



PREDICTING THE RISK FACTOR FOR DIFFICULT LAPAROSCOPIC CHOLECYSTECTOMY: AN OBSERVATIONAL STUDY

General Surgery

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ABSTRACT

Background: Laparoscopic Cholecystectomy (LC) has become the gold standard in the treatment of symptomatic gallstones and it is the most frequent operation now-a-days for gallbladder stones. At times laparoscopy becomes difficult and may need conversion to open cholecystectomy. The prediction of a difficult cholecystectomy has traditionally been based on certain pre-operative clinical and imaging factors. **Aim:** To study the factors determining the preoperative predictability of difficult LC based on the patient's history, physical examination and abdominal ultrasonography. **Methods:** 359 patients diagnosed cholelithiasis, admitted to general surgery department, KPC MCH, Kolkata-32, West Bengal. All of them underwent elective LC, and were operated by experienced laparoscopic surgeons between July 2022 and November 2023. **Study design:** Observational study. **Results:** In our study out of 359 cases 221 are male and 138 are female, male are more predominant than females (61% vs 38%). Among 359 patients 76 (21%) patients were found for difficult cholecystectomy. On multivariate logistic regression revealed that male gender, older age, H/O acute attacks, positive Murphy's sign, past H/O acute cholecystitis requiring hospitalisation, recent H/O jaundice, past H/O co-morbidities, H/O ERCP for choledocholithiasis, H/O gall stone pancreatitis, increased gall bladder wall thickness, peri-cholecystic oedema/ collection, fibrotic gall bladder, intra-operative findings of dense adhesion at Calot's triangle were independent predictors of difficult LC. **Conclusion:** Pre operative prediction of possible difficulties may help a surgeon in choosing the appropriate approach suitable for a particular patient. Patients can pre-op be informed about possible risk of conversion to open cholecystectomy.

KEYWORDS

INTRODUCTION

The popularity of gallbladder (GB) diseases is variable among adults in developed and developing countries. In addition, it is studied as an important risk for morbidity such as cholecystitis, cholangitis, and pancreatitis [1,2]. Over the past two decades, laparoscopic cholecystectomy (LC) has become gold standard for the surgical treatment of gallbladder disease.[3] Approximately, 2–15% of attempted LC has to be converted to an open procedure due to various difficulties faced while performing the procedure.[4]. The benefits of laparoscopic cholecystectomy are- less post operative pain, faster recovery, earlier return of bowel function, and shorter hospital stay when compared to conventional cholecystectomy [5]. Most of the factors such as morbid obesity, and previous upper abdominal surgery which were studied as pure contraindication for pursuing LC have no longer remained as pure contraindications. The number of contraindications has come down undoubtedly over time [6]. It is important to recognize that the need for conversion to laparotomy is neither a failing nor a complication, but an attempt to avert complication and ensure patient safety [7]. Based upon the risk factors like; patient demographics such as age, gender, body weight, comorbidity, and ASA score, along with clinical findings (acute versus chronic cholecystitis), and the surgeon's experience; the chance of possible complications, and conversion into open surgery can be estimated [8,9]. Such prediction done preoperatively may help the patient as well as the surgeon in being better prepared for the intra-operative challenges.

Inclusion criteria

All patients with Gallbladder stone disease indicated for Elective LC operated by experienced laparoscopic surgeons.

Exclusion criteria

Emergency cholecystectomy (operative intervention done within 72hrs of an acute attack of cholecystitis), Coagulopathy, Abdominal wall sepsis, End stage liver disease, Poor cardiorespiratory performance, pregnancy, Neoplasm or non-calculus cholangitis. Non-Compliant patients for follow up.

METHODS

An observational study of surgical records was conducted for all patients who underwent LC between July 2022 and November 2023 at KPC Medical college & hospital, Kolkata-700032. The standard

laparoscopic procedure was followed. Surgery was done using CO₂ pneumoperitoneum with 12 mm Hg pressure and using standard two 10 mm and two 5 mm ports. The open method was used to introduce supraumbilical cannula. In all cases we placed titanium clips for cystic artery and cystic duct ligation. Intraoperative cholangiography did not perform routinely. All intraoperative parameters were recorded.

Parameters recorded for all patients undergoing LC and comprised as the difficult LC were- operative time (The timing was noted from the first port site incision until the last port site closure), and need for conversion to open surgery.

Patient's demographics, risk factors and perioperative details were analysed. Clinical evaluation, abdominal ultrasonography as baseline investigations were used as a tool to assess all patients for surgery. All patients received perioperative prophylactic antibiotics.

To avoid bias in surgical outcome, all patients enrolled in study were operated by experienced laparoscopic surgeons.

RESULTS

Of the total 359 patients included in the study, 221(61%) patients were male and 138(38%) patients were females. The majority of patients were in the age group of >40 years. Among 359 patients 76(21%) patients were found for difficult cholecystectomy.

There were past H/O acute cholecystitis requiring hospitalization and past H/O acute attacks requiring injection for pain relief were 37 and 90. Positive Murphy's sign during examination was present in 70 patients. H/O jaundice in recent past was present in 8 patients. concerning past medical history and comorbidities, 82 patients had HTN, 102 patients had DM, 28 patients had ischemic heart disease, 57 patients had COPD, 15 patients had past H/O CVA or seizure disorder and 3 patients had chronic kidney disease was on haemodialysis. H/O ERCP for choledocholithiasis occurred in 12 patients, H/O gall stone pancreatitis in 39 patients.

Abdominal ultrasound showed that 250 patients had GB wall thickness less than 3.5 mm while 109 patients had GB wall thickness more than 3.5 mm. 38 patient had pericholecystic oedema/ collection, 26 patients had fibrotic gall bladder and adhesion in Calot's triangle seen in 73 patients.

