

Clinical Presentation of Hepatobiliary Disorders - A Study of 178 Cases

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Abstract: Hepatobiliary disorders are some of the commonest disorders of the digestive system. Hepatobiliary diseases refer to any condition that affects the liver, gallbladder and the bile duct. Present study included 178 cases of hepatobiliary disorders admitted in surgical wards of Guru Nanak Dev Hospital, Amritsar with the aim to study the incidence, clinical pattern, etiology, risk factors, treatment pattern, operations performed and complications in various disorders of hepatobiliary disorders. It was observed that Cholelithiasis with chronic cholecystitis was the most common gall bladder disease. Cholelithiasis with choledocholithiasis was most common biliary tract disorder. Liver abscesses were the predominant disease amongst liver disorders.

Keywords- Hepatobiliary, Cholelithiasis, Choledocholithiasis, Acute cholangitis, Hepatic abscesses

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I. Introduction

Hepatobiliary disorders are some of the commonest disorders of the digestive system. Hepatobiliary diseases refer to any condition that affects the liver, gallbladder and the bile duct. These diseases commonly share some telltale signs or symptoms such as jaundice, a darker urine colour and a lighter stool colour. These conditions are treated and managed by a multidisciplinary team.

Below is the list of common hepatobiliary diseases :

- a) Cholelithiasis
- b) Acute cholecystitis
- c) Carcinoma gall bladder
- d) Choledocholithiasis
- e) Acute cholangitis
- f) Choledochal cyst
- g) Cholangiocarcinoma
- h) Hepatic abscesses
- i) Hydatid cyst

II. Review of Literature

The Roman Celsus in his text *De Medicina*, translated by W.G. Spencer in 1935, mentioned the liver and described its anatomic location:

Hippocrates is credited with the first description of a hepatic abscess in the year 4000 BC. The first mention of blood and mucus diarrhoea is found in the Sanskrit document Bhrigu-samhita, dated 3000 BC¹. The association of 'ball-like' abdominal masses with this condition has also been recorded and is thought to be indicative of co-existing hepatic abscess. In the early 20th century, the inciting event was usually appendicitis, causing pylephlebitis and resultant hepatic abscess. More recently, Ochsner's classic 1938 in his paper described this disease as one that occurred in young males with underlying intra-abdominal infection. Open surgical drainage was the recommended treatment for many years. In 1953, McFadzean and associates in Hong Kong advocated closed aspiration and antibiotics for treatment of solitary pyogenic liver abscesses. However, this treatment did not gain widespread acceptance. Descriptions of the segmental nature of liver anatomy by Couinaud, Woodsmith, and Goldburne in 1957 opened the door even wider and introduced the modern era of liver surgery. Imaging advancements in the 1980s allowed for precise localization and a percutaneous approach to treatment. Modern times have seen a major shift in etiology, affected patient population, and treatment of

pyogenic abscesses in the liver. Liver abscesses now rarely occur in young people secondary to appendicitis. They usually occur in older, more debilitated patients, often in the setting of malignancy.²

In 2012 Dhaval O. Mangukiya et al. in their prospective series "Case Study of Pyogenic Liver Abscess: Recent Trends in Etiology and Management" reported that 80% were male and 20% were female. Male to female ratio was 4:1. The patients' age ranged from 10 to 70 years, and mean age was 35 years. Majority of patients (97%) with pyogenic liver abscess presented with upper abdominal pain. High-grade fever was noted in (74%) patients, vomiting and nausea in (50%) patients, while loss of appetite in (49.5%) patients. Majority of liver abscesses (83%) were found in the right lobe of liver. About 4.5% of liver abscesses were confined to the left lobe only. Both lobes were involved in 12.5% of patients. In this study, more than 50% of abscesses were solitary at the time of presentation. Multiple abscesses were found in 21% of patients. Intravenous antibiotic therapy (cephalosporin or fluoroquinolones combined with metronidazole and an aminoglycoside) was started for all patients. 32% patients improved completely by this regimen. Remaining 270 patients required intervention in different forms. 91.66% of patients had solitary large abscess. About 91% of liver abscesses were confined to liver at the time of presentation. Others were ruptured in the pleural (4%), peritoneal (4%), or both the cavities (1%) Rupture of abscess into pleural or peritoneal cavity was the major complication (5%), and 1.5% of patients expired during or after the treatment.³

In September 2014 Channanna C et al. in their study, "A Clinical Study, Diagnosis and Management of Liver Abscess" at VIMS, Bellary reported that the age of the patients varied from 10-80 years. The mean age was 43 yrs. The lowest incidence was noted in the age group 61-70 yrs & 70-80 yrs (6.6%). The highest incidence was noted in the age group 41-50 yrs (30%). 93.33% patients were male and 6.67% cases were female. Alcoholism was found to be the most consistent etiological factor in this study of liver abscess, 83.33% of the cases of this study were found to be alcoholics. Ultrasound abdomen was done to all patients in this study and various findings were analyzed. Solitary abscess was seen in 70% of cases. Multiple abscesses were seen in 30% cases. Right lobe involvement exclusively was seen in 90% and isolated left lobe involvement was seen in 6.6% of cases. Both lobe involvement was seen in 3.3% of cases. Serum bilirubin levels > 2 mg/dl were seen in 36.6% of the cases of liver abscesses. Alkaline phosphatase levels were raised in 76.6% of the cases. Patients who had a solitary abscess with volume <100 ml were treated conservatively. In patients who had abscesses > 100 cc were chosen for USG guided percutaneous aspiration/ pigtail catheter insertion. Laparotomy as initial line of treatment was performed in 2/30 (6.6%) of cases of liver abscess. One case presented as acute abdomen with peritonitis and other cases had multiple liver abscesses.⁴

In 2015, Amit Kumar Jha et al. in their "Clinicopathological study and management of liver abscess in a tertiary care center" reported that amoebic liver abscess was the most common (88%) type of liver abscess. There was a strong correlation with the occurrence of liver abscesses and addiction to alcohol, history of diabetes mellitus and low socioeconomic status. The most common etiology of pyogenic liver abscess was *Escherichia coli*. Ultrasonography (USG) of the abdomen was accurate and cost-effective in the diagnosis of liver abscesses. Percutaneous catheter drainage was the most effective method of treatment. However, for larger abscesses (>200cc) and left lobe abscesses medical management plus intervention such as catheter drainage (compared to needle aspiration) results in high cure rates with surgical option reserved for complications such as peritonitis.⁷⁸

Diseases of the gallbladder have affected humans since antiquity, with gallstones found in the mummy of Princess Amenemhat of Thebes dating to 1500 BC.⁵

Depictions of the gallbladder and biliary tree are found in Babylonian models found from 2000 BC, and in ancient Etruscan model from 200 BC, with models associated with divine worship.⁶

Some historians believe the death of Alexander the Great may have been associated with an acute episode of cholecystitis.⁷ The existence of the gallbladder has been noted since the 5th century, but it is only relatively recently that the function and the diseases of the gallbladder has been documented,⁵ particularly in the last two centuries.⁸

Cholelithiasis was first described by a Florentine pathologist, Antonio Beniveniv, in 1420.^{9,10}

Gall stones are one of the most common disorders of the gastrointestinal tract, affecting about 10% of people in Western society.^{11,12} More than 80% of people with gall stones are asymptomatic. Acute cholecystitis develops in 1-3% of patients with symptomatic gall stones.¹³ According to the third National Health and Nutrition Examination Survey, 6.3 million men and 14.2 million women aged 20 to 74 in the United States had gallbladder disease.^{14,15,16,17,18}

The overall incidence of gallstone disease was 18.8% in women and 9.5% in men.¹⁹

It was Fallopius who in 16th century came close to describing the anatomy and function of the liver and the biliary tract as we know it today. However, Paracelsus in 1500 was the first person to comment on the origin of gall stones. In 1565 Kentman attributed gall stones to bile combustion.

The advent of 18th century ushered in the recognition of acute cholecystitis by John Hunter. The discovery of the association of typhoid fever with cholecystitis rapidly led to the belief that typhoid bacilli were the causative organism. This was supported by Carl Eberth in 1881.

Feinblatt in 1928 described the pathological changes of edema, number of acute inflammatory cells in the gall bladder wall and in the mucosa. The changes were different from the changes seen in other organs. He concluded that the bacteria had a minor role to play in the production of acute cholecystitis.²⁰

In 1892 Naunyn B published a monograph in which he put forward the infective theory of the origin of gall stones. In 1909 Aschoff and Bacmeister considered that cholesterol stones were positively metabolic in origin. Recent studies support the theory that stone formation is due to the precipitation of cholesterol or a deficiency of its solvent, the bile salts.

Then in 1909 Robert Koch discovered clumps of Eberthella typhosa in the walls of an acutely inflamed gall bladder. Kety detected the presence of other organisms in this disease.

In time, other organisms like staphylococci, E.Coli, Streptococci and B.anthraxis, were found to be more frequently associated with acute cholecystitis.

In 1992, Graham said that bacteria reach the gall bladder from a foci of infection in the liver.

Jean Lovis Petik, the founder of gall bladder surgery, in 1733, had suggested the removal of gall stones and drainage of gall bladder.²¹

With the pioneer work of Ephraim McDowell (1780-1830), who in 1809, was the surgeon to open the abdomen with the object of removing an ovarian cyst, the operative treatment of gall stones really began.²²

The first open cholecystectomy was performed on July 15, 1882, by a German Surgeon Carl Johann August Langenbach, at the Lazarus Krankenhaus.^{23,24}

Inspired by Kurt Semm's pioneering use of laparoscopy, a minimally invasive surgical technique, Mühe designed his own surgical laparoscope, which he called the "Galloscope", in 1984. He first used it to remove a gallbladder (in a procedure known as cholecystectomy) on September 12, 1985, marking the world's first laparoscopic cholecystectomy.²⁵ He first presented his work in April 1986 at the Congress of the German Society of Surgery, after performing 94 successful surgeries using his technique.

