

Evaluation of Clinical Parameters that Predict Difficulties During Laparoscopic Cholecystectomy

Karam Kamal Younis*, Layth Qassid Al-Harbawi*, Omar Abbas Ashoor **

ABSTRACT:

BACKGROUND:

Laparoscopic cholecystectomy(LC) may be rendered 'difficult' by various problems encountered during surgery e.g accessing the peritoneal cavity, dissecting the gall bladder ... etc.

OBJECTIVE:

To identify certain preoperative clinical parameters to predict technical difficulties during (LC) .

SETTING: Surgical wards of Al-Jamhoori Teaching Hospital between October 2009 to October 2010.

METHODS:

A prospective analysis of 150 patients who underwent (LC). Prospective analysis of different preoperative data including patient's age, gender, weight, height, previous abdominal surgery and previous attack of acute cholecystitis were done. The dependent variables (outcomes) included the duration of operation, bleeding, difficult accessing, bile leak, difficult dissection of gall bladder, and conversion to open cholecystectomy. Surgeons who performed the operations had operative experience of more than 50 (LC)

RESULTS:

The difficulties were met in 57(38%) patients. The mean duration of surgery was 79.83 ± 1.30 minutes. Factors contributed to difficult (LC) were; male gender, previous upper abdominal surgery and BMI > 35.

CONCLUSION:

Preoperative clinical patient's factors including male gender, BMI > 35 and history of previous upper abdominal surgery are significant predictive preoperative parameters for difficult (LC). Knowledge of these parameters preoperatively can predict difficulties during (LC).

KEY WORDS: cholecystectomy, laparoscopy.

INTRODUCTION :

Laparoscopic cholecystectomy(LC), since its advent in 1987⁽¹⁾ has dramatically replaced open cholecystectomy in the management of cholelithiasis⁽²⁾. It decreases post operative pain, ileus, allows earlier oral intake, shortens hospitalization and improves cosmetic results⁽³⁾. Conversion to open cholecystectomy is neither a complication nor a failure but an attempt to avoid a complication.⁽⁴⁾ Most of previous contraindications to (LC), such as morbid obesity, previous upper abdominal surgery and acute cholecystitis are no longer absolute contraindications.⁽⁵⁾

With the growing experience, a selection criterion has become more liberal⁽⁶⁾. The levels of difficulties during (LC) can be predicted based on certain preoperative clinical, laboratory or radiological parameters.⁽⁷⁾ These parameters have

been studied extensively starting from a single variable, up to 34 parameters to predict difficult (LC).⁽⁸⁾

PATIENTS AND METHODS:

Selection of patients:-

☒The study was conducted prospectively in the surgical wards at AL-Jamhoory Teaching Hospital - during the period from Oct. 2009 to Oct. 2010.

☒The study sample consisted of 150 patients, their age ranged from 21-72 years. All patients underwent elective (LC) by trained surgeons who had done more than 50 (LC)

Criteria of selection of patients

☒All patients admitted for elective (LC) for symptomatic cholelithiasis.

☒All patients were fit for general anesthesia.

•Exclusion criteria included

- (LC) done along with common bile duct exploration.

- (LC) with other intervention at the same setting.

-Patients with anesthetic complications

-Patients with co- morbid diseases.

-Technical and equipment deficiency.

* Department of Surgery, College of Medicine, University of Mosul..

** Al-Jamhoori Teaching Hospital, Mosul.

Surgical procedure (LC) adopted by all surgeons corresponded with the American method: The patient placed in supine position, surgeon stand on the left side of the patient. Pneumoperitoneum is created with carbon dioxide gas⁽⁸⁾.

Data collection: Informations obtained for every patient admitted at least 1 day before elective (LC) for symptomatic cholelithiasis included:

☒Patients' age, gender, previous admission for acute cholecystitis , last admission and any previous upper abdominal surgery.

☒Clinical examination remarks including; height and weight.

☒Operative difficulties were assessed:

- 1.Prolonged operative time more than (80 min) measured from the insertion of port to create CO2 pneumoperitoneum till the removal of the last port.
2. Intraoperative bleeding.
3. Bile leak mainly following peeling off the gall bladder from its bed or spillage of calculi to peritoneal cavity with difficulties in retrieval.
4. Dense adhesion with difficult dissection causing unclear anatomy of Calot's triangle.
5. Decision for conversion to open cholecystectomy.

Preoperative imaging (ultrasound of gall bladder and biliary tree) was excluded from evaluation because of the lack of precise details like size of gall bladder, number and size of gall stones, gall bladder wall thickness, interior of gall bladder and the distance between hepaticoduodenal ligament and Hartmann's pouch during interpretation of different sonographic reports in our hospital.

⌘Data analysis:

☒Analysis of results was done statistically using chi-square test (X²) and p-value to assess the significance of various parameters increasing the difficulties of (LC).