Demographics of study subject and difficulty cholecystectomy

Difficulty cholecystectomy

1.	Sex			Yes	No
	Male	221		47(21%)	172(77%)
	Female	138		27(19%)	111(80%)
2.	Age				
	More than 40	197		58(29%)	139(70%)
	Less than 40	162		18(11%)	144(88%)
3.	Past H/O acute cholecystitis requiring hospitalisation	Yes	37	29(78%)	8(21%)
		No	322	47((14%)	275(85%)
4.	Past H/O acute attacks requiring injectables for pain relief	Yes	90	64(71%)	26(28%)
		No	269	12(4%)	257(95%)
5.	Positive murphy's sign during examination	Yes	70	58(82%)	12(17%)
		No	289	18(6%)	271(93%)
6.	H/O jaundice in recent past	Yes	8	2(25%)	6(75%)
		No	351	74(21%)	277(78%)
7.	Comorbidity				
	No comorbidity	139		32(23%)	107(76%)
	HTN	82		20(24%)	62(75%)
	DM	102		61(59%)	41(40%)
	Ischemic Heart Disease	28		1(5%)	27(96%)
	COPD	57		28(49%)	29(50%)
	Past H/O CVA/Seizure	15		3(20%)	12(80%)
	CKD on HD	3		1(33%)	2(66%)
8.	H/O ERCP for choledo cholithiasis	12		10(83%)	2(16%)
9.	H/O gall stone pancreatitis	39		31(79%)	8(20%)
10.	GB wall thickness in pre-op USG	<3.5 mm	250	12(4%)	238(95%)
		>3.5 mm	109	64(58%)	45(41%)
11.	Pericholecystic oedema/ collection	38		38(100%)	0
12.	Fibrotic gall bladder	26		22(84%)	4(15%)
13.	Adhesion in calots triangle	73		64(87%)	9(12%)

DISCUSSION

Laparoscopic cholecystectomy is one of the most commonly performed surgeries world over and is undergoing regular amendments with growing technology in order to make it safer, cosmetically acceptable, and cost effective. Intraoperative findings may not be similar in every case and could vary based on clinical presentation, and surgical difficulty might arise for the operating surgeon [10]. When a difficult cholecystectomy occurs, the risk of bile duct injury increases by up to 10 times, increases the conversion rate, increased bleeding, more postoperative complication and linger surgical time [11,12]. The foremost purpose of this study was to find predictive factors of a difficult cholecystectomy. This is important to have a tool to predict the difficulty of LC. If the surgeons could predict the risk factors and safety of the procedure, surgeons could have benefit in deciding the surgical approach, counselling the patients, reducing the risk of complication, reducing the rate of conversion to open cholecystectomy, and reducing overall medical cost [13,14].

Various risk factors for conversion have been obtained in this study. When we analysed the predictors of difficult LC, we found that the male gender, past H/O acute cholecystitis, gall bladder wall thickness, fibrotic gall bladder and adhesion in the calot's triangle. In this study majority of patient was male 61% (221/359) and age group above 40 years 54% (197/359). Past H/O acute attacks requiring injectables for pain relief and Past H/O acute attacks requiring injectables for pain relief were 10% (37/359) and 25% (90/359). Adhesion in calots triangle was seen 20% (73/359) patients among them 87% (64/73) had difficult cholecystectomy. Patients who required hospitalization for

repeated attacks of acute cholecystitis carry more chances of difficult laparoscopic cholecystectomy and conversion. Possibilities are dense adhesions at Calot's triangle and gall bladder fossa [15]. In our study also, it was found to be a significant factor for the prediction of difficult laparoscopic cholecystectomy. Murphy's sign positive during examination was 19% (70/359) among them 82% (58/70) had difficult LC.

Similar to reported by Stanisis et al. [16], we found fibrosis of the gallbladder is associated with difficult LC. The fibrotic gallbladder usually resulted from repeated episodes of attack of cholecystitis due to constant irritation of the gallbladder wall with gallstones. Chronic inflammation of gall bladder leads to pericholecystic adhesion and adhesions at the triangle of calot's that leads to difficulty in dissection during LC and this increased duration of surgery, increase the risk of bleeding and injuries to adjacent structures. So, adhesion at Calot's triangle is another important predictor described in a few studies [17,18] similar to our study.

If a high preoperative risk of difficult cholecystectomy is predicted, which implies a greater possibility of elevated intraoperative difficulty, it would be a discretionary decision of the surgeon, to define whether to avoid complications it is better to perform non-operative management or with cholecystectomy.

CONCLUSION:

This study has developed an internally and externally validated pre-operative data system for predicting the operative difficulty of laparoscopic cholecystectomy. This could allow difficult operations to be scheduled for the daytime in the correct theatres and with the correct surgical expertise and equipment.

Male gender, past H/O acute cholecystitis, fibrotic gall bladder, pericholecystic oedema/ collection, GB wall thickness less than 3.5 mm, fibrotic gall bladder and adhesion in calots triangle are significant predictors for difficult LC.

This study may be helpful to determine the risk of conversion of LC to open cholecystectomy beforehand. This study may allow patients to be better prepared for surgery and anticipate risk of conversion to open.

In conclusion, we suggest implementing the preoperative risk factors in all patients who are planning LC, considering it a simple and easy-to-use tool in order to inform the patient, organise the surgery schedule, select proper method, select personnel, request support and have adequate pre-operative planning.

Limitations:

This study was conducted in a single centre, hence the study results derived may not represents the whole community. The study was conducted over a short time periods. These were the limitation of this study.

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Conflicts of interest:

There were no conflicts of interest.

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