The Egyptian Journal of Hospital Medicine (October 2018) Vol. 73 (3), Page 6291-6296

Pre-operative Prediction of Difficulties in Laparoscopic Cholecystectomy

Mahmoud Mohamed Ibrahim, Mohammed Hassan Elshafey, Ibrahim Ismail Elshaikh

Department Of General Surgery, El Hussin Hospital, Al Azhar University

Corresponding author: Ibrahim Ismail Elshaikh, **Mobile:** 01093226167**, Email: himaelshaikh@gmail.com**

ABSTRACT

Background: Laparoscopic cholecystectomy (LC) is one of the most common laparoscopic procedures being performed by general surgeons all over the world. Preoperative prediction of the risk of conversion or difficulty of operation is an important aspect of planning laparoscopic surgery. The purpose of our prospective study was to analyze various risk factors and to predict difficulty and degree of difficulty preoperatively by the use of a scoring system.

Objective: The objective of this study is to evaluate a Scoring system to predict difficult laparoscopic Cholecystectomy.

Patients and Methods: Laparoscopic cholecystectomy was done in the department of surgery, EL Hussin University Hospital. The parameters considered in the preoperative scoring method were old age, male sex, history of hospitalization, obesity, previous abdominal surgery scar, and palpable gall bladder, wall thickness of gall bladder, pericholecystic collection and impacted stone. A total of 50 patients were included in the study.

Results: We found that history of hospitalization; palpable gall bladder, impacted stone and gall bladder wall thickness were statistically significant factors for prediction of difficult laparoscopic cholecystectomy. Conversion rate from laparoscopic to open cholecystectomy was found to be 4%.

Conclusion: High risk patient may be informed beforehand regarding the probability of conversion and hence they may have a chance to make arrangements. Surgeons can also be aware about the possible complications that may arise in high risk patients.

Keywords: Laparoscopic cholecystectomy, Difficult, Prediction.

INTRODUCTION

Laparoscopic cholecystectomy is considered as the gold standard treatment for most gallbladder diseases[(1)]. 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[(2)]. 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 patient's age, male sex and greater body mass index[(3)].

Patients and Methods

This study was conducted in department of general surgery, El hussin university hospital within the period from December 2017 to June 2018. A total 50 patients were included in the study after prior informed consent. This study was commenced after obtaining approval from the ethical committee of the institution. **Technique**: laparoscopic cholecystectomy.

Study design: None randomized prospective study.

Inclusion criteria: Acute calcular cholecystitis, chronic calcular cholecystitis and Acute non-calcular cholecystitis

Exclusion criteria: Known cases of Carcinoma of gall bladder, late month's pregnancy,

Bleeding diathesis and Presence of complications caused by migration of stones (jaundice, cholangitis, dilated common bile duct, common bile duct stones).

RESULTS

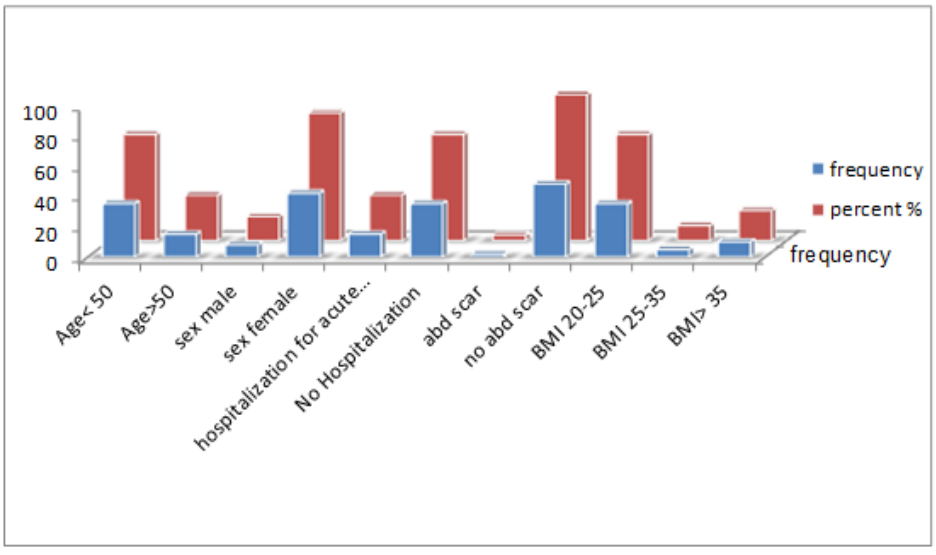
A total of 50 patients were included in this study. Majority of the patients were females (84.00%). Following variable risk factors were analyzed (Table 1).Mean intraoperative time was 30 min (range 20-60

