No	-	-	yes	8	21
50	VEERAMANI	58	M	82068	+	-	-	-	1 year	CAD	-	-	-	S	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	110	-	-	No	-	-	yes	11	24
51	GAYATHRI	26	F	82774	+	+	+	-	6 months	-	-	-	-	S	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	120	-	-	No	-	-	yes	9	21
52	MARUTHAI	57	M	81987	+	+	+	-	2 years	DM	-	-	+	M	NORMAL	CHRONIC CALCULUS CHOLECYSTITIS	Lap cholecystectomy	80	-	-	No	-	+	yes	21	31
53	MEENA	38	F	86393	+	-	+	-	6 months	-	PS	+	-	M	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	100	-	-	No	-	-	yes	12	22
54	RAMAN	47	M	83299	+	-	-	-	15 months	CAD	-	-	+	S	NORMAL	CHRONIC CALCULUS CHOLECYSTITIS	Lap cholecystectomy	150	+	-	No	-	-	yes	9	19
55	MAGESWARI	40	F	87450	+	-	+	+	5 months	-	-	-	-	M	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	110	-	-	No	-	-	yes	12	16
56	ANTHONYAMMAL	66	F	89050	+	+	+	-	3 months	-	-	-	-	M	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	120	-	-	No	-	-	yes	14	27
57	CHANDRA	48	F	2084	+	-	+	-	6 months	-	LSCS	-	-	S	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	90	-	-	No	-	-	yes	12	23
58	CHANDRA	45	F	4103	+	-	-	-	8 months	-	-	-	-	S	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	150	-	-	No	-	-	yes	11	20
59	SHAGIRA BANU	29	F	96447	+	-	+	+	5 months	-	LSCS	-	-	M	NORMAL	CHOLELITHIASIS	Lap cholecystectomy	120	-	-	No	-	-	yes	8	19
60	THAYAMMAL	60	F	3692	+	-	+	-	1 month	DM	-	+	+	M	NORMAL	ACUTE CALCULUS CHOLECYSTITIS	Lap cholecystectomy	170	-	-	YES	ADHESIONS	+	yes	19	35