

**FACTORS AFFECTING CONVERSION OF LAPAROSCOPIC
CHOLECYSTECTOMY INTO OPEN CHOLECYSTECTOMY IN TERTIARY
CARE HOSPITAL**

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Abstract

Aim: To study the conversion rate of laparoscopic cholecystectomy into open cholecystectomy in study conducted among 50 patients in our hospital.

Materials and Methods: This study was conducted in the department of General Surgery at Maharishi Markandeshwar University Solan. Patients were admitted from OPD. History of the patient, general physical examination and clinical examination was done, ultrasound abdomen was done in 50 patients and sonographic findings were noted and posted for laparoscopic cholecystectomy. Patient with ultrasound proved symptomatic cholelithiasis, acute cholecystitis, chronic cholecystitis, empyema gall bladder, mucocele gall bladder, gall stone pancreatitis were included in this study. Patients with gall bladder carcinoma, CBD calculus, dilated CBD with deranged LFT, history of bleeding diathesis, having severe cardiopulmonary compromise were excluded from the study.

Results: Out of 50 patients included in the study, 36 [72%] were females and 14 [28%] were males. All patients underwent successful laparoscopic cholecystectomy. No patient was converted to open surgery.

Conclusion: Though in the literature it is mentioned that chances of conversion of laparoscopic cholecystectomy into open cholecystectomy are high, if patient is male, having gall bladder wall thickness >5mm, Empyema gall bladder, Mucocele gall bladder, Dense adhesions in the calot's triangle. But in our study, we found that in spite of all these features, all the patients were successfully operated laparoscopically without any conversion. This is because of better understanding of biliary anatomy, good hemostatic energy sources and surgeon's experience in laparoscopy.

Keywords: laparoscopy, conversion, cholecystectomy

Introduction

Cholelithiasis is the most usually seen digestive tract problems. The prevalence of Gall stone disease in India is 10-20%.¹ The raised prevalence of cholelithiasis is mainly due to Western style of dietary habits, change in socioeconomic status and increased availability of the

ultrasonography. 80% of the subjects with gall stone disease appear to be asymptomatic, and among these patients only 1-2% present with serious symptoms.² Laparoscopic cholecystectomy is considered as most preferred treatment of choice for the gall stone disease when compared to the open cholecystectomy because of less postoperative pain, good cosmesis, short period of hospital stay, and early return to daily activities.³ Laparoscopic procedure is converted into open cholecystectomy in case of difficult gall bladder, the rate of conversion is 2-15%.⁴ The factors that lead to difficult Laparoscopic cholecystectomy are old age, male patients when compared to female, high BMI, recurrent attacks of acute cholecystitis, previous history of abdominal operations. The ultrasound findings of increased gall bladder wall thickness, pericholecystic fluid, mucocele, empyema gall bladder also led to difficult laparoscopic approach and may cause conversion into open cholecystectomy.⁵ Even though laparoscopic cholecystectomy is considered as safer procedure there is morbidity in 6-8% of the patients which may be due to vascular injuries, bowel injuries, bile duct injuries, wound complications, cardiopulmonary compromise.⁶ The intra-operative findings that leads to difficult laparoscopic procedure are adhesions with surrounding structures, fatty and frozen calot's triangle, aberrant anatomy, instrumental failure, uncontrollable bleeding. These factors lead to conversion into open procedure to reduce the chances of morbidity and mortality of the patient.⁷ Most of the injuries during laparoscopic cholecystectomy can be avoided by the trained laparoscopic surgeon by better understanding of biliary anatomy, good hemostatic energy sources and surgeon's experience in laparoscopy. Most surgeons after training can perform this procedure in a short time with a minimal conversion rate⁸ In the present study Factors affecting conversion of laparoscopic cholecystectomy into open cholecystectomy in tertiary care hospital was studied in our hospital.

Materials and Methodology

Patients presented in the surgery out patient department with history of cholelithiasis were admitted and planned for laparoscopic cholecystectomy. After taking Informed consent, history of the patient was noted and general physical examination and clinical examination was done.

