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RESEARCH ARTICLE

PREOPERATIVE PREDICTION OF THE DIFFICULTY OF LAPAROSCOPIC CHOLECYSTECTOMY

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ABSTRACT

Introduction: Preoperative complexity estimation helps deciding whether to proceed with a minimally invasive approach or perform an open procedure. Laparoscopic cholecystectomy outcome is particularly affected by the presence and severity of inflammation, advancing age, male sex and greater BMI.
Objective: To study Preoperative prediction of difficult laparoscopic cholecystectomy.
Patients and Methods: A total of 102 patients were enrolled to this study who were symptomatic, positive findings on clinical examination and ultrasound abdomen. The triad of clinical examination, laboratory data and ultrasound study was performed for all patients. The primary end point of the study was operative outcome and the second end point was morbidity related to surgery.
Results: The operative outcome was represented as operative bleeding and conversion to open surgery while the postoperative outcome was biliary leakage and port site infection. The total score for each patient with conversion to open surgery or with postoperative biliary leakage was between 6-10 points indicating difficult surgical approach according to the scoring system.
Conclusion: Preoperative prediction of risk factors of conversion or difficult laparoscopic cholecystectomy is an important point for operative planning and the high risk patients may be informed accordingly.

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INTRODUCTION

Laparoscopic cholecystectomy (LC), one of the most commonly performed surgical procedures worldwide is accepted as the gold standard in the treatment of symptomatic gallstones. Preoperative assessment of complexity factors is needed for frequent procedures such as (LC) in order to avoid complications and delays and to guarantee an efficient course of surgery. In case of laparoscopic cholecystectomy, preoperative complexity estimation helps surgeons deciding whether to proceed with a minimally invasive approach or perform an open procedure. .Although laparoscopic cholecystectomy has generally a low incidence of morbidity and mortality as compared to open surgery, its outcome is particularly affected by the presence of previous episodes of cholecystitis, advancing patient's age, male sex and greater body mass index . Previous upper abdominal surgery is associated with a higher rate of adhesions, an increased risk of operative complications, a greater conversion rate, a prolonged operating time and longer stay. Laparoscopic cholecystectomy after endoscopic retrograde cholangiopancreatography (ERCP) with endoscopic sphincterotomy (ES) for combined choledochocystolithiasisis more difficult with prolonged procedure and longer post operative hospital stay than in uncomplicated gallstone disease.

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Objectives

The aim of this study was to predict outcome of laparoscopiccholecystectomy in our patients according to the recently published scoring system.

MATERIALS AND METHODS

A total of 102 patients were enrolled to this study who were symptomatic, positive findings on clinical examination and ultrasound abdomen from April 2016 to August 2017 at Acharya Shri Chander College Of Medical Sciences and Hospital (ASCOMS) affiliated with Jammu University. Surgical interference for patients with acute cholecystitis was done within 72 hours from the onset of symptoms of the acute inflammation. Written consent was obtained from all patients or first degree relatives before the management procedure and the local ethics committee approved the study.

Preoperative workup

The triad of clinical examination, laboratory data and ultrasound study was performed for all patients.

Ultrasonography findings for diagnosis of acute cholecystitis were confirmed when sonographic Murphy sign with tenderness on ultrasound probing was elicited. Thickened gallbladder wall >4 mm and enlarged gallbladder with long axis diameter >8 cm, short axis diameter >4 cm. are other UGC finding pericholecystic fluid collection.

Grading of acute cholecystitis

Grade I: Mild acute cholecystitis is defined as acute cholecystitis in a healthy patient with only mild inflammatory changes in the gallbladder.

Grade II: Moderate acute cholecystitis is diagnosed when palpable tender mass in the right upper abdominal quadrant with marked local inflammation in usg together with WBC count >18 000/mm^3.

Grade III: Severe acute cholecystitis is accompanied by organ dysfunctions.

Difficulty scoring

We relied on the recently advocated scoring system by Gupta and his colleagues which depends on three main items; patient's history, clinical data and imaging study. Score of (0–5) indicates an easy approach while score of (6–10) indicates difficult approach and very difficult approach is observed with score of (11–15).

Assessment of adhesion extent

Intra-abdominal adhesion was graded as previously stated in our simplified scoring. This scoring system advocated evaluation of the extent of adhesion as localized, moderate and extensive. Bleeding during surgery is usually graded as minimal when is loss of less than 500ml, moderate when loss ranges 500-1000 ml or severe when loss reaches 1000-1500 ml. Moderate bleeding is defined as bleeding leading to tachycardia of greater than 100/min without drop in blood pressure. Severe bleeding is defined as bleeding leading to tachycardia of greater than 100/min with a greater than 10 mm Hg drop in blood pressure.