RESULTS:

Age:

As shown in table (1) the most vulnerable age group affected by gall stone and underwent (LC) is between (30-49 years) comprising (45.33%) followed by (10-29y) comprising(29.33%).

Gender:

Among 150 patients, (20%) were males while (80%) were females figure (1). Female to male ratio = 4:1

Intra operative difficulties:.

It was observed that 57 patients (38%) had one or more difficulty during their operations, while 93 patients (62%) had no difficulties and their operations passed smoothly figure (2).

Some of the patients developed two or three difficulties while others developed just one difficulty. The most frequent type of difficulty encountered was bile leak that occurred in 21 patients (23.33%) followed by prolongation of mean operation time more than 80 minutes in 20 patients (22.22%) while the least frequent difficulty was the decision of conversion to open cholecystectomy which was seen in 7 patients (7.77%) table (2)

Frequency of difficulties in relation to preoperative clinical factors

Age: In this study we observed that difficulties mostly occurred in the age group between (10-29years) comprising (59.09%) while the least difficulties occurred in the age group (50-69years) comprising (19.44%). There were no difficulties occurring in patients older than 70 years table (3).

Gender: (70%) of patients that developed difficulties during operation were males while (30%) were females table (4)

Body Mass Index (BMI):- It was observed that (84.21%) of patients who had (BMI) between 35.1-40 developed difficulties during operation, while from the largest group of patients between (25.1-30) constituting 72 patients, only 34.72% of them developed difficulties during operation table (5)

Previous upper abdominal surgery: - From 10 patients in this study, (9) patients (90%) with previous abdominal surgery developed difficulties during operation while only 34.28% of patients with no history of previous surgery developed difficulties during operation table (6).

Previous attacks of cholecystitis : Observations in this study showed that (22) patients (35.48%) out of 62 patients with history of previous attack of cholecystitis (based on patient s history of acute pain and tenderness in the right upper abdomen, fever and sonographic finding of acute calculous cholecystitis with admission to the hospital for treatment) developed difficulties during operation, while out of 88 patients with no history of previous attack of cholecystitis only 35 patients (39.77%) developed difficulties during operation table (7).

Table 1: Age groups.

Age in years	No	%
10-29	44	29.33
30-49	68	45.33
50-69	36	24
> 70	2	1.33
Total	150	

Table 2: Frequency of occurrence of each type of difficulty.

Types of difficulties	No	%
Difficult access	10	11.11%
Prolonged time of operation	20	22.22%
Bleeding	19	21.11%
Bile leak	21	23.3%
Adhesion and difficult dissection	13	14.44%
Conversion to open	7	7.77%
Total	90	

Table 3: Frequency of difficulties regarding age.

Age in years	No	No. of difficulties	%	Y ²	P-value	Significances
10-29	44	26	59.09	2.3	0.129	Not significant
30-49	68	24	35.29	0.068	0.795	Not significant
50-69	36	7	19.44	2.369	0.124	Not significant
> 70	2	Zero				
Total	150	57				

Table 4: Frequency of occurrence of difficulties regarding gender.

Gender	No	Difficulties	%	Y ²	p-value	Significance
Male	30	21	70%	6.31	0.012	Significant
Female	120	36	30%			
Total	150	57				

Table 5: Frequency of difficulties regarding BMI..

BMI	No	Difficulties	%	Y ²	p-value	Significance
< 18	2	Zero				
18.1-25	19	6	31.57%	0.141	0.707	Not significant
25.1-30	72	25	34.72%	0.104	0.747	Not significant
30.1-35	38	10	26.31%	0.904	0.342	Not significant
35.1-40	19	16	84.21%	4.696	0.03	Significant
Total	150	57				

Table 6: Frequency of occurrence of difficulties regarding presence or absence of history of previous abdominal surgery.

Previous abdominal surgery	No	Difficulties	%	Y ²	P-value	Significance
Yes	10	9	90%	4.124	0.042	Significant
No	140	48	43.28%			
Total	150	57				

Table 7: Frequency of occurrence of difficulties regarding presence or absence of history of previous attack of cholecystitis.

Previous attack of cholecystitis	No	Difficulties	%	p-value	Significancy
Yes	62	22	35.48%	0.720	Not significant
No	88	35	39.77%		
Total	150				

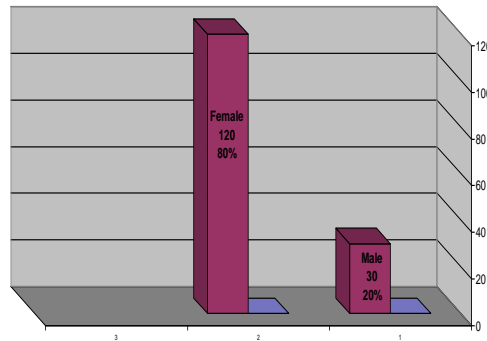


Figure 1 : Gender incidence.

