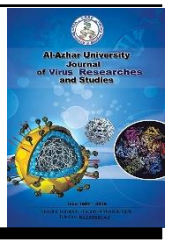
Al-Azhar University Journal
for Virus Research and Studies



Intra-Operative Surprise of Pre-Operative Difficult or Not Laparoscopic Cholecystectomy

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Abstract

Laparoscopic cholecystectomy (LC), one of the most commonly performed surgical procedures worldwide, is accepted as the gold standard in the treatment of symptomatic gallstones for its minimal invasiveness, less pain and early recovery. Sometimes Laparoscopic Cholecystectomy becomes difficult. It takes longer time even with bile/stone spillage and occasionally it requires conversion to open cholecystectomy. Aim of this work is to evaluate the pre-operative difficult or not laparoscopic cholecystectomy to intra operative surprise according to potential factors putting pre-operative. This is a prospective cohort study involved 100 patients admitted with calcular Gallbladder, arranged for laparoscopic cholecystectomy divided into two groups: Group A: Included 50 cases diagnosed pre-operative easy. Group B: Included 50 cases diagnosed pre-operative difficult. Results: 50 cases of group A 35 cases were easy intra-operative, and 15 cases were difficult. 50 cases of group B 9 cases were easy intra-operative, and 41 cases were difficult. In this study we found that age, sex and ultrasonographic data was significant predictive factors for assessment preoperatively. we can report that obese patient who over fifty with history of previous upper abdominal surgery and ultrasonographic picture showed thick-walled GB and pericholecystic collection had high risk of conversion**.**

Keywords: Calcular Gallbladder, laparoscopic cholecystectomy, open cholecystectomy, scoring system.

1. Introduction

Laparoscopic cholecystectomy, one of the most commonly performed surgical procedures worldwide, is accepted as the gold standard in the treatment of symptomatic gallstones for its minimal invasiveness, less pain and early recovery [1]. Although laparoscopic cholecystectomy has generally a low incidence of morbidity and mortality and of conversion rate to open surgery, its outcome is particularly affected by the presence and severity of inflammation, advancing patients' age, male sex and greater body mass index [2]. It may be difficult to anticipate preoperatively whether this procedure is going to be easy or difficult in a particular patient. The degree of difficulties is again impossible to predict but it is important to know for better preparedness for the surgeon and

explanation to patients for possibility of conversion to open cholecystectomy [2]. Preoperative assessment of complexity factors is needed for frequent procedures such as laparoscopic cholecystectomy in order to avoid complications and delays to guarantee an efficient course of surgery [3]. Previous upper abdominal surgery is associated with a higher rate of adhesions, an increased risk of operative complications, a greater conversion to open surgery rate, a prolonged operating time and longer hospital stay. Also, laparoscopic cholecystectomy after endoscopic retrograde cholangiopancreatography (ERCP) with endoscopic sphincterotomy (ES) for combined choledochocyolithiasis is more difficult with prolonged procedure than in uncomplicated gallstone disease with a longer post-operative hospital stay [4]. Preoperative complexity estimation in laparoscopic cholecystectomy helps surgeons decide whether to proceed with a minimally invasive approach, perform an open procedure or make a referral to a more experienced surgeon. It may also be useful for explaining the various risks of laparoscopic and open procedures [5].

2. Patients and Methods

Prospective cohort study was conducted in the General Surgery Department in Al-Zahraa University Hospital, faculty of medicine for Girls, Al-Azhar University, presented with calcular Gallbladder from Jan 2021 to sept 2021. This study included 100 patients were evaluated pre-operatively by age, sex, body mass index (BMI). symptoms &signs mainly Rt hypochondrium pain, nausea, vomiting, fever, +ve merphy's sign. laboratory investigations mainly total leucocytic count (TLC), ALT, AST. Imaging study mainly abdominal ultrasound to evaluate GB wall thickness, impacted stone at the neck of GB & Pericholecystic collection.

2.1. Inclusion criteria of the participants

All cases of calcular Gallbladder fit for surgery.

2.2. Exclusion Criteria

- Patient refuses the study.
- Patient unfit for surgery.
- Patient with CBD stone.
- Patient with Dilated CBD.
- Patient with obstructive Jaundice.
- Patient with mass in Gall Bladder

2.3.Statistical Analysis

Data collected throughout history, clinical examination, laboratory investigations and outcome measures were coded, entered and analyzed using Microsoft Excel software. Data then were imported into Statistical Package for the Social Sciences (SPSS version 11.0) software for analysis. Chi-square test was used to test the significance of relations between different variables. P value < 0.05 was considered significant.