Intra-operative blood loss estimation

Estimation of intra-operative blood loss is governed by visual method and the clinical assessment with collaboration with the anesthetist. Regarding visual estimation of blood loss; a standard absorptive gauze measuring 30 cm X 30 cm was used. When it was soaked by 50 % means it contains about 25 ml of blood and if soaked 100% means it contains 75 ml of blood.

Operative technique

Laparoscopic cholecystectomy was performed using the standard 4-trochar technique. Gallbladder contents were aspirated in cases with gallbladder distension. Meticulous dissection was paid to identify the structures in Calots triangle and attempts of retrograde dissection of the gallbladder (Fundus first) starting at the fundus were done in case of severe inflammation and anatomical difficulty of the pericystic space. We used plastic bags for gallbladder removal from the abdomen for prevention of wound infection and falling of stones.

End Points

The primary end point of the study was operative outcome and the second end point was morbidity related to surgery.

RESULTS

The demographic data of our patients are studied according to age, sex and their special habits as shown in Table (1). The range of operative time was between 45-200 minutes with a mean value of 65.7± 26.08 minutes, the minimum value was 45 and the maximum was 200 minutes respectively. The abdominal wall status was studied according to the presence of surgical, nonsurgical scars and deformity with total number of 19 patients. Infra- umbilical scars and supra-umbilical scars were present in 8 patients each. Burn cicatrization of abdominal wall was seen in 3 patients. Intra-abdominal adhesion was graded as previously statedin our simplified scoring and accordingly.

Table 1. Demographic data of our patients

Item		Male	Female
Age	≤ 50 years	12	40
	≥ 50 years	31	18
BMI	≤ 25 ; 22-24.9	20	19
	≤ 30; 25-29.9	10	15
	≥ 30; 30-34.9	14	24
Special Habits	Smoking	15	5
	Drugs	6	-
	sports	8	8
	None	15	45

Table 2. Preoperative parameters in our study

Item	Status	Sex		Total
		F	M	
Abdominalwall scars	Infra-umbilical scars	8	-	8
[N= 19]	supra-umbilical scars	3	5	8
	Burn cicatrization	1	2	3
Intra-abdominal adhesions	Moderate	2	4	6
[N= 14]	Extensive	3	5	8
Gall bladder pathology	Acute cholecystitis	30	10	40
[N= 59]	Fibrotic GB	3	6	9
	Loaded with stones	3	7	10
ERCP[N= 10]		5	5	10
Total		58	44	102

Table 3. Intra-operative complications

Complication	AC		FG		Adhesion		Hge		Total	
	M	F	M	F	M	F	M	F	M	F
Bleeding	2	2	1	1	1	1	-	-	4	4
conversion	2	2	1	-	1	-	1	1	5	3
Leak	1	1	-	1	1	-	-	-	2	2
Infection	3	2	1	-	-	1	1	1	5	4
Total	8	7	3	2	3	2	2	2	16	13
										29

Moderate and extensive adhesions were detected in 6 and 8 patients respectively.Grades and severity of acute cholecystitis were traced in our patients according to the clinical finding, laboratory data and imaging studies. Only grade I and grade II were included. There were 40 patients with acute cholecystitis, 9 patients dense fibrotic gall bladder and 10 patients had their gall bladder loaded with stones. We had 10 patients operated upon after ERCP. The total number of male patients was 44, 31/44 patients (70.4%) were above 50 years and 24/44 patients were obese and overweighed [14/44(31.8%) and 10/44(22.7%)

respectively]. The majority of female patients 40/58 were under 50 years (68.9%) while and 24/58 (41.3%) patients were obese and 15/58 were overweighed (25.8%). There was no operative mortality and the 30- day death was 3 (2.54%) and the overall complication rate was 28.43% (29/102 patients). The operative outcome was represented as operative bleeding and conversion to open surgery while the postoperative outcome was biliary leakage and port site infection. The overall operative bleeding was observed in 8 patients (7.84%), 4 with acute cholecystitis, 2 with fibroticgall bladder and 2 patient with extensive peritoneal adhesion. Number of male patients with intraoperative bleeding 4/44 (9.09%). 2/4 patients presented with acute cholecystitis and above 50 years of age with higher body mass indices. The total scorefor each patient of these 5 patientswas between 6-10 points indicating difficult surgical approach according to Gupta *et al* scoring system. The incidence of operative bleeding in females in our group was 4/58 (6.8%), most of them were presented with acute cholecystitis and fibrotic gall bladder and having score for each patient between 6-10 points. Our overall conversion rate was 8/102 patients (7.8%) and the most common cause of conversion was acutely inflamed gall bladder with the resultant difficult dissection at Calots triangle (4/8 patients). Bleeding with failed clipping due to obscure anatomy was a cause to convert into open in 2/8 patients while adhesion and fibrotic gall bladder were responsible for conversion in 2/8 patients. Most of patients with conversion to open cholecystectomy were male patients 5/44 (10.2%) 2/5 patients presented with acute cholecystitis and above 50 years of age with higher body mass indices. The total score for each patient of these 5 males was between 6-10 points indicating difficult surgical approach according to Gupta *et al* scoring system. The incidence of conversion to open cholecystectomy in females in our group was 3/58 (5.17%), most of them were presented with acute cholecystitis and intraopeatre blead and having score for each patient between 6-10 points. Postoperative biliary leakage was observed in 4 patients (3.9%) 2 males and 2 females and all having score between 6-10 points. The incidence of wound infection, whether port site or laparotomy was 9/102 (8.82%), 5 of them were males (11.3 % of total male patients) and 4 females (6.9% of total female patients).