In India, the first laparoscopic cholecystectomy was performed in 1990, in Mumbai, by Prof. Tehempton E Udawadia.²⁶

Laparoscopic cholecystectomy is now considered the gold standard treatment for symptomatic gall stone disease.¹⁰⁶

In 2005, Mohan H et al. conducted a study titled **A Clinical Study on Cholelithiasis and its Management** and they reported that *the most age group affected is between 17 and 79 years. Almost all patients had right hypochondrial pain and dyspepsia. By USG abdomen 100% of the patients confirmed the diagnosis of cholelithiasis. Mean age of the patient was 48 years in our study. Mixed type of gall stones being the most common. Next in the list being cholesterol stones, followed by pigment stones. 52% of the patients were female. All the 50 patients were treated surgically, with 39 open cholecystectomies and 11 laparoscopy cholecystectomies. All 50 gall bladders were sent for HPE, out of which 49 were reported as chronic cholecystitis and 1 reported as adenocarcinoma.*²⁷

In 2014 Srinivas A et al²⁸ in their A Clinical Study of Cholelithiasis reported that the maximum number of patients were between 41-50yrs of age. The female to male ratio was 2:1. Most of the patients were not overweight or obese but moderately built. Pain in the right hypochondrium was the presenting symptom in 98% of the cases. Ultrasonography of the abdomen was the most accurate investigation (nearly 100%). Laparoscopic cholecystectomy was the surgical procedure of choice. There was no mortality in the series.

Clinical study of Sharada B and Srinivas D.²⁹ in 2017, reported that there is an increased incidence of cholelithiasis in the 5th and 6th decade with a peak in the 5th decade, with female preponderance. Pain was present in 97.78%, vomiting in 55.56%, dyspepsia in 22.2%, jaundice in 13.33% and fever in 8.8% cases. Ultrasound scanning of the abdomen was done in all patients which showed stones in the gallbladder. In this study, 51.11% patients underwent open cholecystectomy while 48.88% underwent laparoscopic cholecystectomy. Bile duct injury and bile leak was observed in 2.2% each cases. 95.56% patients shows chronic cholecystitis while 4.44% shows acute cholecystitis.

The liver and biliary system, throughout the history of mankind, has always held a distinctive place. For many historical and contemporary civilizations the liver has represented a mysterious organ with a complex anatomy, an overwhelming number of functions and an extraordinary ability to regenerate. The Babylons (2000-3000 BC) regarded this organ as the 'seat of the soul'.⁹

Erasistratus, a Greek physician of 4th century BC, recognized that some of the cases of jaundice were due to obstruction of the duct that leads from the gallbladder to the bowel. His contemporary Diocles agreed with him and demonstrated this in cadavers.³¹

In 2nd century AD, Galen emphasized that the impaired passage of the 'yellow bile' can be caused by inflammation, induration, obstruction or by external pressure by surrounding structures, causing closure of the common duct.^{32,33,30,34}

One of the first reports of the common bile duct pathology was the report of cholangitis by Jean Martin Charcot (1877), a French physician. He described the symptoms associated with the passage of common duct stones - right upper quadrant pain, fever with chills and jaundice, known to us as Charcot's triad. Later a hepatologist from Los Angeles, Telfer Reynolds, added hypotension and altered mental status to it (Reynold's pentad) related to sepsis in cholangitis.³⁰

Robert Abbe of New York, in 1889 performed the first choledochotomy on a 36 yr old woman with dark jaundice, removed a single stone lodged midway in the duct and sewed it up with fine silk. Simultaneously, Ludwig Courvoisier, Lawson Tait, A. W. Mayo Robson, Percy Bland Sutton, W. W. Keen performed choledocholithotomy.³⁰

Emil Theodor Kocher's name is eponymically linked to biliary surgery with the Kocher incision and Kocher manoeuvre. He also devised transduodenal sphincteroplasty.

Charles McBurney in 1898, reported about transduodenal choledochotomy. This can be considered essentially as the precursor of the modern day endoscopic sphincterotomy.

Hans Kehr of Germany invented the T-tube. In one of his two treatises on biliary surgery he quotes "I do not shy at introducing my finger into the hepatic and common ducts to guard against leaving the stones behind". He recognized the dangers of acute cholangitis and advocated drainage of the ducts.³³

In 2003, Gupta BS in his clinical study of Choledochoduodenostomy: a study of 28 consecutive cases reported that 79% of the patients who underwent choledochoduodenostomy were female and majority (43%) belonged to the 51 to 60 age group. All the patients selected for CDD had a dilated common duct of at least 1.5 cm diameter and 71% of them had multiple stones. 79% were asymptomatic during the follow up, two patients developed wound infection. 18% developed alkaline reflux gastritis and only one patient suffered from recurrent cholangitis because of inadequate stoma size. No case of "sump syndrome" was observed in this series.³⁵

In 2014, Chandu S in his Clinical Study and Management of Choledocholithiasis, reported that CBD stones occurred predominantly in elderly females and presented from subclinical jaundice to complications in the form of biliary pancreatitis and cholangitis. USG abdomen with LFTs were able to diagnose a majority of the CBD stones preoperatively. Per operative cholangiogram was used selectively in case USG was inconclusive, ERCP was used in patients presenting with severe obstructive jaundice, pancreatitis, cholangitis and minimal CBD ductal dilation. Open exploration was the main focus with a wide variety of procedures performed according to specific indications.³⁶

In 2016 Manimaran D et al in their study Choledocholithiasis: Clinical Manifestations and Associated Conditions reported that out of 115 patients, 51 were males and 64 were females. Mean age of presentation was 49.91 years. Most common presentation of CBD stones was abdominal pain 60.86% followed by jaundice 38.26%. Charcot's triad was seen in 33.04%.³⁷ Most common associated condition was distal CBD stricture (16.5%). In this study, 54% of patients had associated GB stones, 22% had isolated CBD stones and 24% had CBD stones in post cholecystectomy state.

In August 2019 Sabira S et al in their, A Clinical Study and Management of Common Bile Duct Stones reported that the age of the patients varied from 27 to 72 yrs. The female to male ratio was 1.72. Pain was the most common symptom 28 (93.3%). It varied from mild intermittent pain suggestive of biliary colic, to severe pain radiating to the back suggestive of acute pancreatitis in 2 cases (6.6%); associated with fever and chills suggestive of cholangitis in 11 cases (36.6%). Jaundice was present in 17 cases (56.6%). 3 patients (10%) had documented a past history of jaundice relieved by temporary biliary stenting before their inclusion in our study. 6 patients (20%) had recurrent attacks of fever with chill and rigor, suggestive of cholangitis. The most common combined medical illness was DM (26.6%) followed by HTN (23.3%) Mean serum total bilirubin was 2.8. Alkaline phosphatase was elevated in all patients where 56.6% (17 patients) had a value between 150 – 250 IU/L. On USG gall bladder was seen in 29 of the 30 patients. The gall bladder was thickened in 29 patients (96.6%) and either had stones or sludge. All patients had CBD ductal diameter of greater than or equal to 8 mm. Mean CBD diameter was 12.22 mm. The largest diameter recorded was 23 mm. Out of 30 patients, 5 patients underwent ERCP (16.6%). ERCP was successful in clearing the CBD of stones in 4 cases (80%). In one case, a temporary stent was introduced due to incomplete clearance in which open CBD exploration was carried out. One patient underwent laparoscopic cholecystectomy but was converted to open CBD exploration. The total number of open CBDE was 25 (83.3%).³⁸

In 1925, Graham and Cole introduced oral Cholecystography. Mirizzi of Argentina, in 1931, described the method of intra-operative injection of lipiodol for cholangiography.^{32,33} Although percutaneous transhepatic cholangiography was described initially in 1937 and later again in 1952, it was not until 1973, with the introduction of the Chiba needle by Okuda, that it gained widespread acceptance.³³

III. Aims and Objectives

1. To study the incidence of cases of hepatobiliary disorders presenting to the surgical wards.
2. To study the clinical pattern of the various disorders.
3. To study the etiology and risk factors of the various disorders.
4. To study the incidence of benign and malignant disorders among all these.
5. To study the complications among the various disorders.
6. To study the treatment pattern: conservative /surgical.
7. To study the various types of operations performed for these disorders.
8. To study the morbidity and mortality.

IV. Material and Methods

This was a study of 178 cases of hepatobiliary-pancreatic disorders admitted in surgical wards of Guru Nanak Dev Hospital, Amritsar after taking their written informed consent. Approval of study was taken from Institutional Ethics Committee, Govt. Medical College, Amritsar.

All cases of all age groups and sex with clinical symptoms and signs suggestive of liver, gall bladder and pancreas disorders were taken up for study.

Various diseases pertaining to liver, gall bladder and pancreas diagnosed by clinical, biochemical and radiological investigations were included in the study and the parameters were noted as per proforma attached. Treatment modalities of various disorders (conservative or surgical) were noted. Mortality rate till date of discharge were also recorded and notified.

V. Observations

The study includes the total of 178 cases that were studied prospectively over a period of around two years from 5/8/2017 to 4/9/2019 and observations were made as under :-

5.1 Frequency of various hepatobiliary disorders

Frequency of various hepatobiliary disorders were observed. Gall bladder disease was most common amongst hepatobiliary disorders accounting for 112(62.92%) of total cases, followed by biliary tract disorders accounting for 42(23.60%) of cases and liver disorders accounting for 24(13.48 %) of cases.