3. Results

This study included 100 patients who were divided into two groups: Group A: Included 50 cases pre-operative easy. Group B: Included 50 cases pre-operative difficult. The age groups of patients ranged from 20 years old to 70 years & there were 21 males and 79 females. BMI was evaluated in the study according to if it 20-30 or 30-40 (Table 1). History of previous acute attack and history of previous operations (Table 2). Imaging study mainly abdominal ultrasound to evaluate GB wall thickness, impacted stone at the neck of GB & Pericholecystic collection (Table 4).

3.1 Operative finding

In Group A easy laparoscopic cholecystectomy was done to 35 cases, difficult laparoscopic cholecystectomy was done to 13 cases and 2 cases were converted to open cholecystectomy due to severe uncontrolled bleeding. In Group B easy laparoscopic cholecystectomy was done to 9 cases, difficult laparoscopic cholecystectomy was done to 39 cases and 2 cases were converted to open cholecystectomy 1 case was due to severe adhesions (Fig. 1) the other was because of phlegmon (Fig. 2).

Table (1): Preoperative grading according to age, sex &BMI.

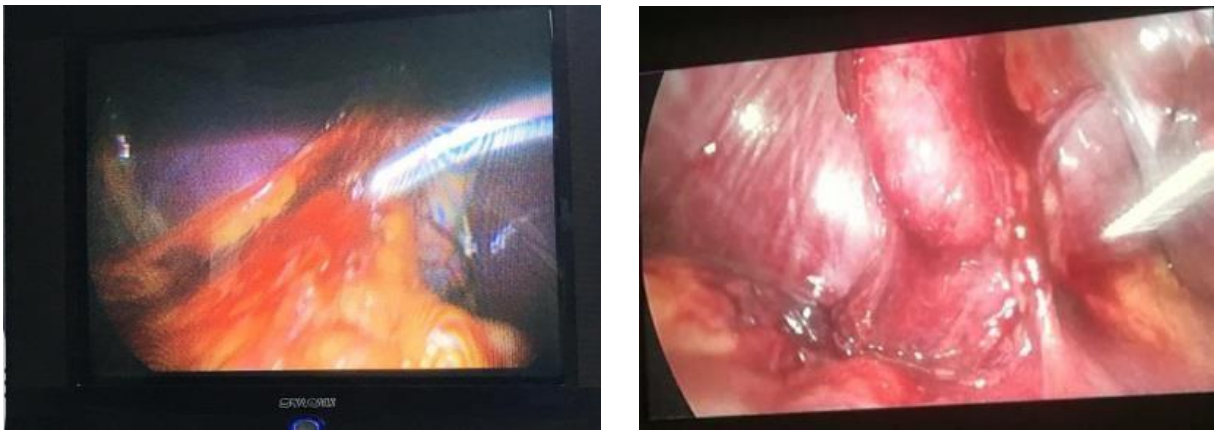
	Preoperative grading	
	Group A	**Group B**
Age		
Range	20-50	30-70
mean	35	50
Sex		
Female	44	35
Male	6	15
BMI		
20-30	29	10
30-40	21	40

Table (2): Preoperative grading according to previous acute attacks with hospitalization, scars of previous operations.

		Preoperative Grading	
		Group A	**Group B**
TLC	Normal	50	35
	Elevated	0	15
Liver Enzymes	Normal	50	42
	Elevated	0	8

Table (3): Relation between laterality and associating urogenital anomalies of the studied patients.

	Preoperative Grading	
	Group A	**Group B**
GB Wall thickness		
<4 ml	**48**	**0**
>4 ml	**2**	**50**
Pericholecystic collection		
No	**50**	**50**
Yes	**0**	**0**
Impacted stones		
No	**49**	**46**
Yes	**1**	**4**



(A) (B)

Figure (1): (A) Severe adhesions on laparoscopic cholecystectomy. (B) GB phlegmon during laparoscopic cholecystectomy.

