

Assessment of preoperative factors for challenging laparoscopic cholecystectomy

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Received: 31-01-2021 / Revised: 17-03-2021 / Accepted: 22-04-2021

Abstract

Aim:Cholecystectomy is one of the most widely practiced surgery around the world. In recent studies, various parameters such as age, sex, BMI, history of previous abdominal surgery, ultrasonography findings of gall bladder wall thickness, contracted gall bladder, peri-cholecystic fluid, stone size, and haematological findings such as raised TLC, alkaline phosphatase, and liver enzymes were added to predict difficult Laparoscopic Cholecystectomy. The aim of present research was to see if such factors can be used to assess challenging laparoscopic cholecystectomy and conversion before surgery. **Methodology:**Patients who reported to the OPD with a symptomatic history of gallstone were involved in the study, and after clinical examination, routine tests, and abdominal ultrasonography, elective surgery was performed. The research included patients of all ages and both genders. Before the procedure, all patients' medical records were reported in detail, and demographic data like sex, age, height, weight, and body mass index (BMI) were measured, hematological blood tests were also performed, TLC, alkaline phosphatase, S. Bilirubin, and enzymes of liver were all provided special attention. Along with abdominal ultrasonography various other parameters were registered. Patients were split into two classes after surgery: who had a good laparoscopic cholecystectomy and those who wanted an open cholecystectomy. Most of those patients underwent laparoscopic cholecystectomy. The data was analysed by using SPSS23.0. **Results:**Conversion/difficult laparoscopic cholecystectomy was associated with age > 50 years. The sensitivity was kept 95.9%, and the optimistic predictive value was 95%. The conversion rate for male was 27.7%, while for the female 8.5%. BMI > 30 kg/m² was found to be related with a higher chance of conversion to open cholecystectomy. The positive predictive value was 94.1%, and the sensitivity was 96.9%. The conversion rate between cases with BMI > 30 kg/m² was 70%, with a p value of 0.000. **Conclusion:**Age, sex, obesity, a raised total leucocyte count, history of surgery for upper abdomen and other risk factors and predictors for conversion to open cholecystectomy include among others.

Keywords: Pre-operative, Laparoscopic, Cholecystectomy.

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Introduction

Cholecystectomy is one of the most widely practiced surgery around the world. In the developing world, Laparoscopy is used for around 80% of cholecystectomy procedures. The 'gold standard' for the management of symptomatic gall stone is now laparoscopic cholecystectomy [1]. In 1882, Carl Langenbuch became the firstly perform an open cholecystectomy [2]. For more than a century, open cholecystectomy has been the gold standard for the management of gall bladder stone disease. Philippe Mouret (1987) did the first laparoscopic cholecystectomy. He managed to remove the gall bladder using a mechanical rigid pipe that was not magnified. Dubois is credited with making laparoscopic cholecystectomy more popular [3]. In recent studies,

various parameters such as age, sex, BMI, previous history of surgery of abdomen, contracted gall bladder, gall bladder wall thickness, stone size, peri-cholecystic fluid, and haematological findings such as raised liver enzymes, TLC, and alkaline phosphatase were added to predict difficult Laparoscopic Cholecystectomy. These predictors/parameters are relevant because if conversion rates can be reliably assumed prior to surgery, the surgeon can plan for a potentially longer and more complicated of

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procedure, and the patient can be informed about the probability conversion[4-6].The aim of this study was to see if these parameters could be used to predict difficult laparoscopic cholecystectomy and conversion before surgery.

Methodology

The research was conducted in the department of surgery at Uttar Pradesh University of Medical Sciences, Saifai, Etawah. It was a prospective research that ran from March 1, 2018, to March 31, 2020. Various patients who presented to the OPD with a symptomatic history of gallstone were registered, and after clinical examination, routine investigations, and abdominal ultrasonography, elective surgery was performed. The research included patients of all ages and both genders. Throughout the report, the operating surgeons were the same, and each of them has performed more than 25 laparoscopic cholecystectomy procedures. Patients were tested for other diseases that were contraindicated to surgery or any exclusion conditions before undergoing surgery. The current research included all patients with symptomatic gallstone disease that did not meet the exclusion criterion.