- Patients were proceeded for routine blood investigations and results were recorded preoperatively. Total Leukocyte Count, Total Bilirubin, Direct Bilirubin, SGOT, SGPT, ALP were noted.

- Sonographic findings: 1. Gall bladder wall thickness 2. Largest stone size 3. Pericholecystic fluid 4. Impacted stone 5. Contracted gall bladder 6. Wall echo sign (WES) 7. CBD status were obtained in all the patients
- Intraoperative findings: • Identification of gall bladder • Calot's triangle dissection • Dissection from liver bed • Difficulty in extraction of gall bladder • Conversion into open cholecystectomy • Any other findings were recorded.
- Study Design: Prospective study period: August 2022- October 2022
- Sample Size: All patients from 1-8-2022 to 31-10-2022 were study subjects.
- Selection of Patients: Patients with ultrasound proved symptomatic cholelithiasis were admitted in surgery department.

Inclusion criteria:

- Patient with Ultrasound proved symptomatic cholelithiasis Acute cholecystitis Chronic cholecystitis Empyema gall bladder Mucocele gall bladder Gall stone pancreatitis were included in this study

Exclusion criteria:

- Patients with Gall bladder carcinoma CBD calculus Dilated CBD with deranged LFT History of bleeding diathesis having severe cardiopulmonary compromise.

Statistical analysis

Data will be recorded in the Master chart in microsoft excel sheet from the findings recorded in the proforma. Data analysis will be done using SPSS ® Software version 17. Preoperative parameters will be compared with intra operative parameters by univariate and multivariate analysis to find most significant parameter. The results will be reported as a difference in proportion (95% confidence interval) p value < 0.05 will be considered as statistically significant. Ethical consideration: Informed and written consent (in the language he/she best understand) will be taken from each subject before collecting data. Only those individuals, who volunteer to participate in the study, will be included and the data will be kept confidential. The study will not impose any burden on the subjects and the Institute; therefore, the study is ethically justified. The proposed study will be undertaken after approval by Institutional Ethical Committee.

