

ORIGINAL RESEARCH

Study of preoperative factors as predictors in failed laparoscopic cholecystectomy requiring conversion to open cholecystectomy at a tertiary hospital

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ABSTRACT

Background: Laparoscopic cholecystectomy is considered the treatment of choice for symptomatic Cholelithiasis. However, of all Laparoscopic cholecystectomies, 1-13% requires conversion to an open for various reasons. Present study was aimed to Study various preoperative factors as predictors of laparoscopic cholecystectomies required conversion to open route at our tertiary hospital.

Material And Methods: Present study was case record based, retrospective study, conducted among case records of patients who required conversion to open cholecystectomy from laparoscopic cholecystectomy was done.

Results: In present study, among 530 laparoscopic cholecystectomy (LC) procedures, 42 cases required conversion to open cholecystectomy (OC) and conversion rate was 7.92 %. In cases required conversion, indication for cholecystectomy were recent acute cholecystitis (40.48 %), recent obstructive jaundice (21.43%) and impacted stone (16.67 %). In cases required conversion, common intraoperative events observed were significant bleeding (47.62%), fibrosis (35.71%), dense adhesions at calot's triangle (30.95%) and difficult port entry (26.19%). On analysis of preoperative risk factors age >50 years, Male gender, previous history of hospitalisation due to acute cholecystitis, Palpable gallbladder, BMI > 30 kg/m², history of previous laparotomy, USG findings of thick-walled GB (>4mm), and Pericholecystic collection were related to failed laparoscopic cholecystectomy surgery required conversion to open procedure.

Conclusion: Age >50 years, Male sex, previous history of hospitalisation due to acute cholecystitis, Palpable gallbladder, BMI > 30 kg/m², history of previous laparotomy, USG findings of thick-walled GB (>4mm), and Pericholecystic collection were found to be significant pre-operative predictive factors in laparoscopic cholecystectomies required conversion to abdominal route.

Keywords: Conversion, Gallstones, Laparoscopic cholecystectomy, Open cholecystectomy

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INTRODUCTION

Approximately 1-2% of asymptomatic patients will develop symptoms requiring cholecystectomy per year.¹ At present, laparoscopic cholecystectomy is considered the treatment of choice for symptomatic Cholelithiasis. The advantages of laparoscopic cholecystectomy over open cholecystectomy are quick recovery of bowel functions, minimal pain in postoperative period, minimal hospital stay, earlier return to normal activity, and decreased overall cost.²

However, of all Laparoscopic cholecystectomies, 1-13% requires conversion to an open for various reasons.³ There will be a certain subset of patients where the laparoscopic approach may become time-taking, technically challenging and may even have to be abandoned, sometimes in an emergency, for the open approach. The common etiologies of such a conversion are uncontrollable bleeding, adhesions, inflammation, anatomical variations, entailed common bile duct (CBD) exploration, trauma of bile duct and other hollow viscera, presence of malignant pathologies, and technical failures.⁴

A pre-operative idea regarding the intra operative difficulty is thus very essential for preparedness of the operating team to prevent or minimise the complications and to have an uneventful surgical outcome. Present study was aimed to Study various preoperative factors as predictors laparoscopic cholecystectomies required conversion to abdominal route at our tertiary hospital.

MATERIAL AND METHODS

Present study was case record based, retrospective study, conducted in department of general surgery, at Yenepoya medical college and hospital, Mangalore, Karnataka, India. Study period was from January 2015 to December 2021 (6 years). Analysis of case records of patients who required conversion to open cholecystectomy from laparoscopic cholecystectomy was done.

Case records were reviewed and demographic details (age, gender), clinical history (complaints, co-morbidities, medical and surgical history), physical examination findings, laboratory investigations, radiological (USG, CT abdomen) findings, indication for laparoscopic cholecystectomy, intra-operative findings, reason/s for conversion to open route, any complication noted was recorded in case record proforma.

Postoperative morbidity and mortality in form of complications such as perioperative complications such as bleeding and CBD injury and also postoperative complications such as surgical site infection, intra-abdominal bile leakage, lung complications and death were recorded.

Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version. Frequency, percentage, means and standard deviations (SD) was calculated for the continuous variables, while ratios and proportions were calculated for the categorical variables. Difference of proportions between qualitative variables were tested using chi-square test or Fisher exact test as applicable. P value less than 0.5 was considered as statistically significant.

RESULTS

In present study, among 530 laparoscopic cholecystectomy (LC) procedures, 42 cases required conversion to open cholecystectomy (OC) and conversion rate was 7.92 %. In cases required conversion, indication for cholecystectomy were recent acute cholecystitis (40.48 %), recent obstructive jaundice (21.43%) and impacted stone (16.67 %).

Table 1: Indication for cholecystectomy

Indication	Surgeries Conversion	required	Percentage
Recent acute cholecystitis	17		40.48%
Recent obstructive jaundice	9		21.43%
Impacted stone	7		16.67%
Cholelithiasis	4		9.52%
Acute cholecystitis	3		7.14%
Biliary pancreatitis	2		4.76%

In cases required conversion, common intraoperative events observed were significant bleeding (47.62%), fibrosis (35.71%), dense adhesions at calot's triangle (30.95%), and difficult port entry (26.19%)

Table 2: Intraoperative events

Intraoperative findings leading to conversion	Frequency	Percentage
Vascular injury/significant bleeding	20	47.62%
Fibrosis	15	35.71%
Dense adhesions at Calot's triangle	13	30.95%
Difficult port entry	11	26.19%
Visceral injury	5	11.90%
Stone/biliary spillage	4	9.52%

On analysis of preoperative risk factors age >50 years, Male gender, previous history of hospitalisation due to acute cholecystitis, Palpable gallbladder, BMI > 30 kg/m², history of previous laparotomy, USG findings of thick walled GB (>4mm), and Pericholecystic collection were related to failed laparoscopic cholecystectomy surgery required conversion to open procedure.

