

Assessment of Operative Predictors for Difficulty in Laproscopic Cholecystectomy

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ABSTRACT

Introduction: Laparoscopic cholecystectomy from the day of its introduction has aimed at improving the results of traditional surgical treatment and is regarded as gold standard treatment in cholecystitis. The study was aimed to assess various operative predictors for difficult laproscopic cholecystectomy.

Material and methods: The present prospective study was conducted over 108 patients with diagnosis of cholelithiasis confirmed by abdominal ultrasonography (USG). Surgical procedure was categorized postoperatively into easy, difficult and very difficult surgical procedure on the basis of time taken in minutes, bile/stone spillage, injury to duct and conversion to open cholecystectomy. Data so obtained was analyzed using SPSS-16 data analysis software. Chi square test was used for statistical analysis with $p < 0.05$ as significant value.

Results: The present study found that obesity, co-morbid diseases, previous history of acute cholecystitis or pancreatitis, delayed surgery after 72 hour of gall bladder inflammation, increased thickness of gallbladder, fibrosis of liver parenchyma, multiple stones, size of calculi more than 1 cm are significant factors that result in difficult and very difficult surgical procedures. Conversion to open cholecystectomy was seen in 19 (17%) patients.

Conclusion: Patient characteristics indicates a type of laproscopic cholecystectomy procedure i.e. easy, difficult or very difficult. Pre-operative prediction of a difficult laproscopic cholecystectomy can help the surgeon to better prepare for risk factors or intra-operative complications and can help to predict the risk of conversion to open cholecystectomy.

Keywords: Cholelithiasis; Laparoscopic cholecystectomy; risk factor

en more than normal are regarded as difficult.⁴ The present study was commenced to identify the factors that can predict difficulty in laproscopic cholecystectomy and thus complications can be prevented beforehand.

MATERIAL AND METHODS

The present prospective study was conducted over 108 patients aged between 35 to 60 years who underwent a laproscopic cholecystectomy for cholecystitis over a period of 3 years in our institute. Ethical approval was taken from the concerned institutional committee for the commencement of study. Informed consent was taken from the patients. Detailed clinical history was obtained that included demographic data consisting of age, sex and obesity, history of previous acute attacks, fever and co morbid diseases (hypertension, any cardiovascular disease, etc). Diagnosis of cholelithiasis was confirmed in patients presenting with abdominal symptoms was done using an abdominal ultrasonography (USG) and the patients who agreed to take part in the study, were randomly selected among them. Leukocyte count, preoperative liver function tests, and other laboratory findings were evaluated. Cholecystectomies were performed by experienced surgeons in the standard four-port technique. All patients were placed on intravenous antibiotics upon admission which was continued after surgery. All the intraoperative events were recorded and timings were noted from the first port site incision until the last port closure. Surgical procedure was categorized postoperatively into easy, difficult and very difficult surgical procedure on the basis of time taken in minutes, bile/stone spillage, injury to duct and conversion to open cholecystectomy (Table 1 as described by Randhawa JS et al⁵). The first port (10-mm cannula) was inserted in the subumbilical region and three 5–10 mm ports were inserted along the subcostal margin under direct vision at midline, midclavicular and anterior axillary line. Dissection of Calot's triangle and the gallbladder from the liver bed was accomplished by using monopolar electrocautery. Conversions to open cholecystectomy were carried out by median or subcostal laparotomy according to the surgeon's decision and each patient's condition. After extraction, specimen was sent for histopathological examination.

INTRODUCTION

Cholecystectomy was considered as the surgical procedure for cholelithiasis in 1882, when its pioneer Carl Johann August Langenbuch performed the first cholecystectomy in a 43-year-old male patient who suffered from gallstone disease over past 16 years.¹ Laparoscopic cholecystectomy is considered as the gold standard treatment for most gallbladder diseases.² The advantages of laparoscopic cholecystectomy are earlier return to bowel function, less postoperative pain, cosmetics, shorter length of hospital stay and earlier return to full activity.³

Laparoscopic cholecystectomy (LC) though considered as safe and effective, yet can become difficult at times due to various problems faced during surgical procedure. Various problems encountered includes problem in identifying anatomy, anatomical variation, creating pneumoperitoneum, accessing peritoneal cavity, releasing adhesions and extracting the gall bladder. LC with these problems along with time tak-

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STATISTICAL ANALYSIS

Data so obtained was analyzed using SPSS-16 data analysis software. Chi square test was used for the analysis and a p-value of less than or equal to 0.05 was considered statistically significant.