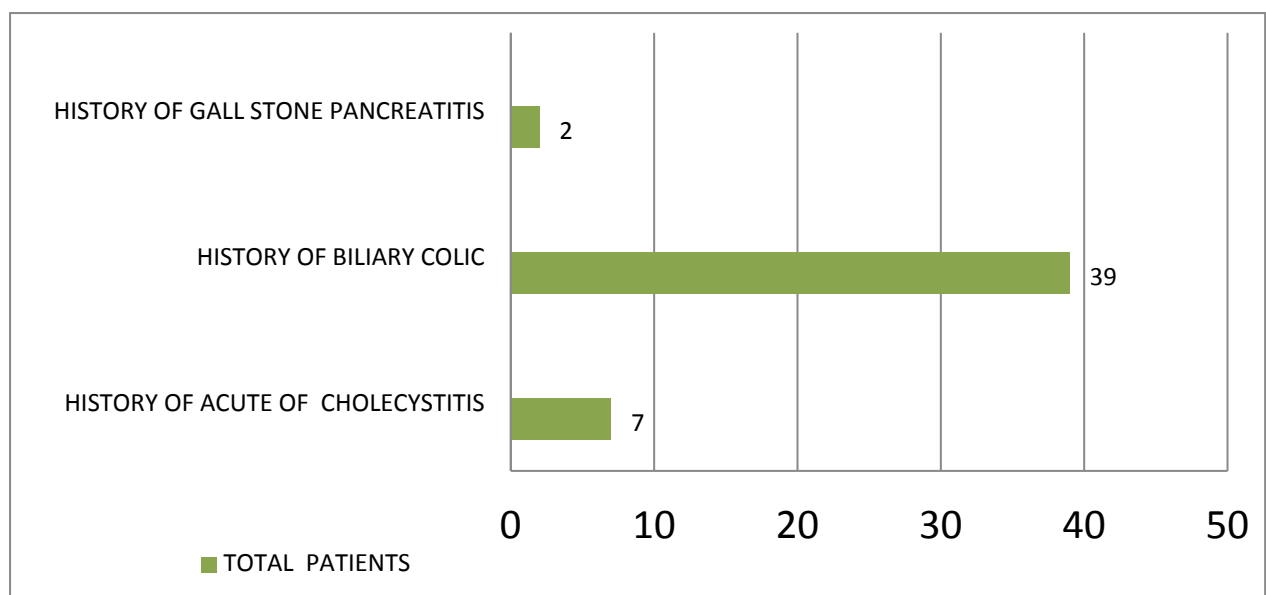
Results

50 Patients were included in the study. Out of the total, 50 patients 36 (72%) were females and 14 (28%) were male patients, giving raise to female: male ratio of 2.5 :1. Ages ranged from males from 24 to 68 years with a mean age of 45.42 years, and females age ranged from 25 to 77 years with a mean age of 46.25 years.

The BMI of the 50 patients ranged from 17.6 to 41.3 Kg/m² with a mean BMI of 25.97Kg/m².

Regarding the history of the 50 patients 2/50 patients had history of gall stone pancreatitis, 39/50 patients had history of biliary colic, and 7/50 patients had history of acute cholecystitis. The symptoms like pain in upper abdomen, dyspepsia, vomiting, fever, jaundice, hematemesis, malena, history of gall stone induced pancreatitis was noted. [GRAPH 1]

GRAPH 1: PREVIOUS HISTORY OF THE PATIENT



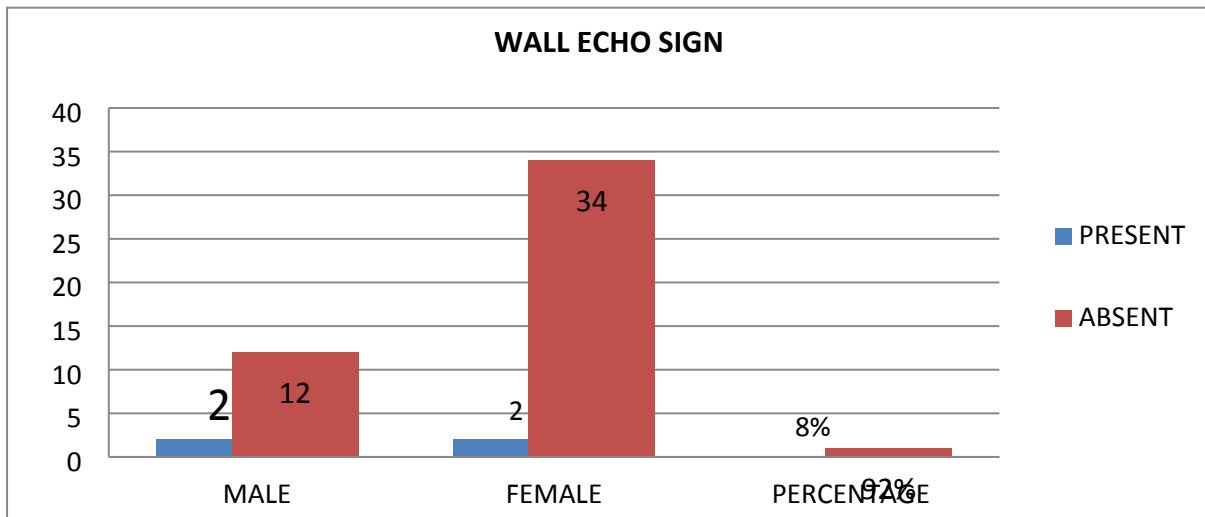
Ultrasonography findings were noted for all the 50 patients, 2 among 36 female patients had wall thickness >3mm and with pericholecystic fluid. Among 14 male patients 2 males had wall thickness >3mm with pericholecystic fluid. Total 8% patients presented with increased wall thickness. [TABLE 1]

TABLE 1: USG ABDOMEN FINDINGS

	MALE	FEMALE	TOTAL	PERCENTAGE
WALL THICKNESS >3mm AND PERICHOLECYSTIC FLUID	2	2	4	8%
WALL THICKNESS <3mm	12	34	46	92%

Among 50 patients 2 females (2/36), 2 males (2/14) had positive wall echo sign in ultrasonography [GRAPH 2].