Received: 17/7/2018
Accepted: 25/7/2018

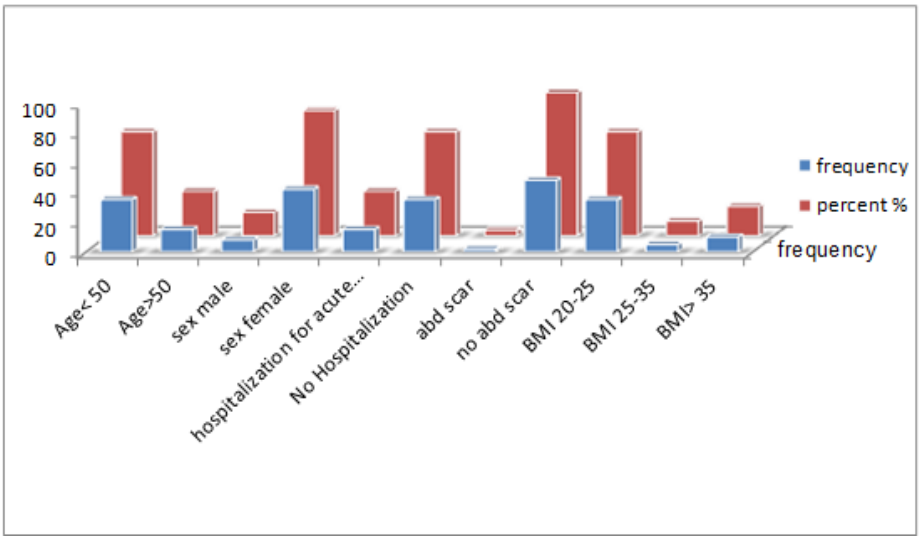
min). Cystic artery was injured in 2 cases but controlled with clips. Bile spillage was seen in 3 cases which were promptly managed with saline irrigation and suction. None of the cases required conversion because of cystic artery bleed or bile spillage. There were total 2 conversions in our study all because of dense adhesions at calot's triangle. Post-operative hospital stay was 1– 2 days.Multivariate analysis of intraoperative outcome with risk factors was carried out which depicted that only four variables (h/o hospitalization, palpable gallbladder, peri-cholecystic fluid collection, thick GB wall and impacted stone) were statistically significant in preoperative prediction of difficult laparoscopic cholecystectomy (Table 2,4).Conversion rate from laparoscopic to open cholecystectomy was 4 %.

Table 1: Distribution of parameters of scoring system of difficult laparoscopic cholecystectomy

	Patient characteristic (n = 200)		Frequency	No. %
1	Age (years)	50	35	70
		>50	15	30
2	Sex	M	8	16
		F	42	84
3	History of hospitalization for acute cholecystitis	Yes	14	28
4	BMI(kg/m2)	20 -25	34	68
		25 -35	6	12
		>35	10	20
5	Abdominal scar	Yes	5	10
		No	45	90
6	Palpable gall bladder	Yes	5	10
		No	45	90
7	Thick gall bladder wall	Yes	10	20
		No	40	80
8	Pericholecystic fluid collection	Yes	12	24
		No	38	76
9	Impacted stone	Yes	6	12
		No	44	88
10	Conversion	Yes	2	4
		No	48	96



Figure(1): Distribution of parameters of scoring system of difficult laparoscopic cholecystectomy.



Figure(2): Distribution of parameters of scoring system of difficult laparoscopic cholecystectomy.

Multivariate analysis of intraoperative outcome with risk factors :

Table 2: predictive association of risk factors with intraoperative outcome demographic data

Risk factors	**Level**	**Intraoperative outcome**			**P value**
		Easy no. no. (%)	**Difficult no. (%)**	**Very diff. no. (%)**	
Age(year)	50 years	27 (77.14)	6 (17.14)	2 (5.71)	0.063
	> 50 years	8 (53.33)	6 (40.00)	1 (6.67)	
Sex	Female	30 (71.44)	10(23.80)	2 (4.76)	0.261
	Male	5 (62.50)	2 (25.00)	1 (12.50)	
History of Hospitalizat Ion	No	29 (80.55)	5 (13.89)	2 (5.56)	
	Yes	5 (35.71)	8 (57.14)	1 (7.15)	0.033