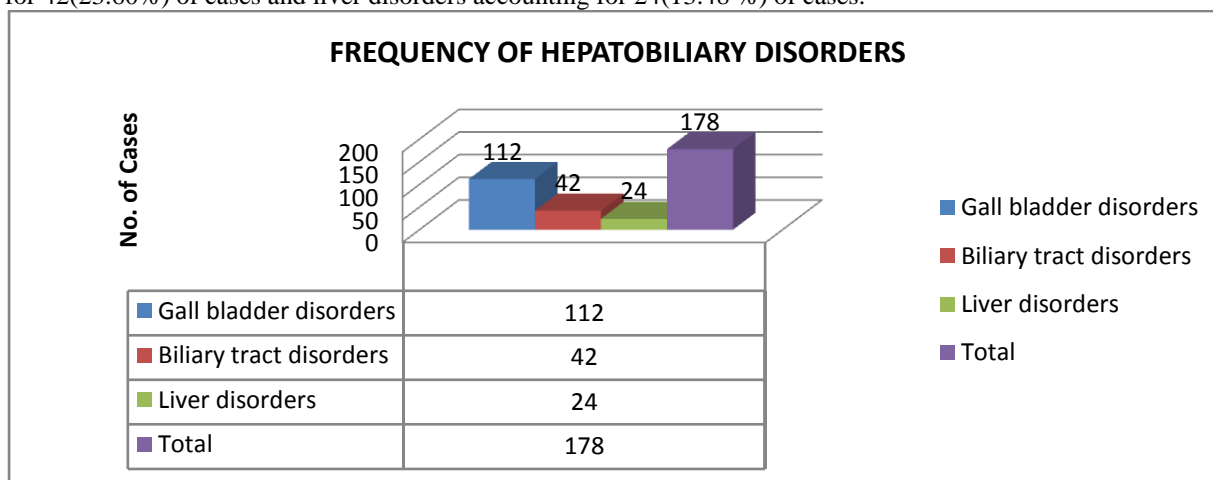


CHART No. 1 showing frequency of hepatobiliary cases

Amongst gall bladder disorders cholelithiasis with chronic cholecystitis was the most common disease 75.90% (85 cases) ; in biliary tract disorders, cholelithiasis with choledocholithiasis was the most common disease 71.42% (30 cases) and in liver disorders liver abscess was the most common disease 100% (24 cases). The detailed distribution of each disorders is shown in table below:-

TABLE I: FREQUENCY OF HEPATOBILIARY CASES IN SURGICAL WARDS (n=178)

Hepatobiliary Pancreatic Disorders	No. of cases	%age among individual group	%age among Hepatobiliary disorders (n=178)
Gall bladder disorders:(n=112)		(n=112)	
• Cholelithiasis with chronic cholecystitis	85	75.90	47.76
• Cholelithiasis with acute cholecystitis	21	18.75	11.79
	6	5.35	3.37

• Gall Bladder Mass	Total	112	100%	62.92
Biliary Tract disorders :(n=42)			(n=42)	
• Cholelithiasis with choledocholithiasis		30	71.42	16.85
• Primary choledocholithiasis		06	14.30	3.37
• Choledochal cyst		02	4.76	1.12
• Cholangiocarcinoma		02	4.76	1.12
• Periapillary carcinoma		01	2.38	0.56
• Caroli disease		01	2.38	0.56
Total		42	100%	23.60
Liver Disorders:(n=24)			(n=24)	
• Liver Abscesses		24	100	13.48
• Hydatid Cyst		0		0.0
Total		24		13.48
Grand.Total		178	100%	100.0

5.2 Age wise incidence.

There is increased incidence of gall bladder disorders and biliary tract disorders in the 5th decade followed by 6th decade of life with the youngest patient in gall bladder disease being 18 years and eldest patient being 75 years old, with mean age being 43.63. **In biliary tract disorders**, the youngest patient being 24 years old and eldest patient being 75 years old with mean age being 50.71. **In liver disorders** there is increased incidence in fourth and fifth decades with mean age being 43.21 with the youngest patient being 23 years old and eldest patient being 75 years old.

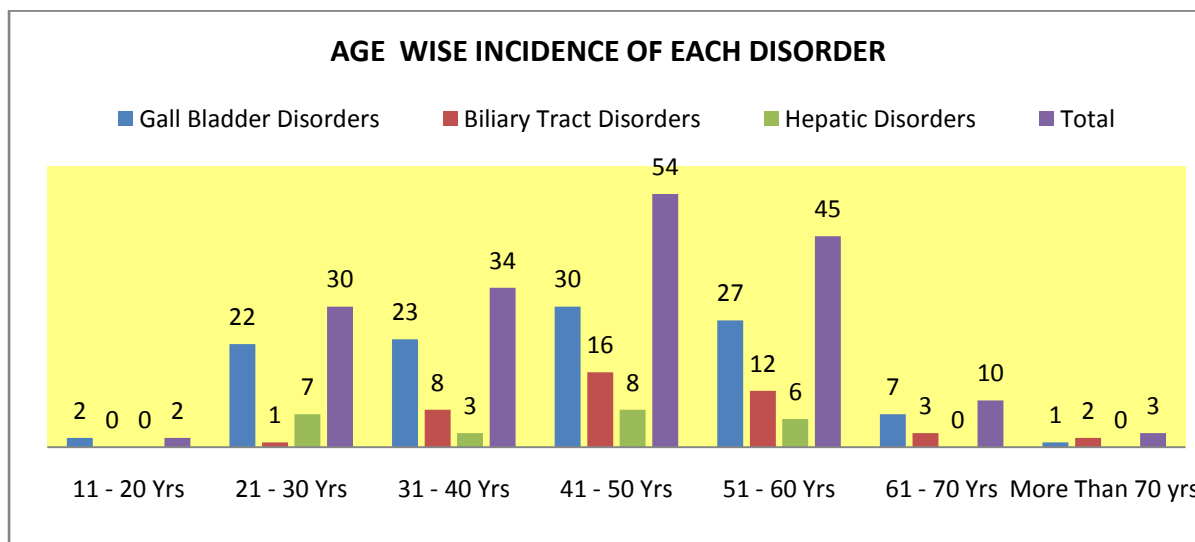


CHART No. 2 showing age wise incidence of each disorder

5.3 Sex wise distribution.

In the present study out of 112 cases of gall bladder disorders 94(83.92%) were females and 18(16.07%) were males. Similarly in biliary tract disorders out of 42 patients 34(80.95%) were females and 8(19.04%) were males. In hepatic disorders among total of 24 patients 1(4.16%) were females and 23(95.83%) were males. Overall in 178 cases of hepatobiliary disorders 129(72.47%) were females 49(27.52%) were males.

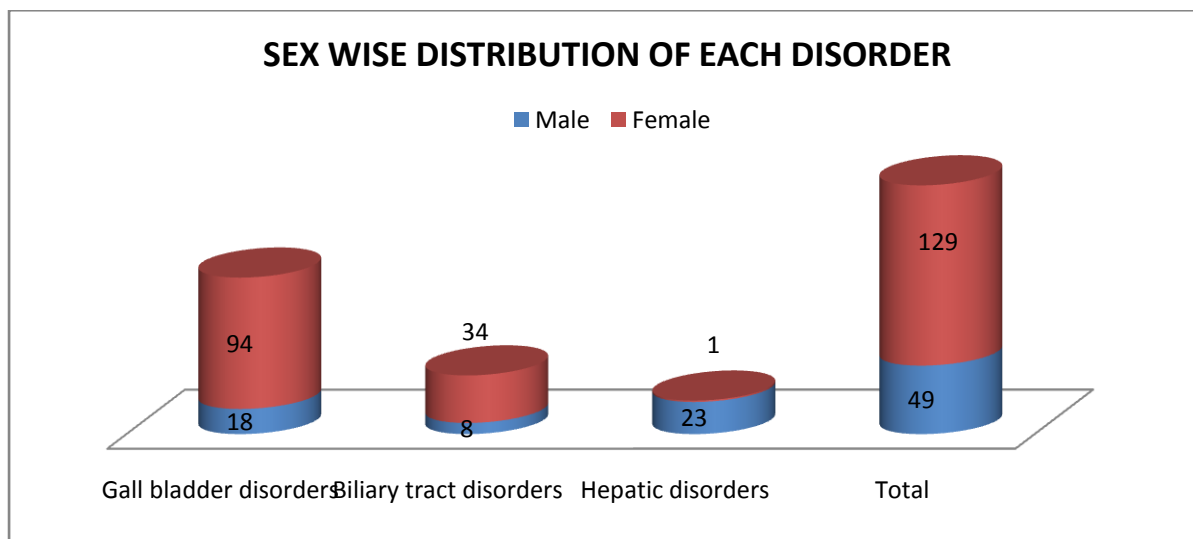


CHART No. 3 showing sex wise distribution of each disorder

5.4 Presenting Symptoms.

Present study shows that pain was the most common presenting complaint in gall bladder disease, present in 112(100%) cases, followed by vomiting in 45(40.17%) cases, dyspepsia in 30(26.78%) cases, fever in 14(12.5%) cases, while jaundice and mass abdomen in 6(5.35%) cases. Commonest site of pain was in right hypochondrium and next commonest site was epigastrium.

Pain was the presenting symptom in 40 out of 42 patients(95.20%) in biliary tract disorders while jaundice was present in 30 patients(71.42%), 27 patients had fever(64.28%), of which the 21 had classic triad of cholangitis (50.0%), dyspepsia in 37(88.09%) cases, vomiting in 35(83.3%) patients, 6 patients had mass abdomen (14.28%).