Table 3: Analysis of preoperative risk factors.

Risk factors	Frequency	Percentage
History		
• Age ≤ 50 years	22	52.38%
• Male gender	24	57.14%
• History of Previous abdominal Surgery	19	45.24%
• History of hospitalization for acute cholecystitis	23	54.76%
• Diabetes mellites	12	28.57%
Examination		
• BMI > 30 kg/m ²	18	42.86%
• GB palpable	25	59.52%
Radiological		
• Thickened gall bladder wall (>4 mm)	27	64.29%

• Pericholecystic fluid collection	28	66.67%
• Impacted stone	18	42.86%
Laboratory		
• Leucocytosis (WBC > 11000)	13	30.95%
• SGOT > 600	15	35.71%

DISCUSSION

Need of conversion from laparoscopic approach to open route is neither a failure nor a complication, but an attempt to avoid complication. Surgical challenges leading to open cholecystectomy have been one of the major concerns as it can lead to significant morbidity and mortality.^{5,6}

Depending on specific circumstances, a conversion can be characterized as either surgeon's elective decision (because of obscure anatomy or lack of progress of the laparoscopic procedure) or a result of a major intraoperative complication (intraoperative emergency such as uncontrollable bleeding or bile duct injury, occurs).⁷

In study by Prakash K *et al.*.....,⁸ 13% subjects required a conversion from Laparoscopic Cholecystectomy to Open Cholecystectomy. Subjects with GB wall thickness >3mm, presence of pericholecystic fluid, appearance of WES sign, and subjects having multiple gall stones and/ or CBD stone had a significantly higher level of difficulty in gall bladder extraction, as well as higher chances of complicated bleeding.

Elgammal AS *et al.*.....,⁹ noted that previous history of attacks of cholecystitis (p=0.001) and wall thickness (p=0.007) were found to be statistically significant in predicting difficult LC in both univariate and multivariate analyses. Other factors such as age (p=0.002), BMI greater than 27.5 (p=0.02), palpable GB (p=0.003), impacted stone (p=0.01) were found to be statistically significant in predicting difficult LC. Factors such as sex, and abdominal scar were not statistically significant in predicting difficult LC. The difficult laparoscopic cholecystectomy and conversion to open surgery can be predicted preoperatively based on number of previous attacks of cholecystitis, WBC count, Gall bladder wall thickness and size of stones.

In study by Bunkar SK *et al.*.....,¹⁰ patients were evaluated for a group of risk factors and preoperatively these risk factors were given a score. BMI >30, previous medical disease like DM, palpable gall bladder, prior hospitalization pericholecystic collection and impacted stone are significant risk factors to predict difficult laparoscopic cholecystectomy. The studied scoring system had a positive prediction value for easy prediction of 94% and for difficult prediction of 100%.

Veselin S *et al.*.....,¹¹ conducted a multivariate logistic regression analysis and identified five predictors significantly related to Difficult laparoscopic cholecystectomy (DLC) were GB wall thickness > 4 mm, GB fibrosis, leukocytosis >10 × 10⁹ g/L, > 5 pain attacks that lasted longer than 4 h and diabetes mellitus.

Ghazanfar R *et al.*.....,¹² noted that the rate of conversion of laparoscopic cholecystectomy to open cholecystectomy was found to be 5%. Male patients aged ≥50 years, acalculous acute cholecystitis, acute cholecystitis, elevated preoperative total leukocyte count, and alanine aminotransferase levels were found to be significant predictors of conversion to open cholecystectomy.

Regarding obesity, laparoscopic surgery is difficult owing to various factors, such as port placement in obese patients takes longer time owing to the thick abdominal wall, dissection at the Calot's triangle is also technically difficult owing to the obscure anatomy

because of excessive intraperitoneal fat, and there is difficulty in the manipulation of instruments through an excessively thick abdominal wall.¹³

Preoperative prediction of Difficult laparoscopic cholecystectomy is important for the surgeon, for his operating strategy, better organization of work in operating room, reduction of treatment expenses, as well as for the patient, for his timely information, giving a consent for an operation and a better psychological preparation for possible open cholecystectomy.

Knowledge of these factors may be used for the preoperative counselling of the patients regarding the successful outcome of the surgery as well as to predict the risk of conversion preoperatively for selected patients, prepare the patient psychologically, arrange operating schedules accordingly, and minimize the procedure-related cost and help overcome financial constraints, which is a significant problem in developing countries and possibility of the conversion so that needful arrangements can be made by the patients.^{14,15}

CONCLUSION

The conversion of laparoscopic to an open cholecystectomy seems to be multifactorial, to be affected by factors related to the patient, GB pathology, and the surgeon. Age >50 years, Male sex, previous history of hospitalisation due to acute cholecystitis, Palpable gallbladder, BMI > 30 kg/m², history of previous laparotomy, USG findings of thick-walled GB (>4mm), and Pericholecystic collection were found to be significant pre-operative

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