Table 3: Predictive outcome according to clinical parameters

Risk factors	Level	Intraoperative outcome			P value
		Easy no. (%)	Difficult no. (%)	Very diff. no. (%)	
BMI(kg/m2)	20 – 25	27 (79.41)	6 (17.65)	1 (2.94)	0.235
	25- 35	3 (50.00)	2 (33.33)	1 (16.66)	0.657
	> 35	5 (50.00)	2 (40.00)	1 (10.00)	0.657
Scar	No	34 (75.76)	9 (20.00)	2 (4.24)	0.543
	Yes	1 (20.00)	3 (60.00)	1 (20.00)	
Palpable gall Bladder	No	35 (77.78)	9 (20.00)	1 (2.22)	0.049
	Yes	1 (20.00)	3 (60.00)	1 (20.00)	

Table 4: predictive association of risk factors with intraoperative outcome according to ultrasonography finding

Risk factors	Level	Intraoperative outcome			
		Easy no. (%)	Difficult no. (%)	Very diff. no. (%)	P value
Thick gall bladder wall	No	34 (85.00)	5 (12.50)	1 (2.50)	0.051
	Yes	2 (20.00)	6 (60.00)	2 (20.00)	
Pericholecystic Collection	No	30 (78.95)	7 (18.42)	1 (2.63)	
	Yes	6 (18.18)	20 (60.6)	7 (21.21)	0.029
Impacted stone	No	37 (86.04)	5 (11.63)	1 (2.33)	0.046
	Yes	1 (14.28)	3 (42.86)	3 (42.86)	

Table 5: Correlation of pre-operative score and the outcome

Pre-op score	**No.**	**Easy**	**Difficult**		**Very diff**		**Total**
		%	**No.**	**%**	**No.**	**%**	
0-5	32	(64.00)	3	(6.00)	-	-	35 (70.00)
6-10	2	(4.00)	10	(20.00)	2	(4.00)	14 (28.00)
11-15	-	-	-	-	1	(2.00)	1(2.00)
Total outcome	34	(68.00)	13	(26.00)	3	(6.00)	50

DISCUSSION

In our study laparoscopic cholecystectomy was performed in 50 patients and different predictive risk factors for difficult laparoscopic cholecystectomy were analyzed in a scoring system. Old age, male sex, history of hospitalization, obesity, previous abdominal surgery, palpable gall bladder, gall bladder wall thickness, pericholecystic fluid collection and impacted stone were included as risk factors in this study. Conversion rate was 7-35% has been reported in literature[4]**.** Conversion rate in our study was 4%.Old age (age > 50 years) has been found to be a significant risk factor for difficult laparoscopic cholecystectomy in many studies **(5)**. In our study it is not found as a significant factor (p = 0.063) probably because of long surgical experience. Male sex makes surgery difficult as being reported in studies **(6)**. In our study it has not been found as a significant factor (p = 0.261).Patient, with 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 **(4)**. In our study also, it was found to be a significant factor for prediction of difficult laparoscopic cholecystectomy (p= 0.033). Obesity has been considered as another risk factor for difficult laparoscopic cholecystectomy as observed **(7)**. However certain studies claim that there was no difference in operative time, time to start oral feeding, length of hospitalization or complications in obese patients **(8)**. In our study BMI (20 -25) did not significantly affect the outcome (p= 0.235) and number of easy and difficult cases were almost equal in both groups of patients (BMI 25-35 and >35).After previous upper or lower abdominal surgery there may be adhesions present between viscera or omentum and abdominal wall **(6)**.