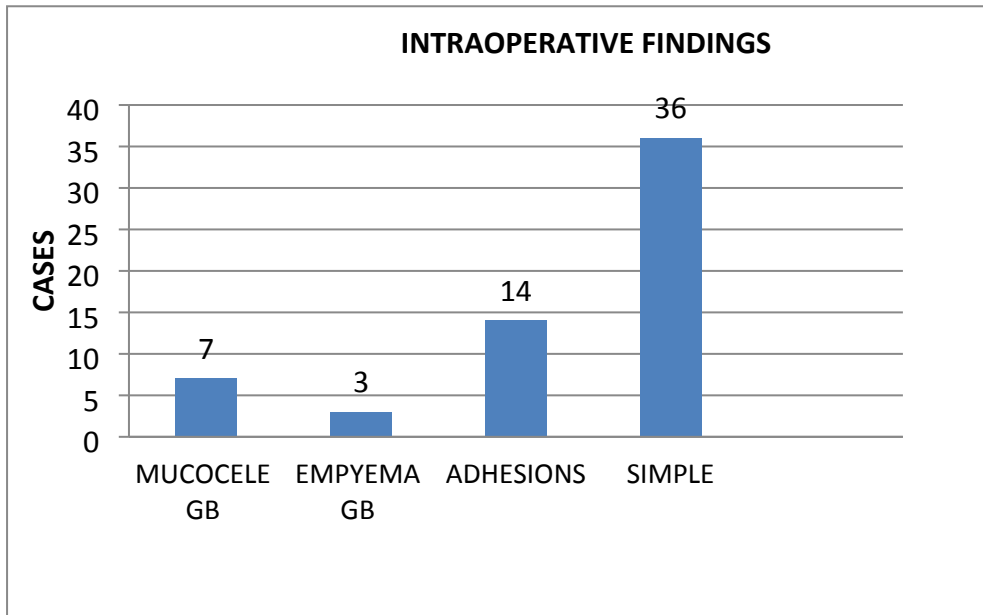
GRAPH 2: WALL ECHO SIGN



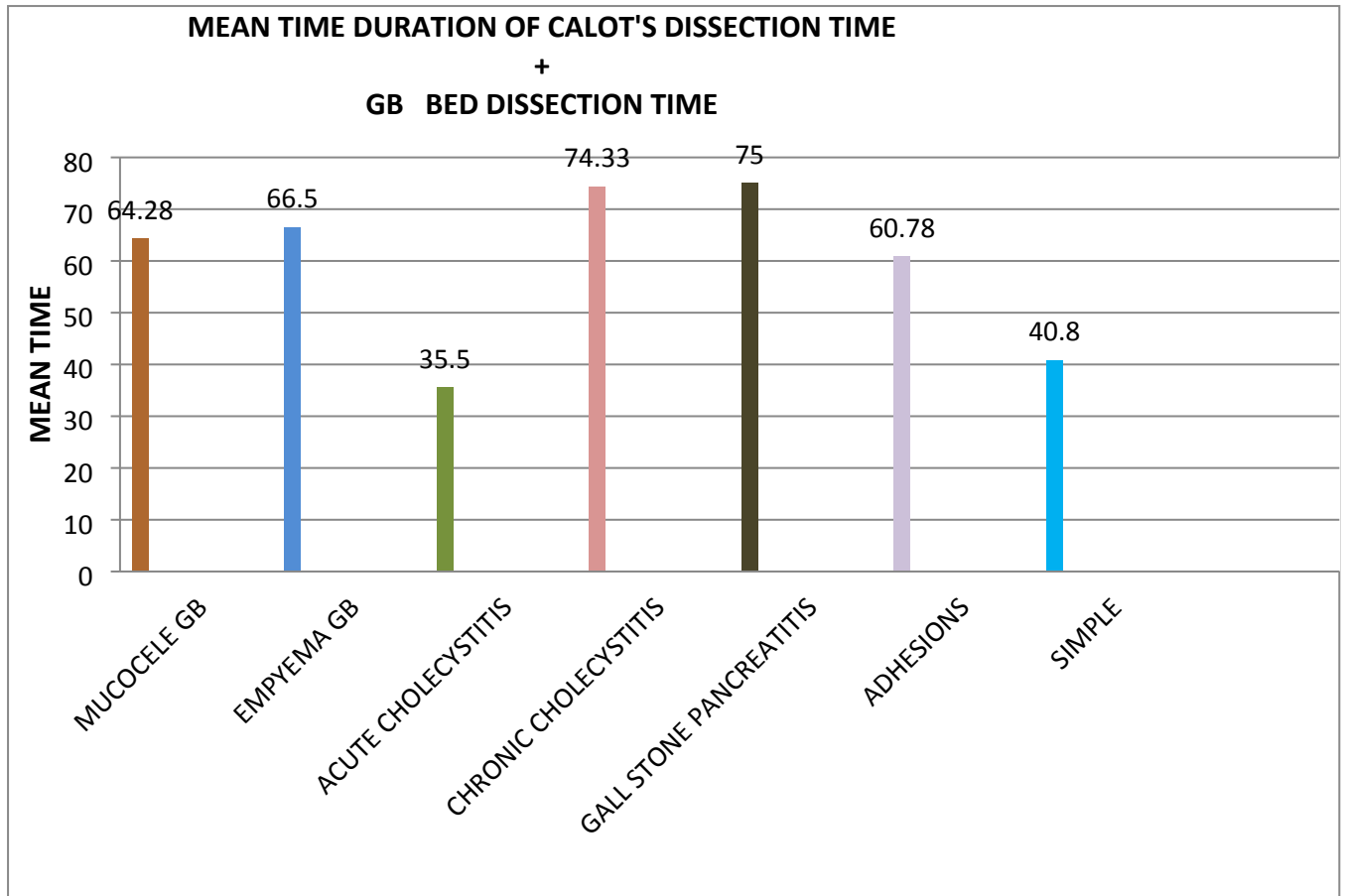
All the 50 patients were posted for laparoscopic cholecystectomy and completed without conversion into open procedure. The intraoperative findings of the 50 patients who underwent laparoscopic cholecystectomy include 7 patients (7/50) with mucocele gallbladder, 3 patients with (3/50) empyema gallbladder, 14 patients (14/50) with dense adhesions between gall bladder and surrounding structures like liver, omentum, stomach, duodenum, transverse colon,

and frozen calot's triangle. 36 patients (36/50) were completed without difficulty in laparoscopic cholecystectomy. [GRAPH 3]

GRAPH 3: INTRAOPERATIVE FINDINGS



The time took for the surgery was calculated, the mean calot's dissection time and gall bladder dissection time was calculated among all the 50 patients. As all the 50 patients were completed by laparoscopic cholecystectomy without converting into open procedure the time taken for calot's triangle dissection and gall bladder bed dissection was increased among the patients with chronic cholecystitis and patients with history of gall stone pancreatitis. The mean time duration of calot's dissection time + gallbladder bed dissection time was 75 minutes in patients with history of gall stone pancreatitis, 