4. Discussion

Patients with undescended testes are Laparoscopic cholecystectomy (LC) is the gold standard treatment of symptomatic cholelithiasis. It is important to predict difficult LC preoperatively so that senior surgeons can be requested to be present during surgery rather than less experienced junior surgeon prolonging the surgery which may lead to intraoperative complications [6]. Although laparoscopic cholecystectomy has generally a low incidence of morbidity and mortality and of conversion rate to open surgery, its outcome is particularly affected by the presence and severity of inflammation, advancing patients' age, male sex and greater body mass index [2]. Old age (age > 50 years) has been found to be a significant risk factor for difficult laparoscopic cholecystectomy in many studies [9]. In this study, the majority of cases were in the age group of ≤ 50 (67 cases) and 33% (33 cases) were > 50 years. In this study we found that 22 cases out of thirty-three who were suspected to be difficult by preoperative scoring were truly difficult by intraoperative grading. On the other hand, 28 out of 67 cases were under fifty years old. This means significant correlation between age and degree of difficult surgery. Higher conversion rate had been reported in old age group cases but in our study may be due to distribution of cases in this study there is no significant rate of conversion related to old age. Esmail et al. [7] reported that most of cases were below 65 years of age (99%) they compared between age group below and above the mean age for the group (45 years). Age above 45 years was associated with prolonged dissection time (p=0.031) and prolonged GB bed dissection time (p=0.043**).** Ashish & Meenakshi [8] reported that, the majority of patients were in the age group of ≤50 years (25 patients) and only 16.7% (five cases) were >50 years. In the present study, they found no significant correlation between age and the difficult level of surgery. This could be because of the small sample size of the study population Abdelhamid al [2] reported that, the majority of patients were in the age group of ≤ 50 (80 patients) and 33.3% were> 50 years. There is significant correlation between age and the difficult level of surgery, only 3 patients converted to open surgery over fifty. Conversion rate and significantly higher mortality has been reported in male sex [10]. Other studies with large sample number have no significant relation between sex and difficulty similar to results by Chndio et al.

[5] but in contrast with many studies and literatures showed significant association. In this study, there were 21 males and 79 females. 15 of our 21 male patients were suspected to be difficult by preoperative scoring were truly difficult by intraoperative grading. This showed a statistically significance in the relation between sex and degree of difficulty of LC. Only two males converted to open cholecystectomy due to severe adhesions and difficult dissection. Esmail et al. [7] reported that, 73 patients were females (73%). The mean operative time was longer in males (67.65 ±25.932minutes) versus females (67.65 ± 25.932) and this was statistically significant (p=0.046). In a study carried on patients presenting with symptomatic cholelithiasis concluded that male gender is a risk factor for severe symptomatic cholelithiasis. Ashish & Meenakshi [8], reported that, there were 11 males and 19 females. Post-surgery 50.0% males (2 out of 11) turned out to have a difficult procedure. Small study group and an unequal distribution of patients on the basis of sex could have altered the results in the present series. Abdelhamid et al. [2] reported that, there were 14 males and 106 females. Of 14 males, 10 were predicted to have a difficult surgery and 3 expected to be very difficult. Post-surgery 100% of males turned out to have a difficult procedure. In their study, there was statistically significance in the relation between male sex and difficulty of LC. Unequal distribution of patients on the basis of sex could have altered the results in the study. Obese patients may have a difficult laparoscopic surgery due to various factors; port placement in obese patient takes longer time due to the thick abdominal wall, dissection at the Calot's triangle is also technically difficult due to the obscure anatomy because of excessive intraperitoneal fat and difficulty in the manipulation of instruments through an excessively thick abdominal wall [11]. In this study BMI was found to be a predictor of difficult LC as from 91 cases who had BMI ≥ 25 only 50 were predicted to be difficult preoperatively, while during intraoperative grading this increased to 58 patients. Esmail et al. [7] reported that, the mean BMI was 29.9 ± 5.3kg/m2. Fifty-four of our patients were obese (54%). In our study, obese patients had a longer mean operative time (61.54 ± 32.121 minutes) versus non-obese patients (55.14 ± 16.564). BMI of 30 or more was associated with prolonged GB bed dissection time (p=0.045). This was mainly due to large fatty momentum that may obscure the triangle of Calot and large fatty liver with difficult GB dissection. Ashish & Meenakshi [8], reported that, 6 were obese patients and only 2 had difficult cholecystectomy but without conversion. They found no significant correlation between BMI and difficult level of surgery, and this could be perhaps because of the surgical expertise. Abdelhamid et al. [2] reported that, 102 patients were BMI ≥25 only 33 predicted to be difficult and outcome was 58 patients had difficult operation, surgical expertise of the operating surgeon could be one of the reasons for this discrepancy. BMI was not found to be a predictor (p 0.136) according to outcome score of difficult cholecystectomies. Gabriel et al. [12] showed that patients who require hospitalization for repeated attacks of acute cholecystitis carry more chances of difficult laparoscopic cholecystectomy and conversion, probably due to dense adhesions at calot's triangle and gall bladder fossa. There are reports of higher rate of bleeding, ductal injury and subsequent conversion in acute cholecystitis. At this study there were 10 cases had history of admission to hospital due to repeated attacks of acute cholecystitis, all 10 (100%) cases were predicted to be difficult and intra-operative outcome were difficult, while of 29 cases suspected to be difficult due to acute attacks without hospital admission, this number significantly increased during the intraoperative grading to be 36.This means