There may be chances of injury to these structures during insertion of first port and risk of conversion was reported to be higher [(9)]. In our study only 5 patients had infra- umbilical scar and none of them had supra-umbilical scar. It was not found to be a significant confounding factor for difficult LC (p = 0.543) in our study. Palpable gall bladder is a clinical finding seen in patients with distended gall bladder due to mucocele or empyema. In distended gall bladder it is difficult to catch hold of the fundus of GB especially with thinking GB wall and hence aspiration of the contents of GB is often required [(10)]. It is time consuming and also there is chance of spillage of contents into the peritoneal cavity. There is only one study which has correlated palpable gallbladder with intraoperative difficulty with a significant association [(11)]. In our study 5 out of 50 patients had palpable gall bladder. The outcome of our study was found to be a significant factor (p= 0.049) in multivariate analysis. Thickened gall bladder wall is an ultrasonographic finding of acute cholecystitis and it was a significant factor in previous studies [(9)]**.** Preoperative gallbladder ultrasound evaluation for symptomatic cholecystitis, which documents a thick gallbladder wall (3.0 mm) with calculi, is a clinical warning for the laparoscopic surgeon of the potential for a difficult laparoscopic cholecystectomy procedure which may require conversion to an open cholecystectomy procedure concluded that detailed preoperative ultrasound evaluation of the gallbladder in patients destined for laparoscopic cholecystectomy is of little value in screening for difficult or un-suitable cases [(12)]**.** They concluded that there were no ultrasound features that can differentiate between the unsuccessful, difficult, or uneventful laparoscopic cholecystectomy [(13)]. In this study thickened gallbladder wall was present in 10 patients and outcome was found to be dependent on this variable by chi-square test (p =0.001), and logistic regression analysis also ascertained the significance of this factor for prediction (p= 0.0051).Pericholecystic fluid is an ultrasonographic finding of acute cholecystitis. This was not found to be a significant factor in our study (p = 0.875). Our findings are in accordance with the observations of on the other hand, palpable gall bladder has been found as a significant factor in our study (p = 0.029). Our study reports that presence of palpable gallbladder has a significant bearing the difficulty index.Impacted stone of gall bladder is an ultrasonography finding and it was found not significant in previous studies but in our study found that's a significant factor (p = 0.046).Conversion rate reported in literature was between 7-35% (**Khan, 2004**). In our study it was 4%. In our study injury to artery occurred in only three cases but they were not converted and bleeding was stopped with clip application. Spillage of stones as a cause of conversion had been observed but in our study none of the cases were converted due to this reason.Bile spillage was present in 3 cases in our study, intra-operative time was 60 min, but these cases have been categorized as difficult due to bile spillage. None of these cases were converted and all were managed by irrigation and suction. In our study 3 cases out of 50 were converted, and the reason for conversion was dense adhesions between gall bladder and surrounding tissue like omentum, duodenum or colon leading to dense calot's triangle.

CONCLUSION

Difficult cases for laparoscopic cholecystectomy should be recognized in the preoperative course and operated by experienced surgeons as these cases carry a higher risk of conversion to open surgery and complications. Preoperative prediction of the risk factors of conversion or difficulty of operation is an important point for operative planning and the high risk patients may be informed accordingly.

REFERENCES

1-Ibrahim S, Hean TK, Ho LS *et al.* (2006): Risk factors for conversion to open surgery in patients undergoing laparoscopic cholecystectomy. World J Surg., 30:1698-704.

2-Sodergren M, OrihuelaF, Espina CJ *et al.* (2010). Evaluation of orientation strategies in laparoscopic cholecystectomy. Annals of Surgery, 252: 1027-36.

3-Kanakala V, Borowski DW, Pellen MG *et al.* (2011): Risk factors in laparoscopic cholecystectomy: a multivariate analysis. Int J Surg., 9: 318-23.

4- Khan IA and El-Tinay OE (2004): Laparoscopic cholecystectomy for acute cholecystitis: can preoperative factors predict conversion? Saudi Med J., 25(3):299-302.

5-Lee NW, Collins J, Britt R and Britt LD (2012): Evaluation of preoperative risk factors for converting laparoscopic to open cholecystectomy. Am Surg., 78(8): 831-833.

6-Hussain A (2011): Difficult laparoscopic cholecystectomy: current evidence and strategies of management. Surg Laparosc Endosc Percutan Tech., 21(4): 211-217.

7-Rosen M, Brody F, Ponsky J (2002): Predictive factors for conversion of laparoscopic cholecystectomy. Am J Surg., 184(3):254-258.

8-Simopoulos C, Polychronidis A, Botaitis S *et al.* (2005): Laparoscopic cholecystectomy in obese patients. Obes Surg., 15(2):243-246.

9-Nachnani J (2005): Pre-operative prediction of difficult laparoscopic Cholecystectomy using clinical and ultrasonographic Parameters. Indian J Gastroenterol., 24(1):16-8.

10-Nikhil V and Singh R (2013): Confocal laser scanning microscopic investigation of ultrasonic, sonic, and rotary sealer placement techniques. Journal of conservative dentistry: JCD., 16(4):294.

11-Randhawa HS, Mutti JS, Kidwell K *et al.* (2009): Rapid and targeted introgression of genes into popular wheat cultivars using marker-assisted background selection. PLoS One, 4(6):e5752.

12-Majeski J (2007): Significance of preoperative ultrasound measurement of gallbladder wall thickness. Am Surg., 73(9):926-929.

13-Carmody E, Arenson AM, Hanna S (1994): Failed or difficult laparoscopic cholecystectomy: can preoperarive ultrasonography identify potential problems. J Clin Ultrasound., 22(6):391-396.