Exclusion criteria was for the patients with-

- a. Not fit for GA.
- b. Bleeding disorders.
- c. Generalized periodontitis.
- d. Cholangiogenic shock.
- e. COPD.
- f. Heart disease.
- g. Liver cirrhosis with portal hypertension.
- h. Cholecystic-intestinal fistula.
- i. Carcinoma of gall bladder.
- j. Pregnancy.
- k. Gangrenous cholecystitis.
- l. Stones of common bile duct.

Patients who decided to participate in the study were briefed about it and given prior approval. They were also briefed about the probability of converting to an open cholecystectomy before surgery. Before the procedure, all patients' medical records were reported in detail, and demographic data such as age, sex, weight, height, and body mass index (BMI) were measured. Prior to surgery, hematological tests were performed. TLC, alkaline phosphatase, S.Bilirubin, and liver enzymes were all

provided special attention. Before surgery, all patients had an abdominal ultrasonography, and various parameters were noted. The duration of surgery was recorded at the time of surgery. The duration it took to insert the veress' needle, or make an incision in the case of the Hasson procedure, was estimated from the time the skin was closed to the time the veress' needle was inserted. 90 minutes are thought to be sufficient period to perform a Laparoscopic Cholecystectomy without any difficulties. More than 90 minutes for surgery was deemed difficult, and further postponement was pointless, so the laparoscopy was changed to an open cholecystectomy. The operating surgeon made the decision to convert. Causes for conversion, such as adhesions, bleeding, and common bile duct injury, were reported after the operation. Patients were distributed into two groups following surgery: Those who underwent a successful laparoscopic cholecystectomy and those who underwent an open cholecystectomy. Most of those patients underwent laparoscopic cholecystectomy. SPSS 23.0 software was used to document and interpret all of the data. The degree of significance was determined using the chi-square test and the t test.

Results

From March 1, 2018, to March 31, 2020, a prospective analytical research was conducted on 112 patients of laparoscopic cholecystectomy. Throughout the study period, all of the elective surgeries were performed by the single surgeons in a same surgical unit. The possibility of conversion/difficult laparoscopic cholecystectomy was associated to age > 50 years in our research. The sensitivity was 95.9%, and the positive predictive value was 95.9% (p-value 0.05). The conversion rate for people over the age of 50 was 61.5 percent, while under the age of 50 was just 5%. A greater rate of conversion to open cholecystectomy/difficult laparoscopic cholecystectomy was found in men. With a p value of 0.035, the sensitivity was 86.8% and the positive predictive value was 91.4 %. The male conversion rate was 27.7%, while the female 8.5 percent. BMI > 30kg/m² was observed to be related with a higher chances of conversion to open cholecystectomy. The positive predictive value was 94.1 %, and the sensitivity was 96.9%. The conversion rate among patients with BMI >30kg/m² were 70%, with a p

value of 0.000. The conversion rate was 5.8% in those abdominal cavity was complicated in obese patients. with a BMI of less than 30 kg/m². Entry to the

Table 1: Distribution of the patients on the basis of age

Age	Frequency	Percentage
<50	100	89.3
≥50	12	10.7
Total	112	100

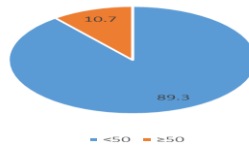


Fig 1: Distribution of the patients on the basis of age

Table 2: Correlation of patients undergoing laparoscopy divided on the basis of age

Age	Prediction		Total	Chi Sq.	P value
	Laparoscopic	Conversion			
<50	95	5	100	39.712	0.000
≥50	4	8	12		
Total	99	13	112		

Table 3: Correlation of patients undergoing laparoscopy divided on the basis of gender

Gender	Prediction		Total	Chi Sq.	P value
	Laparoscopic	Conversion			
Female	86	8	94	5.466	0.035
Male	13	5	18		
Total	99	13	112		

Table 4: Correlation of patients undergoing laparoscopy divided on the basis of BMI

BMI	Prediction		Total	Chi Sq.	P value
	Laparoscopic	Conversion			
<30	96	6	102	36.492	0.000
≥30	3	7	10		
Total	99	13	112		

