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Assessment of Predictive Factors for Challenging Laparoscopic Cholecystectomy: A Clinical Evaluation

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Abstract
The most prevalent biliary disease, cholelithiasis, affects 10 to 15% of the population. Of the patients, 1 to 2% has symptoms. For safe gallbladder removal, 5-10% of laparoscopic cholecystectomy cases may need conversion to open cholecystectomy. Several issues that arise during surgery might make laparoscopic cholecystectomy (LC) more challenging. This study's goal was to use clinical and ultrasonographic parameters to anticipate LC difficulties prior to surgery. For three days before to surgery, all patients got vitamin K and therapy for their symptoms. After examination, the patient had laparoscopic cholecystectomy, the procedure's duration, biliary/stone leakage, duct/artery damage, adhesion presence and conversion were recorded. Two surgeons with comparable years of laparoscopic surgery experience worked on each patient. Every patient was monitored for any complications after surgery. Depending on the drainage, the drain was removed between the second and fifth post-operative days and the sutures were removed on the eighth post-operative day. Every patient was monitored for any reoccurring symptoms. Over the course of a year, 60 patients were enrolled in this prospective investigation. Each of the sixty patients had a gallbladder stone. Thirteen patients exhibited pericholecystic collection, while twenty patients had wall thickening. There were 40 with several calculi, 14 with a single calculus and 11 with a single affected calculus. LC might be challenging at times due to a variety of clinical, radiological and preoperative characteristics. The earlier these prognostic markers are identified, the less challenging LC will be for us.

INTRODUCTION

Around the globe, cholecystectomy is a very prevalent surgical procedure. When compared to open cholecystectomy, laparoscopic cholecystectomy has a few advantages: less postoperative discomfort, better cosmoses, shorter hospital stays, quicker function return lower costs[1]. Furthermore, there is a lower incidence of surgery site infections.

A laparoscopic cholecystectomy (LC) is the gold standard operation for treating gallstones that are causing symptoms[2,3]. The underlying disease and the surgeon's experience and skill level determine the effectiveness and safety of laparoscopic surgery. Preventing damage to the bile ducts and other vascular systems during laparoscopic procedures (LC) is crucial in institutions with a shortage of competent surgeons since there are sometimes no guarantees for a satisfactory outcome[3].

It is acknowledged that the quick acceptance of laparoscopy as the preferred method for cholecystectomy has resulted in a reduction in patient morbidity, a quicker return to normal activities an increase in patient satisfaction overall[4]. Approximately 90% of all cholecystectomies are conducted in the United States each year, with over 700,000 LCs performed yearly, according to current estimates[5].

Surgeons may choose situations that are suitable for their expertise based on ultrasound results, with the goal of minimising surgical time wastage and operating consequences[6]. To help the surgeon and the patient prepare psychologically, some preoperative parameters may accurately predict, based on ultrasonographic data, the likelihood of conversion to an open surgery and the risk of specific problems[7]. The purpose of this research was to identify some prognostic markers for gallbladder ultrasonography that might help surgeons anticipate probable challenges and difficulties during laparoscopic cholecystectomy procedures.

There is inconsistency in the concept of tough LC. Multiple technical intra-operative problems that raise the risk of complications and considerably lengthen the operating time are referred to as difficult cholecystectomy. For a variety of causes, between 2% and 15% of patients need to convert to open surgery[8,9]. As a result, researching the predicted variables for challenging LC is crucial. We have so started our investigation of the predicted variables for challenging LC.

Going straight to OC can assist avoid a first laparoscopy, which has more risks of risky and drawn-out dissections as well as higher expenses, when there is a high probability of conversion[10]. Higher success rates for LC may arise from preoperatively addressing the elements that contribute to conversion. Furthermore, the discovery of possible non-patient-related predictors of increased OC rates may provide information that enhances the surgical management of patients with gallbladder disease at the systemic level[11].

The goals of this research are to identify many risk factors for challenging laparoscopic cholecystectomy, examine distinct cholelithiasis and cholecystitis presentations, assess various cholelithiasis consequences investigate surgical therapeutic options.

MATERIALS AND METHODS

Patients who complained of dyspepsia, jaundice, vomiting, or upper abdominal discomfort were screened as part of the study's methodology. These individuals had extensive clinical evaluations and investigations in accordance with the proforma outlined below.

Every patient had an abdominal ultrasound. Standard biochemical and haematological analyses were performed. For every patient, LFT and PT-INR were performed.

Age, sex, history of prior hospitalisation, BMI weight (kg)/height (mt2), abdominal scar (superumbilical or infraumbilical), palpable gall bladder, sonographic findings (wall thickness, Pericholecystic collection, impacted stone) were all taken into consideration while evaluating the patients who had undergone USG testing. We assigned a score to each risk factor. Up to a total score of five, it was anticipated to be easy, six to ten, challenging >ten, extremely difficult.

For three days before to surgery, all patients got vitamin K and therapy for their symptoms. After examination, the patient had laparoscopic cholecystectomy., the procedure's duration, biliary/stone leakage, duct/artery damage, adhesion presence conversion were recorded.

Two surgeons with comparable years of laparoscopic surgery experience worked on each patient. Every patient was monitored for any complications after surgery. Depending on the drainage, the drain was removed between the second and fifth post-operative days the sutures were removed on the eighth post-operative day. Every patient was monitored for any reoccurring symptoms.

Inclusion criteria: Patients diagnosed with cholelithiasis or cholecystitis by USG examination at the surgical outpatient department and ward of NMCTH Birgunj, ranging in age from 16 to 70 years, were included in the study.

Exclusion criteria: Patients with asymptomatic gallstones, those with CBD calculus, elevated ALP, dilated CBD, patients requiring CBD investigation, patients exhibiting symptoms of obstructive jaundice,

Table 1: USG findings.