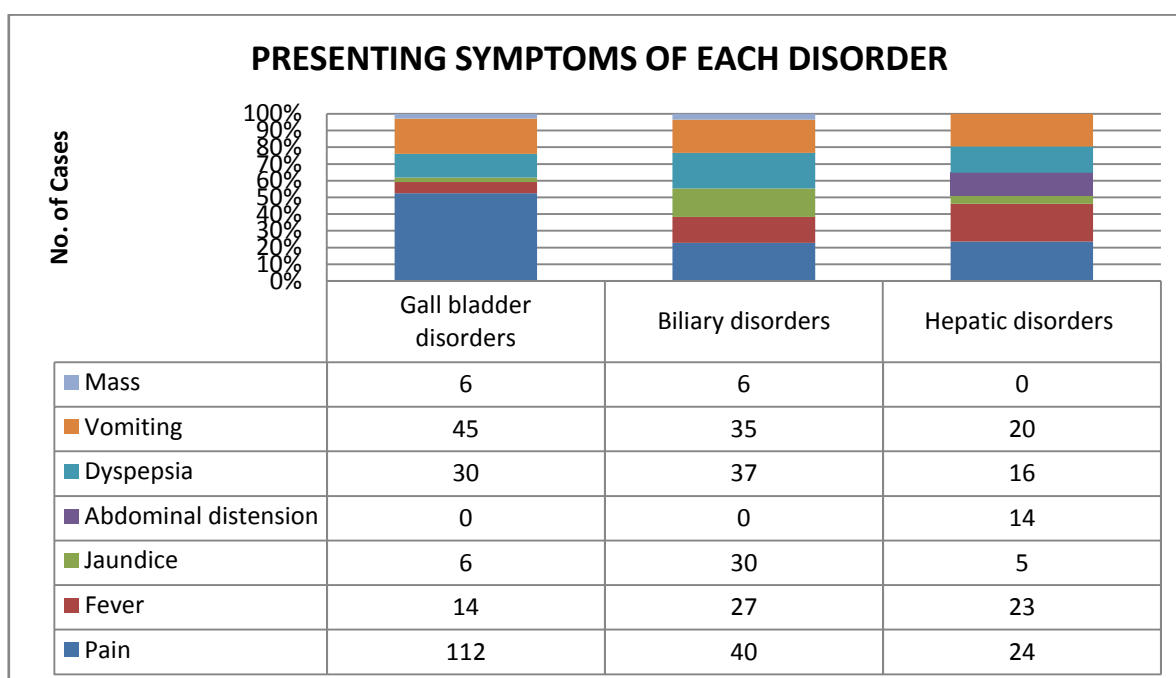


CHART No. 4 showing presenting symptoms of each disorder

In hepatic disorders, abdominal pain was present in all cases (100%). Fever was the most consistent symptom occurring in 95.8% cases, vomiting in 83.33% cases and abdominal distension in 58.33% cases. Jaundice was present in 20.8% of patients.

5.5 Ultrasound findings of gall bladder disorders

Ultrasound scanning of the abdomen was done in all patients of gall bladder disease. In gall bladder disease, gall stones were present in 112(100%) cases with a solitary stone present in 44(39.28%) cases while multiple stones were present in 68(60.71%) cases. 21(18.75%) patients had associated gall bladder wall thickening. 6(5.35%) patients showed associated gall bladder mass.

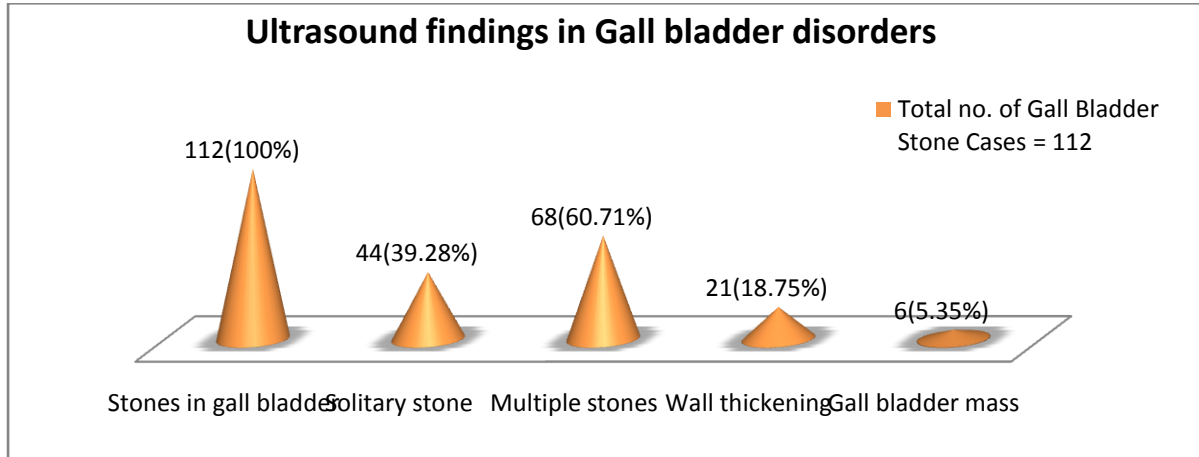


CHART No. 5- showing ultrasound findings of Gall bladder disorders

5.6 Type of Operation performed for Gall Bladder Disease.

In the present study 99(88.39%) patients underwent open cholecystectomy out of which extended cholecystectomy was done in 4 gall bladder mass patients in the early stage of disease and laparoscopic cholecystectomy was done in 11 patients.

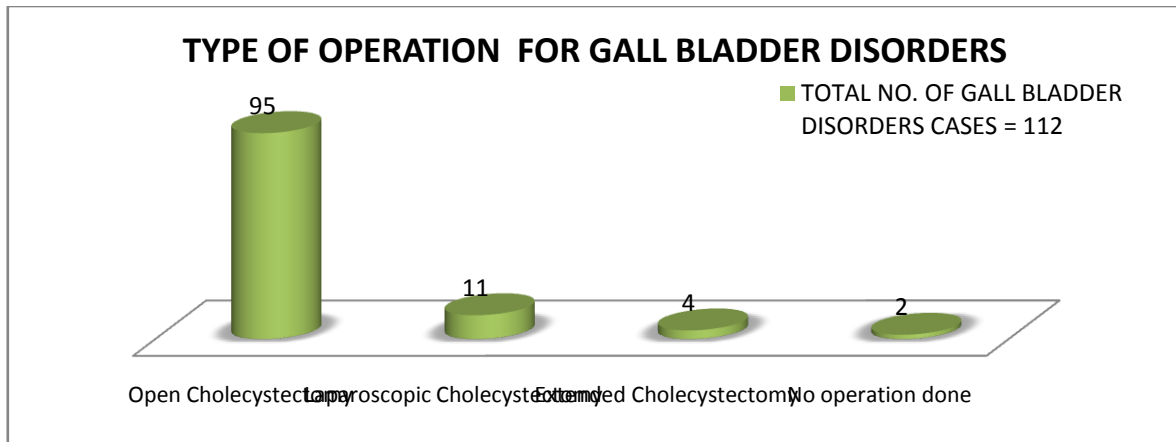


CHART No. 6- showing Type of Operation done for Gall bladder disorder cases

5.7 Operative & Post operative Complications.

In the present study, 6 patients had wound site infection (5.36%), 2 patients had post operative bile leaks (1.79%), which were manage conservatively and the patients recovered. 2 patients (1.79%) had intraoperative bile duct injuries, one of which was repaired on T-tube, while one patient was required to be sent out for ERCP guided stenting.

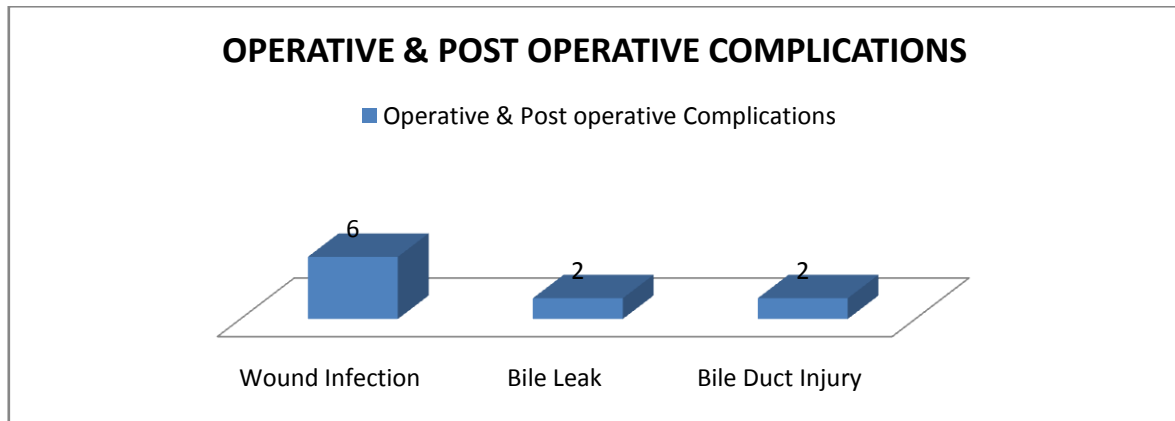


CHART No. 7- showing Operative and Post-operative complications in Gall bladder diseases.

5.8 Ultrasound findings in Biliary Tract Disorders.

Except for six patients, who had undergone prior cholecystectomy, gall bladder was visualized in 36 out of 42 patients.

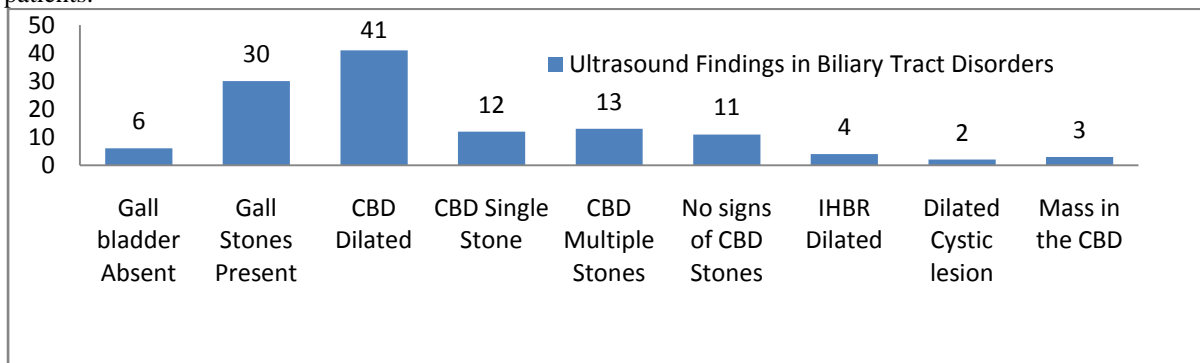


CHART No.8- showing Ultrasound findings in Biliary Tract Disorders

All of these patients had undergone cholecystectomy more than 2 years ago before their current admission. Out of 36 patients, 30 patients had gall bladder stones. CBD was dilated in 41(97.61%) out of 42 patients. USG detected CBD stones in 25(59.52%) out of 42 patients. The patients in whom USG did not detect signs of stones, underwent MRCP(11 patients). MRCP was able to pick up stones in all of these 11 patients, approaching sensitivity of nearly 100% .

