



Preoperative prediction of difficult laparoscopic cholecystectomy using clinical and ultrasonographic criteria

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Abstract

Aim: To assess preoperative prediction of difficult laparoscopic cholecystectomy using clinical and ultrasonographic criteria.

Material and Methods: Using clinical and ultrasonographic criteria, a hospital-based prospective observational study with 100 patients was done to predict difficult laparoscopic cholecystectomy and the possibility of conversion to open cholecystectomy before surgery.

Results: The patients' average age was 38.91 years. Majority of the patients (62%) were in the normal range while 10 (10%) and 28 (28%) patients were overweight and obese respectively. 16% of the patients had previous history of hospitalization of acute cholecystitis while 84 (84%) patients had no history of hospitalization of acute cholecystitis. 30 (30%) patients presented With abdominal scar of which 4 (4%) patients had supraumbilical scar while remaining 26 (26%) patients had an infraumbilical scar.

Conclusion: This study demonstrates that a scoring system predicting the difficulty in LC is feasible. There is a need for further prospective study for the validation of this score. There is scope for further refinement to make the same less cumbersome and easier to handle. This study was targeted at identifying the possible predictors of difficulty in LC. The data generated from the present study concludes that NAC improves the clinical features, biochemical markers of insulin resistance, hormonal levels, Anovulation and consequently the long-term health status of women with PCOS through inhibition of oxidative stress and improvement of peripheral insulin more effectively when compared with metformin. Due to the lack of adverse effects, NAC can be regarded as an appropriate substitute for insulin-reducing medications in the treatment of PCOS patients.

Keywords: cholecystectomy, laparoscopy, ultrasonography

Introduction

Minimal invasive surgery brings a revolutionary change in the treatment of patients with gallbladder stones. Mouret ^[1] pioneered laparoscopic cholecystectomy in 1987, and minimally invasive surgery has progressed since then. It has quickly supplanted open cholecystectomy as the therapy of choice. Laparoscopic cholecystectomy has several distinct advantages, including shorter hospital stays, lower morbidity, faster recovery, and improved cosmesis ^[1-6]. The prevalence of gallstone disease in the general population ranges from 3% to 20% of the global population. Now-a-days Laparoscopic cholecystectomy (LC) is the standard procedure for the treatment of symptomatic gallbladder stones. Although few requires conversion to open cholecystectomy ^[7-10].

Surgeons can choose patients that are appropriate for their skills based on radiological results, limiting operative complications and maximising available operating time. Ultrasonography has been able to reliably detect gallstones in more than 90% of symptomatic individuals. In 93 percent of patients, ultrasonography measurement of the gallbladder wall thickness is accurate to within 1 mm. ^[11-14] In certain,

but not all, literature studies, gallbladder wall thickness more than 3mm is associated with cholecystitis ^[15-18]. The association between preoperative ultrasonography gallbladder wall thickness and the technical difficulty of an LC has been clearly established in various clinical papers in the literature ^[2, 19-21]. The gold standard for the great majority of patients with benign gallbladder disease, both in elective and emergency situations, is laparoscopic cholecystectomy. The advantages of laparoscopic cholecystectomy over open cholecystectomy include faster bowel function recovery, less postoperative pain, better cosmesis, shorter hospital stays, quicker return to full activity, and lower overall costs. Postoperative infection appears to be at a lower rate ^[22-24].

However, conversion rates range from 1.5 to 19 percent. It is necessary to assess the many factors that contribute to complicated laparoscopic cholecystectomy. The ability to accurately identify a patient's risk for conversion based on preoperative data can lead to more meaningful and accurate preoperative counselling, improved operating room scheduling and efficiency, stratification of risk for technical difficulty, and appropriate assignment of resident assistance,

all of which can improve patient safety by reducing conversion time [25]. Hence the present study was done at our tertiary care centre to predict the difficulty of LC and the possibility of conversion to open cholecystectomy (OC) before surgery using the clinical and ultrasonographic criteria.