RESULTS

LC was performed in 108 patients at our hospital out of which 33 were males and 65 were females. Patients were divided into three groups of surgeries i.e. easy, difficult and very difficult surgery groups according to criteria for laparoscopic cholecystectomy. Difficult and very difficult groups were compared surgery (table 1). The mean age of patients

Easy	Time taken for surgery <60 min, no bile spillage, no injury to duct, artery
Difficult	Time taken for surgery 60–120 min, bile or stone spillage, injury to duct, no conversion to open cholecystectomy
Very difficult	Time taken >120 min, conversion to open cholecystectomy

Table-1: Easy/difficult criteria for laparoscopic cholecystectomy as defined by Randhawa JS et al⁵

was 47±1.2 years in case of surgeries completed in time period <60 min (easy cases), 52±2.3 in case of difficult surgeries (Time taken for surgery 60–120 min) and 53±0.7 years in case of very difficult surgeries. Table 2 shows data regarding various assessed factors. 19 cases (17%) categorized into difficult surgery were converted to open cholecystectomy. The factors contributing to open cholecystectomy were inability to correctly identify anatomy, biliary tract injuries, spillage of multiple stones, increased thickness of gallbladder and fibrosis of liver parenchyma. The present study assessed various operative predictors for laparoscopic cholecystectomy and found that obesity, co-morbid diseases, previous history of acute cholecystitis or pancreatitis, delayed surgery after 72 hour of gall bladder inflammation, increased thickness of gallbladder, fibrosis of liver parenchyma, multiple stones, Size of calculi more than 1 cm are significant factors that result in difficult and very difficult surgical procedures (table 2 and 3).

DISCUSSION

Laparoscopic cholecystectomy, which is the treatment of choice for gallbladder disease, is one of the most common laparoscopic surgeries performed in a general surgical unit.⁶

Patient Findings n=108		Easy (n=65)	Difficult (n=24)	Very Difficult (n=19)
Sex	Male (n=33)	12	13	8 (24%)
	Female (n=65)	41	11	13 (20%)
Mean Age		47±1.2	52±2.3	53±0.7
Obesity status	BMI (Non- obese) n=61	44	13	4
	BMI >30Kg/m ² (Obese) n=47	21	11	15
Co morbid disease (n=53)		16	20	15
Ultrasound findings	Increased thickness of gallbladder	3	18	14
	Fibrosis of liver parenchyma	1	11	9
Previous history of acute cholecystitis or pancreatitis		9	16	15
Surgery after 72 hour of gall bladder inflammation		11	19	17
Size of calculi more than 1 cm (n=45)		14	18	13
Multiple stones (n=72)		32	22	18
Conversion to open surgery		-	-	19

Table-2: Comparison of patient findings with easy/difficult/very difficult criteria for laparoscopic cholecystectomy

Predictable Factors	Patients categorized into difficult and very difficult cases	Patients categorized into easy cases	p-value
Gender	Male= 21 Female=22	Male= 12 Female=41	>0.05
Age	52.5 years	47 years	<0.05
Non-obese	17	44	<0.05
Obese (BMI>30 kg/m ²)	26	21	<0.05
Co-morbid diseases	35	16	<0.05
Previous history of acute cholecystitis or pancreatitis	31	9	<0.05
Surgery after 72 hour of gall bladder inflammation	36	11	<0.05
Inability to correctly identify anatomy	9	-	<0.05
Biliary tract injuries	6	-	<0.05
Spillage of multiple stones	4	-	<0.05
Increased thickness of gallbladder	32	3	<0.05
Fibrosis of liver parenchyma	8	1	<0.05
Size of calculi more than 1 cm	31	14	<0.05
Multiple stones	40	32	>0.05
Conversion to open cholecystectomy	19	-	<0.05