Discussion

Since Philippe Mouret (1987) did the first laparoscopic cholecyst-ectomy[7], the procedure has become increasingly common around the world. Although the fact that laparoscopic cholecystectomy is the gold standard for the management of symptomatic gall stone[1].The conversion rate for laparoscopic cholecystectomy to open cholecy-ectomy has been reported to be 2 to 15% in several studies[8,9]. Conversion to open cholecystectomy is not a loss for the surgeon, but rather a sensible decision. Conversion to open cholecystectomy is associated with a variety of factors, including the surgeon, equipment failure, and, most significantly, the

patient. The learning curve of the surgeon may be a factor; as skilled surgeons have a lower conversion rate. Patients' risk factors, such as age, sex, BMI, and prior abdominal surgery, have been identified in a large number of clinical studies. USG outcomes including gall bladder wall thickness, contracted gall bladder, pericholecystic fluid accumulation and large single stone are linked with challenging laparoscopic cholecystectomy[8]. Higher total leucocyte count and serum alkaline phosphatase have been identified as risk factors for difficult laparoscopic cholecystectomy [10,11]. Male gender has been identified as a risk factor for conversion in many studies, with the most likely factors

being a greater correlation with serious disease, such as acute and chronic cholecystitis, and a higher percentage of intra-abdominal and visceral adipose tissue than females[12-14]. Men are also less likely than women to search for medical assistance[15]. Other scientists, on the other hand, found no significant relationship between conversion and male gender[16], but male gender was a significant factor for conversion of laparoscopic to open cholecystectomy in this study (p value=.035). Morbid obesity has been linked to a greater chance of conversion in several studies. Various BMI levels, such as BMI > 27, BMI>30, and BMI> 35, were investigated. Some research, on the other hand, found no such connection[16,17]. In present research, a BMI of more than 30 kg/m² was linked to a greater rate of laparoscopic cholecystectomy conversion to open cholecystectomy (p-value.005). Because of the thick abdominal wall, fat-laden omentum, canula displacement and Falciiform ligament, and a heavy liver that is difficult to elevate, obesity makes it difficult to reach the abdominal cavity. Preoperatively, Agrawal et al., tested a scoring system to guess difficult LC. A single skilled surgeon worked on all 30 patients. There are a total of 15 scores based on the patient's medical history, clinical results, and sonological findings. Scores of up to 5 are considered simple, 6-10 are considered difficult, and >10 are considered extremely difficult. Predictions were correct in 76.4 % of easy cases and 100 % of tough cases; no cases scored higher than 10. Previous hospitalization, clinically palpable gallbladder, impacted gallbladder stone, pericholecystic set, and abdominal scar due to previous abdominal surgery were all found to be statistically important in expecting difficult LC. With a sensitivity of 76.47 % and a specificity of 100 %, the proposed scoring system is accurate [18]. Gupta et al used a rating system to assess different risk factors and predict complexity and degree of difficulty prior to surgery. Male gender, old age, history of hospitalization, obesity, palpable gall bladder, previous abdominal surgery scar, gall bladder wall thickness, impacted stone and pericholecystic collection were included as factors in the preoperative scoring process. The research enlisted the participation of 210 patients. The preoperative scoring method's sensitivity and specificity were observed 95.74% and 73.68 %, separately. For simple and difficult

situations, this scoring system had positive predictive values of 90% and 88 %, respectively. The area under the ROC curve was 0.86. The rate of laparoscopic to open cholecystectomy conversion was discovered 4.28 %. High-risk patients can be told ahead of time about the likelihood of conversion using reliable prediction, allowing them the opportunity to make suitable arrangements[19]. In a study, Joshi et al. establish and validate a scoring method for predicting difficult LC before surgery using information from the patient's medical history, physical examination, abdominal ultrasound, and biochemical parameters. The preoperative scoring for challenging cases had a sensitivity and precision of 53.8 % and 89.2 %, individually, with a PPV of 63.64 % and an NPV of 84.62 %. Individually. To predict difficult LC, a preoperative scoring system may be useful. Surgeons will schedule operations based on how complicated they are expected to be. Patients and their families should be counseled prior to surgery about the likelihood of a difficult procedure, a longer hospital stay, and higher costs if a difficult case is expected[20].

Conflict of Interest: Nil Source of support: Nil

Conclusion

The authors concluded that age, sex, obesity, history of surgery for upper abdomen, increased TLC, and other factors are risk factors and predictors for conversion to open cholecystectomy based on the findings.

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