74.33 minutes among patients with chronic cholecystitis, 66.5 minutes in empyema gall bladder, 64.28 minutes in patients with mucocele gallbladder, 60.78 minutes in patients where there were dense intraoperative adhesions. Simple laparoscopic cholecystectomy cases were completed in a mean time of 40.8 minutes. [GRAPH 4]

GRAPH 4: MEAN TIME DURATION OF CALOTS'S DISSECTION TIME + GALL BLADDER DISSECTION TIME.

Discussion

First cholecystectomy was performed by Carl Langebuch of Germany in 1882.⁹ Until 1985 open cholecystectomies were considered as gold standard treatment for gallstones disease. First Laparoscopic cholecystectomy was performed by Erich Muhe on September 12 ,1985. Laparoscopic cholecystectomy is considered as gold standard approach for symptomatic cholelithiasis.¹⁰ First laparoscopic cholecystectomy in India was done by Prof. T. E. Udwadia in 1989. He presented his work during 10th world conference of G.I. surgery at New Delhi in 1990.¹¹ In Laparoscopic cholecystectomy, there are certain difficulties like three-dimensional depth perception, difficulty in controlling bleeding in the surgical field.¹² In open cholecystectomy structures can be differentiated easily than in laparoscopic procedure by digital palpation.¹³ Numerous factors during laparoscopic surgery leads to difficult procedure

