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Retrospective and prospective study on Cholelithiasis: various modes of management, their results, complications and histopathological changes in the gall bladder

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Abstract

Cholelithiasis is a disease of the hepatobiliary system. The impaired metabolism of cholesterol, bile acids and bilirubin are characterized by gallstone formation. Data was collected from the information available in bed head tickets of patients diagnosed as a case of cholelithiasis. Detailed history, clinical examination, investigations, procedure, operative findings, complications and biopsy reports were recorded. Significant observations were: USG showed gall stones in all cases. Derranged bilirubin was found in 20.21% cases. 46.77% underwent laparoscopic & 50.54% underwent open cholecystectomy with 2.69% laparoscopic to open conversion mostly due to adhesions (52%). Gall stone alongwith CBD stone was the most common complication (4.62%). Intra operatively hemorrhage was the most common complication in laparoscopic (3.26%) and open cholecystectomy (2.76%). In post operative period wound infection and bile leak was found in 5.25% and 1.81% respectively in open cholecystectomy and 1.84% each in laparoscopic cholecystectomy. Chronic cholecystitis was the most common histopathological finding (83.79%).

Keywords: Cholelithiasis, Cholecystitis, Choleystectomy.

Introduction

Cholelithiasis is a chronic recurrent disease of the hepatobiliary system. The impaired metabolism of cholesterol, bile acids and bilirubin are characterized by gallstone formation. Gallstones are solid deposits of various sizes in a patient's gallbladder. The deposits are composed of either cholesterol or bile salts that accumulate and harden in the body of gallbladder. Ultrasonography is an ideal means to quantitate the frequency of gallstone disease, being a noninvasive and safe imaging technique that can accurately detect the point prevalence of gallstones in a defined asymptomatic population.

Gallstones constitute a significant health problem in developed societies, affecting 10% to 15% of the adult population ^[1]. With an estimated 1.8 million ambulatory care visits each year, gallstone disease is a leading cause for hospital admissions related to gastrointestinal problems ^[2]. Although the mortality rate for gallstones disease is relatively low at 0.6%, case fatality rates have steadily diminished, this decline represents the greatest decrease for any digestive disease ^[3].

Methods

This retrospective and prospective observational study was conducted on in-patient department cases diagnosed with cholelithiasis over a period of five years in a tertiary care hospital. Ethics committee approval was obtained and written informed consent was taken from patients who agreed to participate in the study. All patients of cholelithiasis with or without choledocholithiasis, diagnosed by ultrasound were included in the study. Patients diagnosed with acalculous cholecystitis or with primary CBD stones (with no calculus/calculi in gallbladder) were excluded from the study.

Retrospective data was collected from the information available in bed head tickets of patients diagnosed as a case of cholelithiasis. Detailed history, clinical examination, investigations, procedure, operative findings, complications and biopsy reports were recorded.

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Categorical data were assessed in the form of absolute numbers and percentages. Quantitative data was assessed by calculating range and measures of central tendency such as mean and standard deviation.

Results

Ultrasound scanning of the abdomen was done in all patients. Table 1 shows that all patients had stone in gallbladder. 36(3.87%) patients had stones in both gallbladder and common bile duct. Multiple stones were present in 682(73.33%) patients while single stone was present in 248(26.67%) patients including gall bladder sludge in 21(2.26%) patients. 243(26.13%) patients had distended gall bladder whereas 258(27.74%) patients had contracted gall bladder. Gall bladder wall was thickened in 87(9.35%) patients. Pericholecystic fluid collection was present in 34(3.66%) patients.

113 patients (12.15%) had derangement in serum bilirubin level whereas 188(20.21%) patients had derangement in serum aspartate transaminase level and 226(24.3%) patients had derangement in serum alanine transaminase level. (Table 2)

435(46.77%) patients underwent laparoscopic cholecystectomy and 470 (50.54%) patients underwent open cholecystectomy. In 25(2.69%) patients laparoscopic cholecystectomy was converted to open cholecystectomy (conversion rate: 05.34%). CBD Stone retrieval by ERCP followed by cholecystectomy was done in 16(1.72%) patients and 27(2.09%) patients required CBD exploration. (Table 3).

Table 4 shows that adhesions were the cause of conversion from laparoscopic to open cholecystectomy in 52% (13) patients while intra-operative haemorrhage was the cause in 16% (4) cases. Fibrosis of Calot's triangle in 16% (4), thick-walled gall bladder was in 12% (3) and bile duct injury in 4% (1) cases were other causes found.