DISCUSSION

Difficult laparoscopic cholecystectomy is defined in those procedures which exceed 90 minutes in duration and or are converted to open procedure and significant factors which increase the operating time are previous abdominal surgery, multiple large calculi, very thick walled gallbladder, anomalous vessels, large and distended gallbladder. The mean operative time ranges between 60-110 minutes with maximum values of 250-280 minutes in many relevantstudies. Difficult laparoscopic cholecystectomy is associated with serious operative and postoperative complications and a high conversion rate. Vivek *et al*, traced difficulty as in creating pneumoperitoneum, accessing peritoneal cavity, releasing adhesions, identifying anatomy and extracting the gall bladder. Previous attacks of acute cholecystitis, GB wall thickness, inability to delineate the anatomy and previous abdominal surgery are some of the factors that have been identified as potential risk factors for the conversion. Accordingly in concordance with these studies our data showed that burn cicatrization and supra-umbilical surgical scars led to difficult creation of pneumoperitoneum thus, making access to peritoneal cavity difficult. Peritoneal adhesions may be mild, moderate or extensive according to extent as reported by Saber in his experimental work. In our study, extensive peritoneal adhesions were responsible for 17.2% (5/29) of the overall complication rate especially operative bleeding and conversion to open surgery. Many studies of same interest reported that previous upper abdominal surgery is associated with a higher rate of adhesions, an increased risk of operative complications, a greater conversion rate, a prolonged operating time and longer stay. Incidence of operative bleeding in many series was up to 10% with an average figure of 2%. The most important patient-related risk factors of operative bleeding are acute cholecystitis, previous abdominal surgery, peritoneal adhesion, Liver cirrhosisand anatomical abnormalities. Our data came in agreement with these results as we observed that operative bleeding was 7.84% (8/102) in patients with acute cholecystitis, fibrotic gall bladder and extensive peritoneal adhesion. The achievement of the critical view of safety (CVS) requires complete dissection of the fat and fibrous tissue in the Calot's triangle which can be performed easily with inflamed or mildly inflamed field.

In general, laparoscopic cholecystectomy shows an approximately 5% to 10% conversion rate and difficult cases are associated with a conversion rate of 25%. The major risk factors for conversion in these difficult cases included male sex, obesity, and cholecystitis, dense pericholecystic adhesion or unclear anatomy, uncontrolled bleeding and thick fibrosed gall bladder. Our data showed that conversion was more prevalent patients with acute cholecystitis (4/8 patients), operative uncontrollable bleeding (2/8) and fibrotic gall bladder (1/8) and dense adhesion (1/8). The estimation based on patient characteristics such as gender, age and body weight showed that both operative bleeding and the conversion rate were higher in male patients with advanced age and increases body mass indices. Other investigators traced six parameters (male sex, abdominal tenderness, previous upper abdominal operation, sonographically thickened gallbladder wall, age over 60 years, preoperative diagnosis of acute cholecystitis) to have significant effect conversion to open cholecystectomy . The total score for prediction of operative difficulties and conversion to open cholecystectomy was given to every patient on the basis of history, clinical examination and ultrasonographic findings. The total score for each of our patients with conversion to open surgery or with postoperative biliary leakage was between 6-10 points indicating difficult surgical approach according to Gupta scoring system and other studies of same interest.

Conclusion

The conclusion of our study is relevant that Preoperative prediction of difficult LC and difficulties faced intraoperatively can be done on the basis of History & examination and Ultrasound abdomen. The risk and benefits of the procedure i.e., LC can be explained to the patient & preoperatively consent for the open technique can be taken in case of conversion later.

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