that leads to conversion into open procedure like difficulty in creating in pneumoperitoneum, vascular and bowel and mesentery injuries during trocar insertion, CO₂ insufflation causing arrhythmias in cardiopulmonary insufficiency patients, adhesions between gall bladder and the surrounding structures like omentum, stomach, duodenum, transverse colon, frozen calot's triangle, injury to cystic artery during calot's triangle dissection, biliary structure injuries, injury to surrounding structures, during dissection gall bladder from the liver bed, gallstone and bile spillage. These conditions may prolong the time of laparoscopic cholecystectomy and may lead surgeons to perform open cholecystectomy. The chances of conversion of laparoscopic cholecystectomy into open cholecystectomy are high, if patient is male, having gall bladder wall thickness >5mm, empyema gall bladder, mucocele gall bladder, dense adhesions in the calot's triangle. The conversion of laparoscopic cholecystectomy into the open procedure can be avoided by better understanding of biliary anatomy, good hemostatic energy sources and surgeon's experience in laparoscopy.

A prospective study was conducted by Rashiq et al in 2016 among 300 patients; 262 (87.33%) were females and 38 (12.67 %) were males. Twenty-one (7%) patients were converted to open cholecystectomy. The conversion is mainly due to dense adhesions followed by obscure anatomy at Calot's triangle, other causes were bleeding, bile leakage, visceral injuries and failure of instruments. In the first 100 cases, 10% patients were converted to open cholecystectomy followed by 6% in the next 100 cases. Only 5% patients were converted to open cholecystectomy in the last 100 cases.¹⁴

A prospective study was conducted by Hussain et al in 2018 among 200 cases of laparoscopic cholecystectomy. All cases were followed at a time of surgery by obtaining data sheet for patient's age, sex, time from placement of ports till decision of conversion and the cause of conversion. Out of 200 laparoscopic cholecystectomy, 12 cases were converted into open cholecystectomy (6%). The causes of conversion were dense adhesions (4), dilated cystic duct (1), and severe inflammation (1). Two of the conversions were males from 45 male patients who underwent laparoscopic cholecystectomy. 10 cases were females from 155 female patients who underwent laparoscopic cholecystectomy. The percentage of conversion for male patients is 4.44%, and for female patients was 6.45%.¹⁵

A prospective study was conducted Anam et al in 2020 among 100 patients diagnosed with symptomatic cholelithiasis, planned for laparoscopic cholecystectomy were included.

Laparoscopic cholecystectomy was performed and cases which could not be completed laparoscopically were converted to open cholecystectomy via right subcostal incision. The conversion rate was 7%. The most common intra-operative factor for conversion was dense adhesions at the Calot's triangle (71.43%), obscure anatomy (42.86%). Uncontrolled bleeding and CBD stones also led to conversion. The identification and appearance of CBD and achievement of critical view of safety were significant factors for conversion to open cholecystectomy.¹⁶

In Literature incidence of conversion of Laparoscopic Cholecystectomy to Open Cholecystectomy is about 2 to 15%, but in our study, we did not convert a single patient into open procedure. If the surgeon is experienced and he knows the detailed anatomy of Calot's triangle and Hepatocystic triangle the chances of conversion are very less. This study can be substantiated by doing similar studies with large number of patients. Limitation of this study is less number of patients.

Conclusion

Though in the literature it is mentioned that chances of conversion of laparoscopic cholecystectomy into open cholecystectomy are high, the conversion rate of Laparoscopic Cholecystectomy into Open Cholecystectomy in the present study is ZERO, despite of the conditions like acute cholecystitis, chronic cholecystitis, empyema gall bladder, mucocele gall bladder, gall stone pancreatitis, dense adhesions and inflammation. The conversion rate to open cholecystectomy with experience of the surgeon. Predicting risk factors for conversion allows appropriate planning about doing laparoscopic cholecystectomy. In patients having risk factors for laparoscopic cholecystectomy, open cholecystectomy is done to avoid complications, morbidity and mortality.

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