On USG multiple stones in the CBD were found in 13(30.95%) cases while single stones in the CBD were found in 12(28.57%) cases. IHBRs were dilated in 4(9.52%) cases with associated mass in CBD was found in 3(7.14%) cases. 2(4.76%) patients had associated dilated cystic lesion along with dilated CBD.

5.9 CBD Diameter.

CBD was dilated(>8mm) in 41 out of 42 patients(97.61%) with a mean CBD diameter of 14.73 mm, minimum diameter of CBD was 8mm while maximum diameter was 24mm.

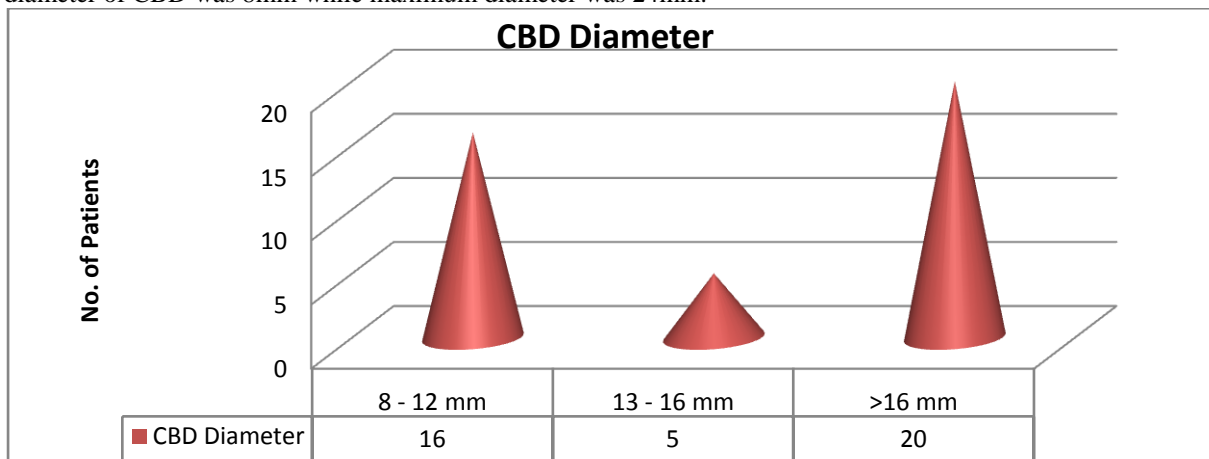


CHART No. 9- showing CBD Diameter

5.10 Type of Surgery performed in Biliary tract disorders.

Patients with cholelithiasis and choledocholithiasis underwent cholecystectomy with CBD exploration (40.47%) and cholecystectomy with choledochoduodenostomy (26.19%). Patients with primary choledocholithiasis underwent choledochoduodenostomy in 19.04% cases while patients with choledochal cyst underwent hepaticojejunostomy (4.76%).

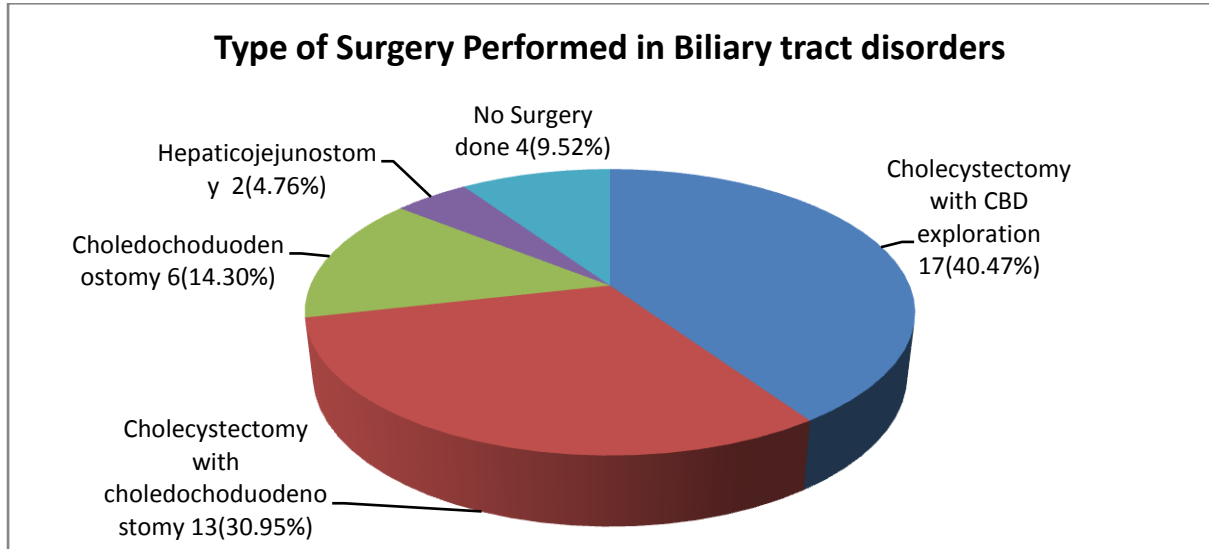


CHART No.10- Type of Surgery performed in Biliary tract disorders

5.11 Complications in Biliary Tract Surgery.

Out of 42 patients 3 patients who underwent CBD exploration developed wound infections. Bile leak was present in 2 patients which necessitated re-exploration and closure of the leaking CBD rent and 1 patient developed pneumonia.

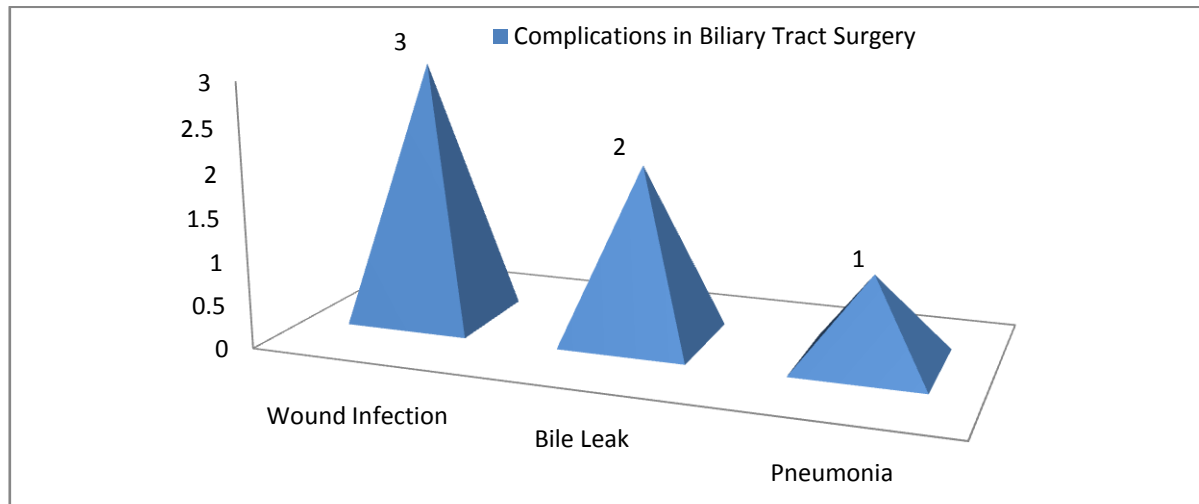


CHART No.11- showing complications in Biliary Tract Surgery

5.12 Alcoholism in liver Abscess.

In the present study, 79.17% of patients with liver abscesses are alcoholic.

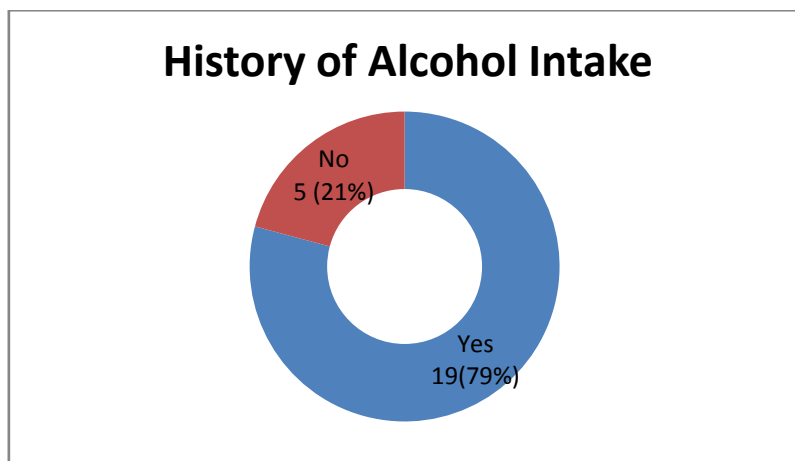


CHART No.12- showing Alcoholism and Liver Abscess

5.13 Ultrasound findings in Liver Abscess.

Ultrasound whole abdomen was done in all the hepatic disorder cases. Solitary abscess was observed in 20 out of 24 cases (83.3%) while multiple abscesses were noted in 4 out of 24 cases (16.66%).