Table-3: Predictable factors for difficult and very difficult cases and statistical analysis using Chi-square test

It is regarded as the gold standard for the treatment of symptomatic cholelithiasis. The difficult gallbladder is the most common 'difficult' laparoscopic surgery being performed by general surgeons all over the world and the potential one that places the patient at significant risk. Although the complication rate are low in experienced hands, the surgeon should keep a low threshold for difficult surgeries and conversion to open surgery and it should be taken as a precaution for better care of patient rather than be looked upon as an affront to the surgeon.⁷

The present study was commenced to identify the factors that can predict difficulty in laparoscopic cholecystectomy and thus complications can be prevented beforehand. The present study assessed various operative predictors for laproscopic cholecystectomy and found that obesity, co-morbid diseases, previous history of acute cholecystitis or pancreatitis, delayed surgery after 72 hour of gall bladder inflammation, increased thickness of gallbladder, fibrosis of liver parenchyma, multiple stones, Size of calculi more than 1 cm are significant factors that result in difficult and very difficult surgical procedures. Similarly Dhanke PS et al³ determined the predictive factors for difficult laparoscopic cholecystectomy and reported that high BMI, history of prior hospitalization, palpable gallbladder, impacted stone and pericholecystic collection are significant predictors of difficult laparoscopic cholecystectomy. Nachnani J et al⁸ evaluated pre-operative prediction of difficult laparoscopic cholecystectomy using clinical and ultrasonographic parameters and reported that body mass index >30 kg/m², male gender, past history of acute cholecystitis or pancreatitis, past history of upper abdominal surgery and thickness of gall bladder wall more than 3 mm are significant predictable factors of difficult cases.

Randhawa JS et al⁵ developed a scoring system to predict the degree of difficulty of LC preoperatively, with total 15 score from history, clinical, sonological findings. Score up to 5 predicted easy, 6–10 difficult and >10 are very difficult which was used to preoperatively define cases into easy, difficult and very difficult and results reported that prediction came true in 88.8% for easy and 92% difficult cases with factors like BMI > 27.5, previous hospitalization, palpable and thick-walled gallbladder (GB) were found of statistical significance in predicting difficult LC. Similarly, Dhanke PS et al³ utilized the same scoring system and concluded that the proposed scoring system had a positive prediction value for easy prediction of 94.05% and for difficult prediction of 100%. The present utilized the same criteria of easy, difficult and very difficult cases to compare the predictable factors.

19 cases (17%) categorized into difficult surgery were converted to open cholecystectomy. The factors contributing to open cholecystectomy were inability to correctly identify anatomy, biliary tract injuries, spillage of multiple stones, increased thickness of gallbladder and fibrosis of liver parenchyma. On the contrary, Singh K et al¹ conducted a retrospective study over 6,380 patients underwent LC over a period of 13 years and reported 22.66% cases were identified as difficult cases. Literature reports a large variation over a rate of conversion of laproscopic method to open cholecystectomy. Oymaci et al⁶ reported a rate of conversion of 27.9%, Nachnani J et al⁸ reported 11.4% cases whereas Singh K et

al⁹ reported a rate of conversion of 0.36%, Ishizaki Y et al¹⁰ of 5.3% and Bakos E et al¹¹ as 5.7%.

Available data suggests that the experience of the surgeon and meticulous surgical technique are the important factors to achieve a low complication rate. The limitation of the present study was a small sample size. Further cohort studies and meta-analysis of the available literature from various regions or study groups and private or government hospitals are needed to confirm these findings.

CONCLUSION

Laparoscopic cholecystectomy is the procedure of choice for management of symptomatic gallstone disease which could at times is an easy procedure conducted in a short time whereas occasionally, it can be a difficult procedure extending to a longer duration of time. Pre-operative prediction of a difficult laproscopic cholecystectomy can help the surgeon to better prepare for risk factors or intra-operative complications and can help to predict the risk of conversion to open cholecystectomy.

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