In our study, 4.62% (43) patients had CBD stone along with cholelithiasis. Gall stone pancreatitis was present in 01.07% (10) patients. GB perforation was present in 00.97% (9) patients. Pyocoele of GB was found in 00.75% (7) patients. Mucocoele of GB was detected in 00.64% (6) patients and in 00.21% (2) patients gall bladder was gangrenous. (Table 5).

In this study, during operation in patients of open cholecystectomy 9 (2.34%) patients had intraoperative hemorrhage, 1 (0.21%) had bile duct injury, 1 (0.21%) had visceral (stomach) injury while in patients of laparoscopic cholecystectomy 15 (3.26%) had intraoperative hemorrhage. One (0.22%) had bile duct injury and one (0.22%) had electrocautery burn. (Table 6)

In postoperative period, overall 78(8.39%) patients had postoperative complications.

34 (3.66%) had wound infection, 17(1.83%) had bile leak, 10 (1.08%) had septicemia, 6 (0.64%) patients had hemorrhage, 6 (0.64%) had wound dehiscence and 5 (0.54%) had peritonitis.

In patients of open cholecystectomy, 26 (5.25%) had wound infection, 9 (01.81%) had bile leak, 6 (1.21%) had wound dehiscence, 4 (0.81%) patients had hemorrhage, 4 (0.81%) had septicemia, 3 (0.61%) had peritonitis, while in patients of laparoscopic cholecystectomy 8 (1.84%) had bile leak, 8 (1.84%) had wound infection, 6 (1.34%) had septicemia, 2 (0.46%) had

hemorrhage and 2 (0.46%) had peritonitis. (Table 7)

Table 8 shows that most common histopathological changes in gall bladder was chronic cholecystitis in 83.79% (781) patients followed by acute on chronic cholecystitis in 10.00% (93) patient and acute cholecystitis in 3.55% (33) patients. Polyp was present in 2.04% (19) cases. Cholesterosis was seen in 1.51% (14) and Xanthogranulomatous cholecystitis was seen in 0.98% (9) cases. Adenocarcinoma was noted in 0.54% (5) cases.

Table 1: Ultrasonographic findings in cholelithiasis

USG findings		No. of patients	%
Gall stones	Single stone	248	26.67
	Multiple stones	682	73.33
	Total	930	100
Gall bladder sludge		21	02.26
Contracted GB		258	27.74
Distended GB		243	26.13
Thickwalled GB		87	9.35
Pericholecystic fluid collection		34	3.66
Common bile duct stone		36	3.87

Table 2: Liver function derangements in cholelithiasis

LFT	No. of patients	Percentage
Serum bilirubin	113	12.15
Serum aspartate transaminase(AST)	188	20.21
Serum alanine transaminase(ALT)	226	24.30

Table 3: Various modalities of treatment done for patients of cholelithiasis

Treatment done	No. of patients	%
Laparoscopic cholecystectomy	435	46.77
Open cholecystectomy	470	50.54
Laparoscopic converted to open cholecystectomy	25	02.69
CBD Stone retrieval by ERCP followed by cholecystectomy	16	01.72
Cholecystectomy with CBD exploration	27	02.90

Table 4: Causes of conversion from laparoscopic to open cholecystectomy (n=25)

Cause of conversion	No. of patients LC→OC	Percentage
Intraoperative hemorrhage	4	16
Adhesions	13	52
Fibrosis of Calot's triangle	4	16
Empyema of gall bladder(thickened and friable gall bladder wall)	3	12
Bile duct injury	1	4
Total	25	100

Table 5: Complications of cholelithiasis

Complications	No. of patients	Percentage
CBD stone	43	04.62
GB perforation	9	00.97
Gall stone pancreatitis	10	01.07
Pyocoele of GB	7	00.75
Mucocoele of GB	6	00.64
Gangrenous GB	2	00.21

Table 6: Intraoperative complications of cholecystectomy

Complications	Open Cholecystectomy n=470(%)	Laparoscopic cholecystectomy plus converted n=460(%)	Total n=930 (%)
Intraoperative complications			
Hemorrhage	9 (2.34)	15 (3.26)	24 (2.58)
Bile duct injury	1 (0.21)	1 (0.22)	2 (0.21)
Visceral organ injury	1 (0.21)	0 (0)	1 (0.11)
Electrocautery burn	0 (0)	1(0.22)	1 (0.11)
TOTAL	11(2.76)	17(3.69)	28(3.01)