that acute attacks without hospital admission can be sometimes underestimating to the degree of difficulty due to different factors (e.g. Patient refusal). There was significant relation between history of acute attack and difficulty. Esmail et al. [7] reported that, patients with previous acute attacks of cholecystitis, 16 patients (16%), had longer operative time (mean= 57.72 ± 29.786 min) due to difficulty to identify anatomy during dissection but this was statistically insignificant. Ashish & Meenakshi, [8] reported that, there is strongly significant correlation between previous history of hospitalization and difficult LCIn our study, only 2 patients had clinically palpable GB and out of them 50% (1 of 2) was truly difficult. Esmail et al. [7] reported that, patients with palpable GB, 6 patients (6%), had significantly longer operative time (p=0.045), prolonged GB bed dissection time (p=034), prolonged GB extraction time (p=0.006) and conversion to OC(p=0.045). This might be due to adhesions that made dissection difficult and lack of plane of cleavage between the GB and the liver. Ashish & Meenakshi, [8] reported that, only 2 patients had clinically palpable GB and both had a difficult procedure during surgery. Abdelhamid et al. [2] reported that, only 10 patients had clinically palpable GB and out of them 100% (10 of 10) turned out to have a difficult procedure post-surgery and three of them converted to open surgery. Upper abdominal scars (indicators of previous upper abdominal surgeries) may lead to intraperitoneal adhesions that cause increased probability of injury and bleeding while placement of umbilical port. It was found to be statistically significant factor in the study as 8 of 55 patients had previous scars had upper abdominal scars 75% of them converted to open due to severe adhesions [2]. It was found to be statistically significant factor in this study as 7 of 55 cases had previous scars had upper abdominal scars 5 of them was preoperative difficult and only 4 of them was truly difficult intraoperative. Ashish & Meenakshi, [8] reported that,15 patients had history of previous surgeries but were lower abdominal scars mainly of previous tubal ligation in female patients. they did not find any significant association between previous surgery and difficulty level. Baki A [13] showed that while performing LC, stone impacted at the neck of GB makes some technical problems, because of distension of GB, as is with thick GB wall. It is difficult to grasp the GB neck to allow adequate retraction to perform dissection at the Calot's triangle**.**

5% of cases (5 out of 100) in this study had GB stone impacted at the neck of GB and turned out to be difficult. It was found to be a statistically significant factor in predicting the difficulty of the procedure in this study. 4 out of 5 cases predicted to be difficult and all of 5 cases were intraoperative difficult due to distension of GB and thick GB wall. Ashish & Meenakshi [8] also did not find any significant association between impacted stone and pericholecystic collection with the difficulty level of the procedure, 12.5% of cases (15 out of 120) in the series had GB stone impacted at the neck of GB and turned out to be difficult. It was found to be a statistically significant factor in predicting the difficulty of the procedure in this study. (100%) predicted to be difficult and 100% of them were intraoperative difficult due to distension of GB and thick GB wall [2]. Increased GB wall thickness is associated with difficult dissection of the GB from its bed. Presence of a thick GB wall may make grasping and manipulation of GB difficult. This makes the dissection at the Calot's triangle and the GB bed to be difficult and limits the extent of anatomical definition [14]. In this study, we found significant correlation between the GB wall thickness and the difficulty level of surgery (52 of 100) had wall thickness > 4 mm, 50 cases (about 96%) of them predicted to be difficult. Only 45 of them (about 90%) was truly difficult intraoperative. Only two cases with wall thickness converted to open

cholecystectomy due to severe adhesions and difficult dissection Intraoperative Factors that increase the difficulty of LC (Bile spillage, bleeding from cystic artery & prolonged time of operation) were mostly depends on predefined factors detected such as: pericholecystic collection, palpable gall bladder, previous upper abdominal operations, impacted stones and increased GB wall thickness. In this study there were cystic artery injury in 5 cases, bile spillage with 43 cases and 25 cases suffered from prolonged time of operation; all previous intraoperative data increase the risk of difficulty and rate of conversion to open cholecystectomy. Ashish & Meenakshi, (8) reported that, they found extremely significant correlation between the GB wall thickness and the difficulty level of surgery. Abdelhamid et al. [2] reported that, they found no significant correlation between the GB wall thickness and the difficulty level of surgery (65 of 120) had wall thickness >4mm,32 patients (about 50%) of the predicted to be difficult and the 10 cases who were converted to open cholecystectomy were had thick wall of GB. In Group A easy laparoscopic cholecystectomy was done to 35 cases, difficult laparoscopic cholecystectomy was done to 13 cases and 2 cases were converted to open cholecystectomy due to severe uncontrolled bleeding. In Group B easy laparoscopic cholecystectomy was done to 9 cases, difficult laparoscopic cholecystectomy was done to 39 cases and 2 cases were converted to open cholecystectomy 1 case was due to severe adhesions the other was because of phlegmon. There was cystic artery bleeding was in 5% of cases while bile spillage was in 43% of cases. The100 laparoscopic cholecystectomy time was > 60 min in 25 cases While it was < 60 min .in 75 cases**.**