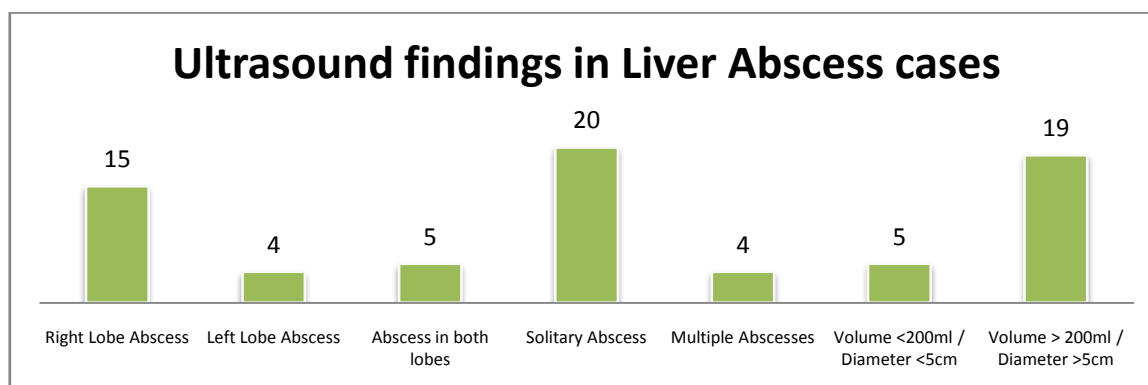


CHART No.13- showing Ultrasound findings in case of Liver Abscess

Isolated right lobe abscess was seen in 15 out of 24 cases (62.5%) while isolated left lobe abscess was seen in 4 out of 24 cases (16.66%). Both lobe involvement was seen in 5 out of 24 cases (20.83%). Number of cases with abscess cavity <200 cc/ <5cm were 5 out of 24 cases (20.83%) while >200/ >5cm were seen in 19 out of 24 cases (79.16%).

5.14 Treatment options for Liver Abscess cases.

Of the 24 cases of liver abscess included in the study, 5 cases (20.83%) who had a cavity size <200 cc / <5cm were managed conservatively.

19 patients who had a cavity size of > 200 cc / > 5cm, were subjected to intervention. Out of which 14 patients (58.33%) who had ruptured liver abscesses underwent exploratory laparotomy while 5 patients underwent pigtail catheter drainage under ultrasound guidance as the abscess cavity was big and not completely liquefied.

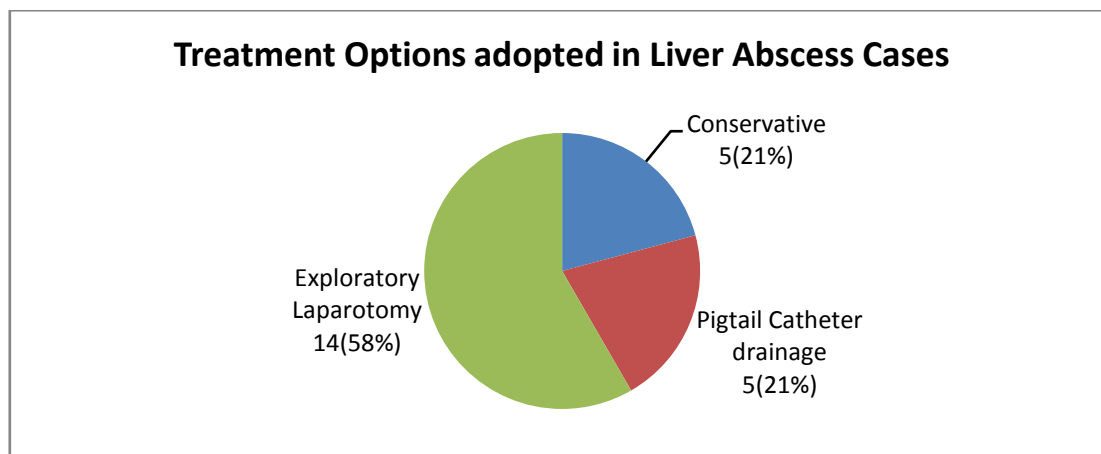


CHART No.14- showing treatment options adopted in Liver Abscess cases

5.15 Complications occurring in Liver Abscess Cases.

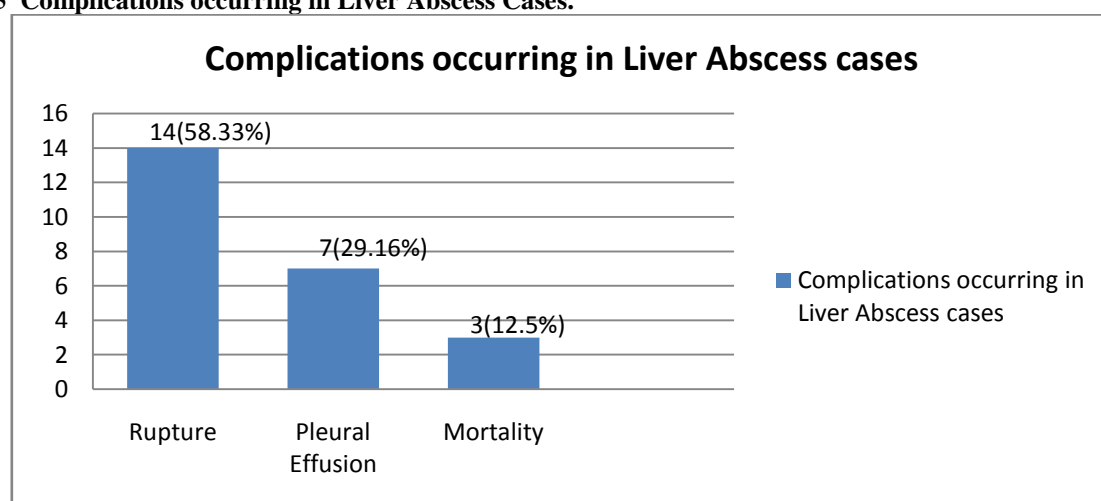


CHART No.15- showing Complications in Liver Abscess Cases

14(58.33%) patients of liver abscess ruptured while 7(29.16%) patients developed pleural effusion. 3(12.5%) cases of liver abscess in our present study showed mortality.

VI. Discussion

In this study, 178 cases of hepatobiliary disorders who were admitted in the department of surgery GMC Amritsar during the period of around two years from 5/8/2017 to 4/9/2019 were studied. Known available literature on hepatobiliary disorders has been reviewed, and the results of our study are compared with those of other studies.

After a detailed history, clinical investigations and available treatment and on analysing the results following inferences were drawn :-

In case of **gall bladder disorders**, it is noted that among total 178 hepatobiliary cases 112 (62.92%) were of gall bladder disorders, 42(23.59%) cases were of biliary tract disorders and 24(13.48%) cases belonged to liver disorders.

On analysing the data in Chart No.1 we see that in our study gall bladder cases fall between 18 and 75 years of age with mean age equal to 43.63, biliary tract cases were between 24 to 75 yrs with mean age being 50.71 and hepatic disorder cases were between 23 to 75 yrs with mean age as 43.21.

As evident from Chart No. 2 about the age wise incidence, the incidence of gall bladder and biliary tract disorders is noted more in 5th and 6th decade of life with maximum incidence in 5th decade. Our results were comparable to the study done by A Srinivas et al²⁸ in 2014 and with the study of Shradha B. and Srinivas D²⁹ in 2017. They also reported maximum incidence of gall bladder diseases in 5th decade. The results were also comparable with the study done by Sabira S et al³⁸ in which the age of biliary tract disorder patients varied between 27 to 72 yrs. Mean age of presentation in our study is 50.71 yrs for biliary tract disorders. This was again comparable to the study of Nathanson LK et al³⁹. They reported 59.6 yrs as mean age for biliary tract

disorders. Results of hepatic disorders were also comparable to those observed by Channanna C et al⁴. They reported highest incidence in 5th decade of life with mean age of presentation as 43 yrs for hepatic disorders.

On analysis of Chart No. 3 it is observed that in gall bladder disorders females(83.92%) were more than males(16.07%). The result are comparable to those reported by A Srinivas et al²⁸ in 2014. They reported more incidence of gall bladder disorders in females than in males. In biliary tract disorders females(80.95%) were more as compared to males(19.04%) with female to male ratio of 4:1. Way LW et al⁴⁰ showed a female to male ratio of 3:1 which is again comparable with our study. In hepatic disorder cases females(4.16%) were less and males(95.83%) were more. These were again consistent with the results reported by Channanna C et al⁴. They reported 93.33% males and 6.67% females in their study.

On looking at Chart No. 4, we see that in gall bladder disorders pain was the most common presenting symptom experienced by all 112(100%) patients followed by vomiting in 45(40.17%) patients, fever in 14(12.5%) while jaundice and mass abdomen in 6(5.35%) patients. Right hypochondrium was the commonest site of pain. Similar presentation of symptoms were noted by Shradha B. and Srinivas D²⁹ in 2017. They observed that pain was present in 97.78% cases, vomiting in 55.56% cases, dyspepsia in 22.2% cases, and fever in 8.8% cases. In 2014, Srinivas A. et al²⁸ in his clinical study reported pain in the right hypochondrium in 98% of cases. So our results are comparable with the available literature.

In biliary tract disorders pain was the presenting symptom in 40 out of 42 patients (95.20%), while jaundice was present in 30 patients (71.42%), 27 patients had fever (64.28%), of which the 21 had classic triad of cholangitis (50.0%) . These could be the patients with long standing cholestasis and consequent infection. Sabira S et al³⁸ reported that pain was the most common symptom, affecting 93.3% of patients. It was associated with fever and chill suggesting of cholangitis in 11 cases(36.6%). Jaundice was present in 17cases (56.6%). The results are more or less comparable.