Ultrasonography	No of cases
Multiple calculi	40
Wall thickening	20
Solitary calculi	14
Solitary impacted calculi	11
Pericholecystic collection	13

Table 2: Analysis of preoperative outcome with risk factors.

		Per-op outcome	P	
Risk factors	Level	D	E	value
	≤50	21	19	
	>50	9	11	
Sex	Female	17 23		
	Male	13	7	0.030
BMI				
wt(kg)/ht(m2)	≤25	13	21	
	25.1-27.5	4	3	
	>27.5	13	6	
Previous Surg.	Nil	19	16	0.329
	Yes	11	14	
GB palpable	NP	22	30	0.232
	Yes	8	0	
USG- wall				
Thick	N	11	30	<0.001
	Yes	19	0	
Adhesions	Nil	9	23	<0.001
	Yes	20	8	
P/C collection	Nil	16	26	

Table 3: Post-operative complications.

Post op complications	No of cases
Wound infection	8
Retained stone	0
Bile leak	8
Hemorrhage	0
Fever	0

Table 4: Histopathological examination.

Histopathological examination	No of cases
Chronic cholecystitis	60
Acute cholecystitis	3
C/A Gall Bladder	2
Gangrenous gall bladder	0
Rupture Gall Bladder	0

Patients who are unwilling to have a laparoscopic cholecystectomy.

The whole investigation was conducted with ethical considerations in mind. Participants received an explanation of the study's objectives. Before beginning any study, informed permission was acquired. Confidentiality and privacy were maintained throughout the whole study. They were aware that they may change their minds at any point while the research was ongoing and that doing so would not have an impact on patient treatment going forward.

The statistical package for social sciences (SPSS) software for Windows was used to process the data. It was input into Microsoft Excel and SPSS. The statistical significance test was used to examine the connection. Using the Chi-square test, a $P<0.05$ was deemed significant. When possible, the results were presented in tables and charts.

RESULTS AND DISCUSSIONS

This study included 60 cases in a period of 12 months which were studied prospectively. All 60 patients had stone in Gall Bladder.20 patients had wall thickening and 13 patients had pericholecystic collection. 40 had multiple calculi, 14 had solitary calculi and 11 had solitary impacted calculi as shown in Table 1.

It illustrates that 67.8% having multiple calculi. There were 20% of single and 14.2% of single impacted calculi in our study. In the present study (Table 2) male sex, BMI >27.5, thick GB wall, adhesions and pericholecystic collection were significant predictors of difficult laparoscopic cholecystectomy.

Only 8 patients had wound infection at the port site which need dressing (Table 3). In our study among 60 patients, 8 (13.3%) patients were having superficial surgical site infection. All improved with minor dressings.

There were 55 cases of chronic cholecystitis and 3 cases of acute cholecystitis (Table 4). 2 case of malignancy was detected. It was staged 0 after HPE.

Thirteen patients were men and thirty-two were women, according to the research. The ratio of men to women was 1:2.46. Our research findings corroborated the findings of the 60 patients, which indicated that pain was the most common complaint. Every single

one of the sixty patients had recurrent, persistent pain. Roughly one-third of the patients had right hypochondrial discomfort. Two thirds of the sixty individuals had colicky discomfort. The results of our investigation were in line with those of previous studies conducted in comparable settings[12,13]. About one-third of the patients also had vomiting in addition to discomfort. The majority of the spontaneous vomiting happened during the pain attack. None of the patients in the trial had jaundice. Similar to this, almost one-third of the patients had dyspepsia. Approximately one-seventh of the patients had a fever. According to the research, almost one-third of the patients had had abdominal surgery. A similar study by Gupta et al. identified the history of hospitalisation, particularly previous abdominal surgery along with the scar from that operation, as a risk factor[14]. In that research, the preoperative scoring method's sensitivity and specificity were determined to be 95.74% and 73.68%, respectively. Comparably, a recent research by Jethwani *et al.* investigated prior abdominal surgical history as a risk factor for challenging laparoscopic cholecystectomy[15]. They have drawn the conclusion that early prediction may enable the patient and the surgeon to be aware of the high risk and to plan ahead for the likelihood of conversion, giving them the opportunity to make the appropriate measures. The several factors listed in the literature to forecast a challenging laparoscopic cholecystectomy are: Size of gallstones, thickness of the gallbladder wall, volume of the gallbladder, quantity of stones, size of common ducts and tone impaction in the gallbladder neck.16 Only the gallbladder wall thickness, CBD diameter, gallbladder contraction stone impaction are significant when it comes to challenging laparoscopic cholecystectomy and converting it to an open treatment. There are many restrictions on our investigation. This research was entirely hospital-based, with a purposeful sample size of only 60 people taken into account. The subjects in the sample were not included in the general population.

CONCLUSION

Biliary pathology most often manifests as cholelithiasis. Gallstones affect 10-15% of the general population the majority of them-roughly 80%-do not exhibit any symptoms. A cholecystectomy is one of the most frequent surgeries done, with 1-2% of asymptomatic people developing symptoms each year that need one of these procedures. About 5-10% of laparoscopic cholecystectomy patients may need conversion to open cholecystectomy in order to remove the gallbladder safely. Analysing the risk variables that indicate a challenging laparoscopic cholecystectomy is thus essential. Age over 50, male sex, BMI above 27.5, palpable GB, wall thickening, adhesions pericholecystic collection were all taken into consideration as risk factors. The current research found that among those with a BMI of >27.5, male sex, adhesions, gall bladder wall thickness pericholecystic collection were significant predictors of complicated laparoscopic cholecystectomy.

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