Table 7: Postoperative complications of cholecystectomy

S. No.	Complication	Open Cholecystectomy plus converted n=495(%)	Laparoscopic cholecystectomy n=435(%)	Total n=930 (%)
1	Hemorrhage	4 (0.81)	2 (0.46)	6 (0.64)
2	Bile leak	9 (1.81)	8 (1.84)	17(1.83)
3	Wound infection	26 (5.25)	8(1.84)	34 (3.66)
4	Septicemia	4 (0.81)	6 (1.34)	10 (1.08)
5	Peritonitis	3 (0.61)	2 (0.46)	5 (0.54)
6	Wound dehiscence	6 (1.21)	0 (0)	6 (0.64)
Total postoperative complications		52(10.50)	26(05.98)	78(8.39)
Total intropertative complications		11(2.34)	17(3.69)	28(3.01)
Gross total		63	43	106(11.40)

Table 8: Histopathological changes in gall bladder in cholelithiasis

Histopathological changes	No. of patients	%
Chronic cholecystitis	781	83.97
Acute on chronic cholecystitis	93	10.00
Acute cholecystitis	33	3.55
Polyp	19	2.04
Cholesterolosis	14	1.51
Xanthogranulomatous cholecystitis	9	0.98
Adenocarcinoma	5	0.54

Discussion

Present study comprises a review of 930 patients with cholelithiasis, admitted in various surgical wards of a tertiary care hospital over a period of five years.

Ultrasound scanning of the abdomen was done in all patients. All patients had stone in gallbladder. 3.87% patients had stones in both gallbladder and common bile duct. Multiple stones were present in 73.33% patients while single stone was present in 26.67% patients including gall bladder sludge in 2.26% patients. 26.13% patients had distended gall bladder whereas 27.74% patients had contracted gall bladder. Gall bladder wall was thickened in 9.35% patients. Pericholecystic fluid collection was present in 3.66% patients. Transabdominal ultrasound (USG) is sensitive, inexpensive, reliable and modality of choice to study the initial evaluation of symptoms of biliary disease. There is no radiation exposure. USG has a high specificity and sensitivity for cholelithiasis. Gallstones show an echogenic focus with a characteristic posterior acoustic shadow. In gallbladder stone(s), the wall-echo-shadow triad is present: visualization of the anterior gallbladder wall followed by the echogenic structure of intraluminal stone(s), with distal acoustic shadow^[4]. Pathologic changes in cholecystitis (status of gallbladder, number of stones, wall thickness, and pericholecystic fluid) are seen in USG.

12.15% patients had derangement in serum bilirubin level whereas 20.21% patients had derangement in serum aspartate transaminase level and 24.3% patients had derangement in serum alanine transaminase level. Arnold DE Macro *et al.*^[5] reported severely deranged LFTs in 14% while Magee R. B. and Mac Duffy R.C.^[6] reported in 7% patients. Amir A. *et al.*^[7] study reported mild elevations of serum total bilirubin (40.61%), direct bilirubin (41.9%), GGT (51.1%), and alkaline phosphatase (38.6%) patients in calculus cholecystitis (acute and chronic).

46.77% patients underwent laparoscopic cholecystectomy and 50.54% patients underwent open cholecystectomy. In 2.69% patients laparoscopic cholecystectomy was converted to open cholecystectomy (conversion rate: 05.34%). CBD Stone retrieval by ERCP followed by cholecystectomy was done in 1.72% patients and 2.09% patients required CBD exploration. In Bansal A *et al.* (2014)^[8] study 53.8% patients had laparoscopic cholecystectomy and 41.3% patients had cholecystectomy. 6.73% patients had common bile duct stone(s), of which 4.8% patients underwent open cholecystectomy with CBD exploration and 1.92% patients had ERCP guided stone removal followed by laparoscopic cholecystectomy. In Dr Alok Chandra Prakash *et al.* (2016)^[9] study 81.11% patients had laparoscopic cholecystectomy and 13.89% patients underwent open cholecystectomy. 3.89% patients had common bile duct stone(s), of which all patients had open cholecystectomy with CBD exploration. No patients had conversion from laparoscopic cholecystectomy to open cholecystectomy. In Bansal A *et al.* (2014)^[8] study the conversion rate from laparoscopic to open cholecystectomy was about 9.6% of the total attempted laparoscopic cases (6 out of 62). The conversion rate was 7 % in Schlumpf *et al.* (2006)^[10] study and in a study of 376 patients by Fajardo *et al.* (2011)^[11] in Colombian population.