5 .Conclusion

- In this study we found that age, sex and ultrasonographic data was significant predictive factors for assessment preoperatively difficult cases that will be operated, we found 22 cases above 50 years who scored to be difficult were at outcome difficult, only two cases converted to open surgery over fifty.

- Conversion rate was 4 % (4 of 100 patients) were occurred and they had following risk factors (BMI > 25 Kg/, scars of previous abdominal operations, palpable GB and increased wall thickness).

- Another noted data was found that complications such as bleeding from cystic artery or bile spillage if occurred intra operatively increased risk of conversion to open surgery or made the operation more difficult.

- In conclusion we can report that obese patient who over fifty with history of previous upper abdominal surgery and ultrasonographic picture showed thick-walled GB and pericholecystic collection had high risk of conversion**.**
- At the pre-operative score, sensitivity and specificity of this scoring method were 79.5 % and 73.2 % respectively.

- After this study we recommended that:

- Further studies for long time follow up and large number of patients**.**
- Increase number of centers of further studies.

References

1 .Prashanth R,Tagore S,Krishna C,et al (2019) : Epidemiology of gallbladder cancer Clinical and Experimental Hepatology 5(2): 93–102.

2 .Abdelhamid M, Gharib A, Abdelaal M, et al (2020): Anticipation of Difficulty during Laparoscopic Cholecystectomy Universal Journal of Surgery Universal Journal of Oncology.Vol (1): Issue (5):1-5.

3 .Shaffer E (2006): Epidemiology of gallbladder stone disease. Best Pract Res Clin Gastroenterol., 20(6): 981-996.

4 .Mintu M, Shib S, Yash S, et al (2018): Study of early cholecystectomy for mild and moderate acute cholecystitis as per Tokyo Guidelines Asian Journal of Medical Sciences Vol 9 | Issue 3.

5 .Hanna H, Mohamed I& Amir M (2018): Preoperative Prediction of Difficulty of Laparoscopic Cholecystectomy the Egyptian Journal of Hospital Medicine (July 2018) Vol. 73 (2), Page 6097- 6102.

6 .Adil A, Umar F, Mikael P, et al (2019): The heavy price of conversion from laparoscopic to open procedures for emergent cholecystectomies The American Journal of Surgery Volume 217, Issue 4, April 2019, Pages 732- 738.

7 .Esmail T, Mohammed A& Ahmed M., (2020): Predictive Factors of Difficult Laparoscopic Cholecystectomy the Egyptian Journal of Hospital Medicine Vol. 82 (1), p 67-73.

8 .Ashish K & Meenakshi Y. (2017): Preoperative prediction of difficult laparoscopic cholecystectomy using a scoring system Int Surg J. Oct;4(10):3388-3391.

9 .Bhupen S, Amit K, Mohit J, et al., (2021): An observational study to assess male gender as an isolated risk factor in the laparoscopic cholecystectomy International Surgery Journal Songra B et al. Int Surg J.8(8): p 2382-2387.

10 .Alqahtani R, Ghnnam W, Alqahtani M, et al., (2015): Role of male gender in laparoscopic cholecystectomy outcome. Int J Surg Med; 1 (2): p 38:42.

11 .Younis K, Al-harbawi L and Ashoor O., (2013): Evaluation of Clinical Parameters that Predict Difficulties During Laparoscopic cholecystectomy ;12(2): p175-18.

12 .Larsa O &William S., (2018): Scientific Session of the 16th World Congress of Endoscopic Surgery, Jointly Hosted by Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) & Canadian Association of General Surgeons (CAGS), Seattle, Washington, 2: Poster Abstracts Surg Endosc 32: p 130–359

.

13 .Baki A., (2006): Pre-Operative Prediction of Difficult Laparoscopic Cholecystectomy Using Clinical and Ultrasono- Abstract: Patients and Methods; 27 (3): p 1-7.

14. Tosun A, Hancerliogullari K, Serifoglu I, et al., (2014): Role of preoperative sonography in predicting conversion from laparoscopic cholecystectomy to open surgery. Eur J Radiol. Volume 84, Issue 3, P. 346-349.