Materials and Methods

A hospital based prospective observational study of among 100 patients admitted at tertiary care centres from November 2015 to July 2017 for Undergoing Laparoscopic Cholecystectomy were studied.

Inclusion criteria

- **Age group:** 20-60 years.
- Patients presenting with symptoms and signs of cholelithiasis/Cholecystitis & diagnosed by USG Abdomen I CT abdomen.
- Patients with Common bile duct (CBD) calculus who underwent ERCP and CBD clearance preoperatively.

Exclusion criteria

- Patients below 20 years
- Raised ALP, dilated CBD, where CBD exploration is needed.
- Patient medically unfit for laparoscopic surgery
- Malignancy.

Patient information, clinical results, laboratory data, ultrasound details, and intraoperative findings were all recorded on a thorough proforma. Every patient underwent a pre-operative evaluation, laparoscopic/open procedure, and

post-procedural care in accordance with normal hospital guidelines. Every patient had an ultrasound, and the following parameters were evaluated prior to surgery:

1. Gallbladder wall thickness
2. Number of stones
3. Size of largest stone
4. Gall stone location
5. Gall bladder size
6. Pericholecystic fluid/edema
7. Emphysematous cholecystitis
8. Biliary sludge/gravel

Age, sex, BMI, temperature, fever, dyspepsia, history of jaundice, fever & vomiting, abdominal scar (infraumbilical or supraumbilical), tenderness right hypochondrium, positive Murphy's sign, palpable Gallbladder, Complete Blood Counts and Liver Function Test values, Serum Amylase, UltraSonographic Findings were taken.

Following an examination, the patients had laparoscopic cholecystectomy. Time taken, biliary/stone spillage, bleeding during surgery, Calot's triangle dissection, peritoneal cavity access, Gallbladder bed dissection, Anatomical variation, injury to Duct/artery, difficult Gallbladder extraction, extension of incision, and conversion to open were all noted, with the operating surgeon grading it as follows: Easy or difficult, operating time (in minutes), length of stay in hospital, intraperitoneal bile leak, need for interventional procedure, and death were all reported. The Mean and Standard deviation are used to present quantitative data. The findings of the normalcy test are used to compare the research groups using an unpaired t test. Significant is defined as a 'p' value of less than 0.05.



Fig 1: Typical ultrasonographic appearance of cholelithiasis. (A) Gallstone is present within lumen of the gallbladder, casting an acoustic shadow. (B) Cholelithiasis in the setting of acute cholecystitis. Multiple gallstones can be seen within the gallbladder lumen with associated acoustic shadowing. In addition, the gallbladder wall is thickened (arrowheads).



Fig 2: Gall bladder is retracted cranially and separation of adhesions from the gallbladder

Results

Table 1: Distribution of subjects according to different variables

Variables	N	%	Mean ± SD
Age			
20-30	34	34	38.9 ± 12.16
31-40	26	26	
41-50	16	16	
51-60	24	24	
Gender			
Male	12	12	
Female	88	88	
BMI			
Normal	62	62	
Overweight	10	10	
Obese	28	28	
History of hospitalization of acute cholecystitis			
Yes	16	16	
No	84	84	
Presence of abdominal scar			
Supraumbilical scar	4	4	
Infraumbilical scar	26	26	
No	70	70	
Palpable Gallbladder			
Yes	4	4	
No	96	96	
Thick wall Gallbladder			
Yes	32	32	
No	68	68	
Pericholecystic fluid collection			
Yes	8	8	
No	92	92	
Impacted Stone			
Yes	6	6	
No	94	94	
Operative time (mins)			
20-30	36	36	39.1 ± 15.46
30-40	28	28	
40-50	16	16	
50-60	14	14	
>60	6	6	
Bile spillage			
Yes	6	6	
No	94	94	
Conversion to open cholecystectomy			
Yes	4	4	
No	96	96	
Hospital stay(days)			
<1	74	74	1.3 ± 0.53
1-2	20	20	
2-3	6	6	

