



RESEARCH ARTICLE

PREOPERATIVE FACTORS PREDICTING DIFFICULT LAPAROSCOPIC CHOLECYSTECTOMY: A PROSPECTIVE OBSERVATIONAL STUDY

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ARTICLE INFO

Article History:

Received 20th June, 2024

Received in revised form

19th July, 2024

Accepted 19th August, 2024

Published online 30th September, 2024

Key words:

Cholelithiasis, Difficult laparoscopic, Cholecystectomy, Critical view of Safety, Gallstone Disease.

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ABSTRACT

Laparoscopic cholecystectomy (LC) is one of the most common abdominal operations and is considered as gold standard for management of symptomatic GSD (1). However laparoscopic cholecystectomy is associated with higher risk of bile duct injuries (BDI) than open cholecystectomy [0.3vs0.1] (2). This study aims to predict difficult laparoscopic cholecystectomy preoperatively. **Methods:** This study is a prospective observational study. Patients who went for LC from February 2021 to September 2023 were taken as sample subjects in this study. We studied patients' demographics and analyzed the data.

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Citation: Dr. Imtiyaz Ahmad Malik, Dr. Ashiq Hussain Raina, Dr. Sajad Nazir Malla, Dr. Waseem ul Rehman, Dr. Maajid Kaleem and Dr. Sheikh Bisma Ramzan. 2024. "Preoperative factors predicting difficult laparoscopic cholecystectomy: a prospective observational study." International Journal of Current Research, 16, (09), 29979-29981.

INTRODUCTION

LC is considered as a gold study for management of GSD. This is one of the common procedures taught to surgical residents, this procedure has the advantages of reducing hospital stay, improving quality of life with fast recovery of less pain and early return to work (3). However, this procedure is sometimes difficult to perform demanding conversion to open operation (4). It therefore becomes necessary to predict preoperatively difficult LC so that the surgeon is mentally prepared and is ready with a good surgical team. Based on patients age, sex(gender) (5), BMI (6), along with radiological factors (impacted stone, pericholecystic fluid and wall thickness), previous history of hospitalization (7, 8) and abdominal surgical procedure the chances of a difficult LC and its complications can be minimized. Patients with reduced risk might be recognized and accurately scheduled in an ambulatory care facility and selected as easy cases for education for surgical trainees (9), whereas patients with increased risk need to be accurately counseled and operated with skilled surgeons (10). This, our study is aimed to study such factors preoperatively for a difficult LC.

METHODOLOGY

The present study was an observational study conducted in a prospective manner over a period of February 2021 to September 2023. The study was conducted in the Post Graduate Department of General Surgery, Government Medical College, Srinagar. The Institutional Medical and Ethics Committee consent was obtained before collecting the data. Written and informed consent was taken from all the patients enrolled into the study. The study included a comprehensive history, physical examinations, and radiological investigations of the patients. A total of 150 cases diagnosed with symptomatic gallstone disease were included in the study. Exclusion criteria comprised patients with conditions incompatible with laparoscopic procedures. The preoperative ultrasound findings, including the presence of gallbladder (GB) calculi, GB wall thickness, pericholecystic fluid collection, and the presence of concomitant common bile duct (CBD) stones, (table Z & 4) were assessed. The incidence of conversion of LC to open cholecystectomy was analyzed. The rates of conversion remained tremendously stable all through the duration of study. The indicators of conversion to open procedures were analyzed in Table z.

Inclusion and exclusion criteria: We included patients greater or equal to 18 years of age who were planned for elective LC and excluded patients who underwent emergency cholecystectomy. Difficult LC is defined as those with operative time 60-120 min, critical view of safety was not achieved, need of conversion to open cholecystectomy and those with vascular and biliary injuries.

Objectives: Preoperative factors-- age, sex(gender), BMI, along with radiological factors (impacted stone, pericholecystic fluid and wall thickness), previous history of hospitalization and abdominal surgical procedure were studied. All these factors were independently assured and given a score (table X).

STATISTICAL METHODS

The recorded data was compiled and entered in a spreadsheet (Microsoft Excel) and then exported to data editor of SPSS Version 20.0. Statistical software SPSS (version 20.0) and Microsoft Excel were used to carry out the statistical analysis of data. Continuous variables were expressed as Mean, SD and categorical variables were summarized as percentages.

OBSERVATION AND RESULTS

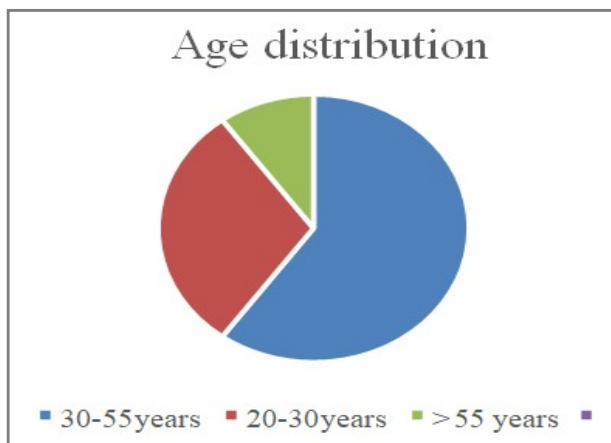
A total of 150 patients [60 male & 90 female] were studied with a median age of 50 years. Total difficult LC was found in 50 patients. The overall conversion rate was 20 percent (30 out of 150). Various preoperative independent predictors (table 1 to 6) taken into a study were age, gender, previous attack of acute cholecystitis, body mass index, previous abdominal surgery, palpable gallbladder (GB), wall thickness of gallbladder, pericholecystic collection and impacted stone in GB.