In our study of hepatic disorders, abdominal pain was present in all cases (100%). Fever was the most consistent symptom, occurring in 95.8% of cases and vomiting in 83.33% cases. Abdominal distension was present in 58.33% of cases. Jaundice was present in 20.8% of patients. Our results are comparable to the study of Mangukiya DO et al³ who in their prospective case study of pyogenic liver abscesses, reported that upper abdominal pain was present in 97% of cases, fever was noted in 74% of cases, while vomiting and nausea was seen in 50% of patients.

Ultrasound abdomen was done in all the patients. On looking at Chart No. 5 we observed that gall stones were present in all 112(100%) patients of gall bladder disease out of which solitary stones were present in 44(39.28%) patients whereas 68(60.71%) patients were found to be having multiple stones. In 21(18.75%) patients gall bladder wall thickening was an associated finding and 6(5.35%) patients showed associated gall bladder mass. Shradha B. and Srinivas D²⁹ in 2017 in their study reported the incidence of solitary stones as 24.44% and that of multiple stones as 75.56%. Associated thickening of gall bladder wall in 80% cases and 7.78% cases were having associated gall bladder mass. The difference in results might be due to patient selection and demographic variations of gall bladder disease.

Similarly on observing the data shown in Chart No. 8 showing ultrasound findings in biliary tract disorders we noted that out of 42 patients gall bladder was visualised in 36(85.71%) patients. In 6 patients in whom gall bladder was absent, they had undergone cholecystectomy more than 2 years ago. Among 36 patients in whom gall bladder was present, only 30 were having gall stones and 6 were not having stones in the gall bladder. CBD was dilated in 41(97.6%) out of 42 patients. Out of 42 patients of biliary tract disorders USG could detect CBD stones in 25 patients. In 11 patients there were no signs of presence of stones in the CBD. In these patients MRCP was done and it was able to pick up stones in all of these 11 cases. So out of total 36 cases of choledocholithiasis 6 patients were having primary stones in CBD while 30 patients were having gall bladder stones alongwith CBD stones. Multiple stones in CBD were found in 13(30.95%) cases whereas single CBD stone was found in 12(28.57%) cases. IHBRs were dilated in 4(9.52%) cases with associated mass in CBD in 3(7.14%) cases. 2(4.76%) patients had associated dilated cystic lesion along with dilated CBD.

From Chart No. 8 & 9 it is observed that on ultrasonography CBD was dilated in 41 out of 42 patients (97.61%), with a mean CBD diameter of 14.73mm, minimum diameter of CBD was 8mm while maximum diameter was 24mm. Sabira S et al³⁸ reported that all patients had a CBD ductal diameter of greater than or equal to 8 mm. Mean CBD diameter was 12.22 mm. The largest diameter recorded was 23 mm.

MRCP was done in cases in which ultrasound showed dilated CBD along with dilated cystic lesion and in all other patients in whom USG showed dilated IHBR and mass in the CBD to confirm the diagnosis. Consequently, 2 patients were found to be having Choledochal cyst and one was having Caroli disease. 2 patients were of cholangiocarcinoma whereas one was of periampullary carcinoma.

CECT was done in patients with cholangiocarcinoma and in periampullary carcinoma to look for local and distant spread of tumor.

As depicted in Table No. 1, cholelithiasis with choledocholithiasis was found in 71.42% cases. Primary choledocholithiasis was found in 14.30% cases as these patients underwent cholecystectomies more than 2 years before their current admission, choledochal cyst and cholangiocarcinoma each in 4.76% cases, Caroli disease and periampullary carcinoma was found in 2.38% cases

Observing Chart No. 10 we come to know that in our present study, 6 patients with a CBD diameter of more than 15mm, who had primary CBD stones (14.30%) underwent choledochoduodenostomy. 13 patients who had multiple stones in the CBD (30.95%) underwent choledochoduodenostomy with cholecystectomy. Indications of choledochoduodenostomy were compared with a clinical study by Gupta BS⁴¹, who reported that, all the patients (100%) selected for CDD had a dilated common duct of at least 1.5 cm diameter and 71% of them had multiple stones.

In other 17 patients who had a CBD diameter of <15mm, or a single CBD stone, or who had associated gall bladder stones, underwent cholecystectomy with CBD exploration with T-tube insertion (40.47%). In the clinical study by Sabira S et al³⁸, the total number CBD explorations were 83%.

Two patients with choledochal cyst underwent hepaticojejunostomy (4.76%). One patient with Caroli disease was referred to higher centre because of the non availability of hepatic transplant surgeon. Two patients of cholangiocarcinoma and one patient of periampullary carcinoma were at advanced stage at the time of presentation. So these three patients were also referred to higher centre because of non availability of tumor board and superspeciality units.

As shown in Chart No. 11 we noted that in our present study, out of 42 patients 3 patients who underwent CBD exploration developed wound infections, bile leak was present in 2 patients which necessitated re-exploration and closure of the leaking CBD rent, 1 patient developed pneumonia who got recovered after longer duration of intravenous antibiotics.

Among **liver disorders** we encountered only liver abscess cases. In the present study liver abscesses were the predominant disease amongst liver disorders accounting 13.48%(24 out of 178 cases) of Hepatobiliary disorders and 100% of liver disorders(Chart No. 1). As observed by data in Chart No. 2 most of the patients who presented with liver abscesses were in the middle age group with highest incidence in the 5th decade with a mean age of presentation of 43.21 where the youngest patient was 23 years old and the eldest was 75 years old. According to a study done by Channanna C et al⁴, the mean age of presentation of liver abscesses was 43 years and highest incidence was noted in the 5th decade.

As evident from Chart No. 3 liver abscesses were more common in males 23(95.83%) cases. While according to the study done by Channanna C et al⁴, 93.33% of patients were males and 6.67 % of patients were female.

On observation of Chart No. 4 we noted that in our study, abdominal pain was present in all 24(100%) hepatic disorders cases. Fever was the most consistent symptom, occurring in 23(95.8%) cases and vomiting in 20(83.33%) cases of hepatic disorders.. Abdominal distension was present in 58.33% of cases. Jaundice was present in 20.8% of patients. According to a study done by Mangukiya DO et al³ in his prospective case study of pyogenic liver abscesses, reported that upper abdominal pain was present in 97% of cases, fever was noted in 74% of cases, while vomiting and nausea was seen in 50% of patients.

In the present study, alcoholism was found to be the most consistent etiological factor in liver abscess patients. As shown in Chart No. 12, history of alcohol intake was present in 19(79.17%) patients of liver abscess. 83.33% of the cases of study by Channanna C et al⁴ were found to be alcoholic.

In our present study ultrasound whole abdomen was done in all hepatic disorder cases. As shown in Chart No. 13, a solitary liver abscess was observed in 20 out of 24 cases (83.3%), while multiple liver abscesses were noted in 4 out of 24 cases (16.66%). Isolated right lobe liver abscess was seen in 15 out of 24 cases(62.5%), while isolated left lobe liver abscess were seen in 4 out of 24 cases (16.66%). Both lobe involvement was seen in 5 out of 24 cases (20.83%). The number of cases with an abscess cavity <200 cc or <5cm were 5 out of 24 (20.83%), while abscess cavity >200 or >5cm were seen in 19 out of 24 (79.16%) cases. Channanna C et al⁴ reported that a solitary abscess was seen in 70% of cases, multiple abscesses were seen in 30% of cases, exclusive right lobe involvement was seen in 90% of cases and isolated left lobe involvement was seen in 6.6% of cases. According to Mangukia DO et al³ in their prospective study, reported that 83% of liver abscesses were found in the right lobe, 4.5% in left lobe, both lobe involvement was seen in 12.5% cases, 50% of abscesses were solitary and 21% of abscesses were multiple.

Surgical drainage of liver abscesses have been an accepted therapy for decades. Diagnoses and treatment of liver abscess have changed due to advances in imaging techniques. As shown in Chart No. 14, Out of 24 liver abscess cases in our study, 5 patients who had multiple small abscesses and solitary abscesses with a volume of <200cc or size < 5cm were treated conservatively. 19 patients who had abscesses >200cc or left lobe abscesses were subjected to intervention as compared to the Hyo Min YO et al⁴² study where 100% cases underwent intervention. In our present study, 14 patients (58.33%) who had ruptured liver abscesses underwent exploratory laparotomy while 5 patients underwent pigtail catheter drainage under ultrasound guidance as the

abscess cavity was big and not completely liquefied as compared to the Hyo Min et al⁴² series where 21% of patients underwent surgical intervention. All patients on conservative treatment were started on antibiotics which were continued for 10-14 days depending on the improvement of their condition. Majority of patients improved excellently.

As noticed from Chart No. 15, the complications of liver abscess like intraperitoneal rupture in 14(58.33%) cases with peritonitis and pleural effusion 7 (29.16%) cases are seen. The results were compared with a study by Mangukia DO et al³ which shows that rupture of abscess into pleural or peritoneal cavity was the major complication (5% cases). 3(12.5%) cases of liver abscess in our present study showed mortality which was comparable to the study by Mangukia DO et al³ which showed 1.5% of mortality.

VII. Summary And Conclusion

The present study consists of only 178 cases of entire hepatobiliary disorders. It included 112 cases of gallbladder disorders, 42 cases of biliary tract disorders and 24 cases of liver disorders. There may be some variations in the statistics as the sample size is small for full statistical evaluation. The observations in our study are summarized below:

A. GALL BLADDER DISORDERS

1. The highest age incidence of gall bladder disorders were in 5th and 6th decades with maximum incidence in 5th decade
2. There was increased incidence in females (83.92% cases) with male to female ratio -1:5.2.
3. The most common clinical presentation was pain in the right hypochondrium (100%cases) followed by vomiting (40.17%cases) and dyspepsia (26.78% cases).
4. USG whole abdomen was the investigation of choice for gall bladder disorders. All patients had gall stones (100% cases)
5. Cholelithiasis with chronic cholecystitis was the most common gall bladder disease (75.89%cases)
6. Open cholecystectomy was the most common operation performed for gall bladder disorders in our hospital (84.82% cases)
7. Most common post operative complication of open cholecystectomy was wound site infection (5.36% cases).