Majority of the patients (34%) were in the age group of 20-30 years followed by 26% in the age group of 31-40 years, 24% in the age group of 51-60 years and 16% in the age group of 41-50 years. The mean age of the patients was 38.9±12.16 years. 88 (88%) patients of the study group were female while 12 (12%) patients were male. Majority of the patients (62%) were in the normal range while 10 (10%) and 28 (28%) patients were overweight and obese respectively. 16 (16%) patients had previous history of hospitalization of acute cholecystitis while 84 (84%) patients had no history of hospitalization of acute cholecystitis. 30 (30%) patients presented with abdominal scar of which 4 (4%) patients had supraumbilical scar while remaining 26 (26%) patients had an infraumbilical scar. 4 (4%) patients had palpable gall

bladder while majority 96 (96%) of the patients had no palpable gall bladder. 32 (32%) patients had thick wall gall bladder while no thickening of gall bladder wall was observed in 68 (68%) patients. 8 (8%) patients had Pericholecystic fluid collection while majority (92%) of the patients had no Pericholecystic fluid collection. 6 (6%) patients had impacted stone while majority (94%) of the patients had no impacted stone. 36 (36%) patients had operative time of 20-30 minutes. 28 (28%) and 16 (16%) patients had operative time of 30-40 and 40-50 minutes respectively while 14 (14%) and 6 (6%) patients had operative time of 50-60 and >60 minutes respectively. The mean operative time was 39.1±15.46 mins. Bile spillage was seen in 6 (6%) patients which was managed with saline irrigation and suction. It was observed in our study that 4% cases were converted to open cholecystectomy. The hospital stay of all patients ranged between 1 to 3 days. 74 (74%) patients were admitted in the hospital for ≤1 day while 20% and 6% patients were admitted in the hospital for 1-2 days and 2-3 days respectively. The mean hospital stay was 1.3±0.53 days (table 1).

Discussion

A hospital based prospective observational study was conducted with 100 patients for preoperative prediction of difficult laparoscopic cholecystectomy and possibility of conversion to open cholecystectomy before surgery using clinical and ultrasonographic criteria.

In the present study, majority of the patients (34%) were in the age group of 20- 30 years followed by 26% in the age group of 31-40 years, 24% in the age group of 51-60 years and 16% in the age group of 41-50 years. The mean age of the patients was 38.9±12.16 years. 88 (88%) patients of the study group were female while 12 (12%) patients were male.

Dhea M *et al* [26] non randomized prospective study on pre-operative score to predict the difficulty of laparoscopic cholecystectomy found a total of 115 patients. Majority of these patients were females 103, (89.56%). Gupta G *et al* [27] prospective study evaluating the role of various factors responsible for conversion from laparoscopic to open cholecystectomy reported BMI was less than 30 in 68% and 32% had a BMI more than 30. Gupta G *et al* [27] prospective study evaluating the role of various factors responsible for conversion from laparoscopic to open cholecystectomy reported No patient had a history of upper abdominal surgery while 24% had a previous lower abdominal surgery. 22% patients had contracted GB while 72% had a distended GB. 18% patients had a GB thickness >3 mm. 82% had multiple stones on USG.

Conclusion

So, the clinical and ultrasonographic findings may help predict a difficult LC. This information may be useful to both the patient and the treating surgeon. The preoperative parameters that significantly predicted difficult LC were based on the clinical criterion of presence of local signs of cholecystitis in addition to ultrasonographic criteria of not only large stones but thick and fibrosed GB due to previous attacks of acute cholecystitis. However, the patient's age, body habitus, previous lower abdominal surgery, past history of jaundice, shape of GB and number of stones had no significant effect on the course of surgery. This study demonstrates that a scoring system predicting the difficulty

in LC is feasible. There is a need for further prospective study for the validation of this score. There is scope for further refinement to make the same less cumbersome and easier to handle. This study was targeted at identifying the possible predictors of difficulty in LC.

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