Table 4 shows that adhesions were the cause of conversion from laparoscopic to open cholecystectomy in 52% patients while intra-operative haemorrhage was the cause in 16% cases. Fibrosis of Calot's triangle in 16%, thick-walled gall bladder was in 12% and bile duct injury in 4% cases were other causes found. Several studies demonstrated that the risk of conversion depends mainly on the degree of inflammation, pathology of gallbladder disease (e.g. thickness of gallbladder wall), age, male sex, and CBD diameter. Conversion rate in elective laparoscopic cholecystectomy may be 0% to 15%, but in cases of gangrenous cholecystitis or empyema it may be high. Ultrasound may help to predict the risk of conversion. However, the surgeon has to decide intraoperatively whether to convert to the open procedure within a short time^[12, 13].

In our study, 4.62% patients had CBD stone along with cholelithiasis. Gall stone pancreatitis was present in 01.07% patients. GB perforation was present in 00.97% patients. Pyocoele of GB was found in 00.75% patients. Mucocoele of

GB was detected in 00.64% patients and in 00.21% patients gall bladder was gangrenous.

In this study, during operation in patients of open cholecystectomy 2.34% patients had intraoperative hemorrhage, 0.21% had bile duct injury, 0.21% had visceral (stomach) injury while in patients of laproscopic cholecystectomy 3.26% had intraoperative hemorrhage. 0.22% had bile duct injury and 0.22% had electrocautery burn.

In postoperative period, overall 8.39% patients had postoperative complications. 3.66% had wound infection, 1.83% had bile leak, 1.08% had septicemia, 0.64% patients had hemorrhage, 0.64% had wound dehiscence and 0.54% had peritonitis.

In patients of open cholecystectomy, 5.25% had wound infection, 01.81% had bile leak, 1.21% had wound dehiscence, 0.81% patients had hemorrhage, 0.81% had septicemia, 0.61% had peritonitis, while in patients of laproscopic cholecystectomy 1.84% had bile leak, 1.84% had wound infection, 1.34% had septicemia, 0.46% had hemorrhage and 0.46% had peritonitis. Hemorrhage was the most common complication in both open & laproscopic cholecystectomy intraoperatively. The major problems related to laparoscopic cholecystectomy are bile duct injury, hemorrhage and subhepatic collection. Careful identification of the structures in the Calot's triangle is the main step in cholecystectomy, either open or laparoscopic. Haemorrhage from the liver bed is encountered more frequently in patients with acute cholecystitis, a shrunken fibrotic gallbladder and in cirrhotics. The most serious problem is an injury to the common bile duct. Injury to the extrahepatic bile ducts can occur at any level. Separation of the gallbladder may open any accessory bile ducts present in the gallbladder bed. Hemorrhage due to arterial injury is usually a reason for conversion. Generally, the uncontrolled reaction of the surgeon is more dangerous than the haemorrhage itself: blind clip application or, even more serious, the blind use of the electrocautery can cause severe injury to the bile duct ^[14].

Wound infection was the commonest complication in patients of open cholecystectomy, and the mean hospital stay was more in these patients.

Table 8 shows that most common histopathological changes in gall bladder was chronic cholecystitis in 83.79% patients followed by acute on chronic cholecystitis in 10.00% patient and acute cholecystitis in 3.55% patients. Polyp was present in 2.04% cases. Cholesterosis was seen in 1.51% and Xanthogranulomatous cholecystitis was seen in 0.98% cases. Adenocarcinoma was noted in 0.54% cases.

Comparison of histopathological changes of gall bladder with other studies.

Conclusion

So it could be concluded that for cholelithiasis ultrasonography is the investigation of choice for the diagnosis and cholecystectomy is the definitive and standard treatment of cholelithiasis either by open or laproscopic approach. However laparoscopic cholecystectomy is safe and superior alternative to conventional open cholecystectomy and should be regarded as gold standard with low threshold of conversion.

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