B. BILIARY TRACT DISORDERS

1. The highest age incidence of biliary tract disorders were in the 5th decades of life.
2. Biliary tract disorders were more common in female patients (80.95% cases) with male to female ratio of M:F-1:4.2.
3. The most common clinical presentation of biliary tract disorders was pain in the right hypochondrium (95.2%cases), followed by vomiting (83.3% cases) and jaundice (69.04% cases).
4. USG whole abdomen was able to pick up stones in 25 patients of choledocholithiasis (59.52%cases) and ductal dilatation in 41 out of 42 patients (97.6% cases).
5. On USG mean CBD diameter was 14.02mm.
6. MRCP was done in the patients in whom USG was not able to pick up stones in CBD and had 100% sensitivity. MRCP was also done in cases in which USG shows dilated CBD alongwith dilated cystic lesion to confirm the diagnosis of choledochal cyst and in all other patients in whom USG shows dilated IHBR and mass in the CBD.
7. Cholelithiasis with choledocholithiasis was most common (85.72% cases) biliary tract disorder.
8. Open Cholecystectomy with CBD exploration was the most common operation performed (54.77% cases), followed by cholecystectomy with choledochoduodenostomy (26.19% cases) for biliary tract disorders in our hospital.
9. Most common complication of open biliary tract surgery was wound infection.

C) LIVER DISORDERS

1. The highest age incidence of liver disorders were in the 4th decade of life
2. Liver disorders were more common in male patients (95.83%) with male to female ratio of M:F-23:1.
3. The most common clinical presentation was pain abdomen (100% cases), followed by fever (95.8% cases) and vomiting (83.33%cases)
4. The study found alcohol as the single most consistent etiological factor in all patients of liver abscess patients (79.17% cases). All these patients had history of alcohol consumption of more than one year.
5. USG whole abdomen was done in all patients of liver abscess. Most of the liver abscess was solitary (83.30%). Right lobe was the most common location of liver abscess (62.50% cases)
6. Exploratory laparotomy was the most common surgery performed for liver abscess patients in our hospital (58.33%cases).

7. Intraoperative rupture was the most common complication (58.33%) of liver abscess in the study.

Bibliography

- [1]. Vaidya AB, Ray DK. Amoebiasis: the tropical scourge. *Science Today (India)*. 1982;21
- [2]. McFadzean AJ, Chang KP, Wong CC. Solitary pyogenic abscess of the liver treated by closed aspiration and antibiotics: a report of 14 consecutive cases with recovery. *British Journal of Surgery*. 1953 Sep;41(166):141-52.
- [3]. Mangukiya DO, Darshan JR, Kanani VK, Gupta ST. A prospective series case study of pyogenic liver abscess: recent trends in etiology and management. *Indian Journal of Surgery*. 2012 Oct 1;74(5):385-90.
- [4]. Channanna C, Rehman FU, Choudhuri B, Patil A. A clinical study, diagnosis and management of Liver Abscess at VIMS, Bellary. *Journal of Evidence Based Medicine and Health Care*. 2014;1:668-85.
- [5]. Jamagin WR, editor. *Blumgart's Surgery of the Liver, Pancreas and Biliary Tract E-Book*. Elsevier Health Sciences; 2016; 12(3): 511.
- [6]. Eachempati, Soumitra R.; II, R. Lawrence Reed (2015). *Acute Cholecystitis*. Springer. pp. 1–16.
- [7]. Eachempati SR, Reed II, Lawrence R, editors. *Acute Cholecystitis*. Springer International Publishing; 2015 Aug 20, pp. 1-16.
- [8]. Bateson MC, editor. *Gallstone disease and its management*. Springer Science & Business Media; 2012 Dec 6, pp. 1–2.
- [9]. Portincasa P, Moschetta A, Palasciano G. Cholesterol gall stone disease. *Lancet*. 2006;368:230-239.
- [10]. Shehadi WH, The biliary system through the ages. *Int Surg* 1979;64:63-78.
- [11]. Jensen KH, Jorgensen T. Incidence of gallstones in a Danish population. *Gastroenterology*. 1991;100:790–794.
- [12]. Bates T, Harrison M, Lowe D, Lawson C, Padley N. Longitudinal study of gall stone prevalence at necropsy. *Gut*. 1992;33:103–107.
- [13]. Friedman GD. Natural history of asymptomatic and symptomatic gallstones. *Am J Surg*. 1993;165:399–404.
- [14]. Gracie WA, Ransohoff DF. The natural history of silent gallstones: the innocent gallstone is not a myth. *N Engl J Med*. 1982;307:798–800.
- [15]. Shaffer EA. Epidemiology and risk factors for gallstone disease: has the paradigm changed in the 21st century? *Curr Gastroenterol Rep*. 2005;7:132–40.
- [16]. Kratzer W, Mason RA, Kächele V. Prevalence of gallstones in sonographic surveys worldwide. *J Clin Ultrasound*. 1999;27:1–7.
- [17]. Pedersen G, Hoem D, André-Sandberg A. Influence of laparoscopic cholecystectomy on the prevalence of operations for gallstones in Norway. *Eur J Surg*. 2002;168:464–9.
- [18]. Everhart JE, Khare M, Hill M, Maurer KR. Prevalence and ethnic differences in gallbladder disease in the United States. *Gastroenterology*. 1999;117 (3):632.
- [19]. Attili AF, Carulli N, Roda E, Barbara B, Capocaccia L, Menotti A, et al. Epidemiology of gallstone disease in Italy: prevalence data of the Multicenter Italian Study on Cholelithiasis (M.I.COL.). *Am J Epidemiol*. 1995;141 (2):158.
- [20]. Feinblatt HM. The infrequency of primary infection in gallbladder disease. *New England Journal of Medicine*. 1928 Nov 29;199(22):1073-8.
- [21]. Beal JM. Historical perspective of gall stone disease. *Surg Gynecol Obstet* 1984;158:181.
- [22]. Turner GG. The History of gall bladder surgery. *Br Med J* 1939;1 (4078):464-465.
- [23]. Polychronidis A, Laftsidis P, Bounovas A, Simopoulos C. Twenty years of laparoscopic cholecystectomy: Phillip Mouret- March 17, 1987. *JSLs* 2008. Jan-Mar;12 (1):109-111
- [24]. Orgenstem L, Langenbuch C, Morgenstem L. The first cholecystectomy *Surg Endosc* 1992;6:113-114.
- [25]. Litynski GS. Erich Mühe and the rejection of laparoscopic cholecystectomy (1985): a surgeon ahead of his time. *JSLs: Journal of the Society of Laparoendoscopic Surgeons*. 1998 Oct;2(4):341.
- [26]. Soper NJ, Stockman PT, Dunnegan DL, Ashley SW. Laparoscopic cholecystectomy: The new gold standard. *Arch Surg* 1992; 127:917-921.
- [27]. Mohan H, Punia RP, Dhawan SB, Ahal S, Sekhon MS. Morphological spectrum of gallstone disease in 1100 cholecystectomies in North India. *Indian journal of surgery*. 2005 Jun 1;67(3).
- [28]. Aachi Srinivas & M. Venugopal K et al *Int J Biol Med Res*. 2014; 5(3): 4314-4321
- [29]. Sharada B, Srinivas D. Clinical study of cholelithiasis. *International Journal of Scientific Study*. 2017 Jun 1;5(3):210-4.
- [30]. Mulvihill SJ, Debas HT. History of surgery of gastrointestinal tract. In: Norton JA, Bollinger RR et al (eds). *Surgery, Basic Science and Clinical evidence*. Springer – Velag, 2001; 23: 399-412.
- [31]. Meyers WC, Jones RS. Development of the liver and biliary tract In: Meyers WC, Jones RS (editors). *Textbook of liver and biliary surgery*. J.B. Lippincott Company 1990; (1): 1-19.
- [32]. Mirizzi PL. Operative Cholangiography. *Surg Gynecol Obstet* 1937; 65: 702-707
- [33]. Morgenstem L. A History of Choledochotomy In: Berci G, Cushieri A. *Bile Ducts and Bile Duct Stones*. WB Saunders 1997; 2: 3-8.
- [34]. Wood MD. Presidential address: Eponyms in Biliary Tract Surgery. *Am J Surg*. 1979; 138: 746 – 754.
- [35]. Gupta BS. Choledochoduodenostomy: a study of 28 consecutive cases. *Kathmandu University Medical Journal*. 2003;2(3):193-7.
- [36]. Chandu S. Clinical study and management of choledocholithiasis. *Journal of Evolution of Medical and Dental Sciences*. 2014 Oct 2;3(49):11736-44.
- [37]. Manimaran D, Chitra S, Balamurali R, Kumar SJ, Pugazhendhi TP. Choledocholithiasis: Clinical Manifestations and Associated Conditions. *Journal of Medical Science And clinical Research*. 2016;4(11):14123-7.
- [38]. Sabira S, Rao MP. A clinical study and management of common bile duct stones. *Ind.J. of Applied Research*. 2019 Aug 22;9(8)
- [39]. Nathanson LK, O'Rourke NA et al. Postoperative ERCP versus laparoscopic choledochotomy for clearance of selected bile duct calculi: A randomized trial. *Ann of Surgery* 2005; 242(2): 188-92.
- [40]. Way LW, Admirand WH et al. Management of Choledocholithiasis. *Ann Surg* 1972; 176: 347-359.
- [41]. Gupta BS. Choledochoduodenostomy: a study of 28 consecutive cases. *Kathmandu University Medical Journal*. 2003;2(3):193-7.
- [42]. Hyo Min Yoo et al—The Changing Patterns of Liver Abscess During the Past 20 Years A study of 482 cases – *Yonsei Med J Vol. 34, No. 4, 1993*.

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