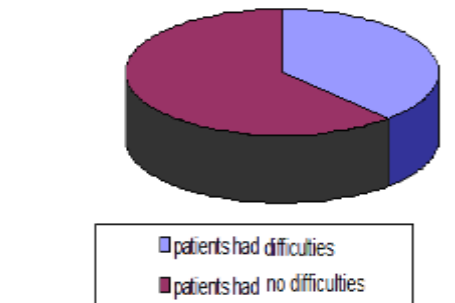


Figure 2: Number of patients according to development of Intra operative difficulties.

DISCUSSION:

The difficulty of (LC) can be predicted by assessing some preoperative variables⁽⁹⁾. In the present study, it was observed that advancing age as a preoperative parameter had not significantly increased the frequency of occurrence of difficulties during (LC). This finding is in agreement with the results of Gabriel R. et al study who found that advancing age had not significantly increased the risk of conversion to open cholecystectomy⁽¹⁰⁾, while it contradicts with the results of Juliane Bingeor et al⁽¹¹⁾, Alexanderes polychronidis etal and Gurkan Yetkin etal who reported that age is a significant parameter to increase the occurrence of difficulties probably due

to longer history of gall stone and increased number of cholecystitis attacks.^(12, 13). In the current study, it was observed that male gender had significantly increased the rate of occurrence of difficulties during (LC), a finding that is consistent with similar findings of Kamal I. A et al⁽¹⁴⁾. They reported that males had longer operation time than females because males had more pericholecystic fibrosis attributed to the predominance of macrophages, mast cell and eosinophils in males more than females and the tissue collagen levels both in the submucosal area of gall bladder wall and in percholecystitis tissue were significantly higher in men than women⁽¹⁵⁾. While Theodoros E.

et al⁽¹⁵⁾ and Simon E. et al had attributed the increased difficulty in males to more frequent incidence of acute cholecystitis⁽¹⁶⁾.

Initially, (LC) was contraindicated in obese patients mainly because of technical difficulties such as difficult access to thick abdominal wall creation of pneumoperitoneum, cannula displacement, fat-laden omentum or falciform ligament and a heavy fatty liver difficult to retract⁽¹⁷⁾. In this study it was observed that difficulties significantly increased with high BMI especially with more than 35. This finding is in agreement with Hussein et al and Theodor et al results who considered obesity a significant risk factor for difficulty in (LC) in addition the increased fat in Calot's triangle which make dissection more difficult in obese patients^(15,18). On the contrary, Unger et al. considered (LC) as safe and effective treatment for obese patient and should be the procedure of choice for those patients avoiding complication of prolonged bed rest and wound complications, so common in these patients⁽¹⁹⁾. It was stated that previous abdominal surgery is not a contraindication to (LC)⁽¹⁶⁾. Depending on the results in this study; it was found that this parameter had significantly increased the occurrence of difficulties as it poses a problem in creating pneumoperitoneum and the need for adhesiolysis with the resultant increased incidence of bile leak which was the most significant difficulty encountered in this study. These findings were in agreement with Akyurek N. et al. and Karayiannakis et.al^(20,21) while they disagree with the results of Ya Sc. et. al who found that (LC) can be performed safely in patients with previous abdominal surgery.⁽²²⁾ This factor of adhesion can be further evaluated if preoperative sonographic mapping has been done. It was stated that one of the most significant and independent predictor of difficult (LC) is the presence of previous attack of acute cholecystitis⁽¹³⁾. In the current study, this parameter had not significantly increased the rate of occurrence of difficulties of (LC), a finding that is consistent with the results of Kamal I.A et al who stressed on the safety and feasibility of (LC) in both acute and chronic cholecystitis despite the greater rate of conversion in acute cholecystitis than in chronic cholecystitis⁽¹⁴⁾. In such cases, the highest risk of difficulty is expected in gangrenous cholecystitis and gall bladder empyema though the rate of difficulty increases after a delay of 48 hours⁽¹³⁾. Therefore; patients with acute cholecystitis should be hydrated well, investigated and taken up for early (LC) by an experienced surgeon within

72 hours of attack for the safe performance of the procedure.

CONCLUSION:

Evaluation of preoperative clinical factors contributing to a possibility of encountering intraoperative difficulty during (LC) for cholelithiasis showed that male sex, previous upper abdominal surgery and BMI more than 35 had statistically significant predictive preoperative clinical parameters for difficulties. Furthermore, the results demonstrated that the most frequent intraoperative difficulty encountered was intraoperative bile leak followed by prolonged operation time and bleeding. Knowledge of these patient-related parameters preoperatively may help in improving patient safety with involvement of experienced surgeon who could better anticipate intraoperative technical difficulty encountered while operating on these patients safely.

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