AGE DISTRIBUTION

Of the total 150 study patients, majority i.e. 90 (60%) patients belonged to the age group of 30-55 years followed by 40 patients who belonged to age 20- 30 years ,20 (13.3%) patients were aged greater than 55 years. Median age was 50 years.

Table 1

S.no	Number of patients	Age distribution (years)	Percentage (%)
1.	90	30-55	60 %
2.	40	20-30	26.7%
3.	20	>55 years	13.3%



GENDER DISTRIBUTION

Among the study patients, females out-numbered males in our study with only 60 (40%) males and 90(60%) females.

Table 2.

S. No	Males	Females	Total
01	60	90	150

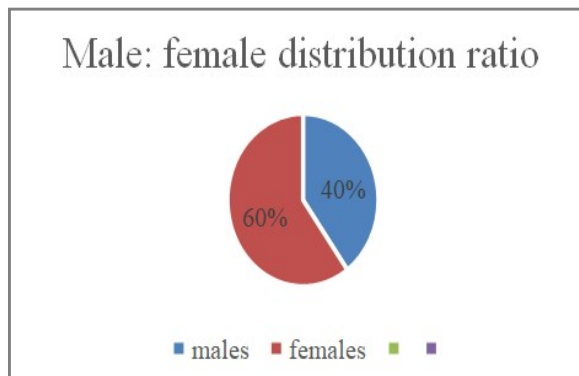


Table 3. Patients BMI distribution

BMI	Number
Normal (18 to 24.9)	30
Preobese (25 to 29.9)	60
Obesity (30 to 39.9)	40
Morbid obesity (> 40)	20

Table 4. Ultrasound findings in our patients

Parameters		No. of patients
Wall thickness	>4mm	30
Pericholecystic collection	Present	15
Impacted stone	No	6

Table 5. Previous history of acute attacks, hospitalization, previous abdominal surgeries

History	Acute attacks	Previous surgery	Hospitalization
Yes	15	32	30
No	135	118	120

Table 6. History and examination

	Abdominal scar	Palpable GB
YES	42	8
NO	108	142

Table 6. Causes of conversion to open in our study

Causes of conversion	No. of patients
Frozen calots	13
Inflamed GB (acute attack)	4
Dense adhesions	11
Bleeding	2

Table X Preoperative Scoring System

History		Score		Score	Max
Age	<=50Y	0	>50Y	1	1
Sex	F	0	M	1	1
H/o hospitalization	No	0	Yes	4	4
Clinical					
Bmi	<25	0	25-27.5 >27.5	1 2	2
Abdominal scar	NO	0	Infraumbilical Supraumbilical	1 2	2
Palpable GB	NO	0	YES	1	1
SONOGRAPHY					
Wall thickness	<4mm	0	>4mm	2	2
Pericholecystic collection	No	0	Yes	1	1
Impacted stone	No	0	Yes	1	1
			Max. score		15
EASY		DIFFICULT		Very Difficult	
<5	6-10			11-15	

DISCUSSION

LC is the preferred procedure for management of all cases presented with GB calculi [11]. It offers a minimally invasive technique with much less morbidity and better postoperative recovery. Moreover, it provides a good exposure of the operative field for GB surgery. On the contrary, lacking of tactile sensation and bidimensional vision are considered as obstacles, especially with difficult cases. Open surgical procedure has numerous advantages over laparoscopic technique, especially in difficult cases, as it allowed surgeons to apply manual compression, experience better tactile feedback, have a wide range of exposure and movements, and also there is no restricted number of instruments in the operative field. Preoperative identification of patient with considerable difficulties that lead to conversion could decrease the drastic outcomes of prolonged surgical procedure through decreasing the period of the trial of laparoscopic dissection [12].

This study aimed to identify certain preoperative factors that predict difficult laparoscopic Cholecystectomy for better planning before surgery and early decision to convert to open procedure. Difficult cholecystectomies were seen in 30 % of cases older than 45 years, especially in male patients (25%). As age above 45 years predicted prolonged dissection time at Calot's triangle due inflammation and fibrosis, which is more extensive in male than females. These results are similar to what stated by Ercan et al. [13] that the rate of difficult LC with possible conversion is 52% in male above 60 years. We find that obese patients with BMI of 30kg/m² or more were difficult laparoscopic cholecystectomies because of prolonged GB bed dissection time owing to inflammation or fibrosis and unclear anatomy owing to presence of excessive intraperitoneal fat and insufficient retraction of the liver, and difficulty increase with increases in BMI and obesity. This study showed that cholecystectomy in acute cholecystitis is quite difficult (75%), and also, the time of surgery in acute cholecystitis is very important [8]. Acute cholecystitis is a severe inflammation associated with increased vascularity and extensive adhesions which lead to improper visualization, as the thick-walled GB became shrunken and contracted. So, the cystic duct becomes shortened and GB adherents to the CBD, making grasping and retraction of GB difficult and its dissection from the CBD unsafe. Difficult LC cases (87.5%) with possible conversion to open cholecystectomy are encountered if cholecystectomy is performed after 3 days from the onset of pain. These data are similar to the results obtained by Madan et al. [14]. They stated that the surgical procedure needs to be performed among 48–72h as the appearance of the first symptoms and conversion rate was less than 1% (four cases out of 24 cases) if performed more than 3 days. Sonography is the investigation of choice for gall bladder wall thickness and gall stones. Thick-walled GB is one of the predictors of conversion, significant factor ($p < 0.01$). Gall bladder wall thickness on pre-operative sonography > 4 mm signifies acute cholecystitis and hence, a predictor of difficult cholecystectomy. In this study we also find gallbladder neck stones to be better predictor of difficult cholecystectomy. Pericholecystic collections/edema was found to be statistically significant predictor of difficulty ($p < 0.01$). Pericholecystic edema-fluid around gall bladder indicates acute cholecystitis (15,16).

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