

Preoperative Ultrasonography as a Predictor of Difficult Laparoscopic Cholecystectomy: A Prospective Study

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ABSTRACT

Background: Laparoscopic Cholecystectomy is the Gold standard treatment of symptomatic cholelithiasis. Conversion to open is 2.6% to 5.2% Laparoscopic cholecystectomy cases to be done will be classified as easy or difficult based on Difficult Laparoscopic Cholecystectomy criteria as class I to class IV. An ultrasound predictive score will be devised on collection, distended gall bladder, impacted stone, multiple stones, common bile duct diameter, liver size and deep fissure. Predictive score accuracy will be tested for easy and Difficult Laparoscopic Cholecystectomy. Aim & Objective: The aim of the present study is to see whether preoperative Ultrasonography can predict a difficult laparoscopic cholecystectomy. Objective will be to develop an ultrasound based scoring system for predicting an easy or difficult laparoscopic Cholecystectomy and also to compare it with surgical findings. **Methods:** 50 patients of cholelithiasis, selected from surgical OPD of Maharishi Markandeshwar Medical College and Hospital, Kumarhatti, Solan who fulfilled all inclusion and exclusion criteria for the study underwent elective laparoscopic cholecystectomy. **Results & Conclusion:** The difficult laparoscopic cholecystectomy can be predicted preoperatively based on number of previous attacks of cholecystitis, WBC count, Gall bladder wall thickness and Pericholecystic collection, number of stones, gall bladder transverse diameter.

Keywords: Calot's triangle, cholecystectomy, spillage, ultrasonography.

INTRODUCTION

Cholecystectomy was considered as the surgical procedure for cholelithiasis in 1882, when its pioneer Carl Johann August Langenbuch performed the first cholecystectomy in a 43-year-old male patient who suffered from gallstone disease over past 16 years. Cholelithiasis (gall stone disease) is a well-known disease worldwide. Its estimated incidence is 1.39/100 person/year, varying little between populations.^[1,2] Ultrasonography is the most common screening test for cholecystitis and cholelithiasis. Cholecystectomy is considered the treatment of choice for symptomatic gall stone disease. Laparoscopic cholecystectomy (LC) has gradually replaced open cholecystectomy (OC) in the treatment of symptomatic gall stone disease and accepted as the gold standard.^[3] Better cosmetic results, shorthospital stay, early recovery and return to physical activity and work, all have contributed to the popularity of this technique.^[4-6] In the beginning, patients with acute cholecystitis, empyema, gangrenous gallbladder, cirrhosis patients and Mirizzi syndrome, previous upper abdominal surgery, and morbid obesity were considered as contraindications for carrying out LC.

Ultrasonography is the most common noninvasive, safe, and highly accurate screening test for cholecystitis and cholelithiasis. It can also help surgeons to get an idea of potential difficulty to be faced during surgery in that particular patient.^[8]

On the basis of ultrasound findings, surgeons can select the cases appropriate for their skills aiming at reducing operative complications and minimizing the waste of operative time.^[2] Based on ultrasonographic findings, certain preoperative factors can reliably predict the chances of conversion to the open procedure and the danger of certain complications so that the surgeon and the patient are mentally prepared.^[9] Laparoscopic cholecystectomy (LC) is very commonly performed surgical intervention. Acute or chronic cholecystitis, adhesions due to previous upper abdomen surgeries, Mirizzi's syndrome and obesity are common clinical conditions that can be associated with difficult cholecystectomy. In this study, we evaluated and scored the patients with difficult surgical exploration during laparoscopic cholecystectomy. According to intraoperative findings DLC cases will be classified as Class I difficulty: Adhesion of omentum majus, transverse colon, and duodenum to the fundus of the gallbladder. Class II difficulty: Adhesions in Calot's triangle and difficulty in dissection of cystic artery and cystic duct Class III difficulty: Difficulty in dissection of gallbladder bed (scleroatrophic gallbladder, hemorrhage from liver during dissection of gallbladder, cirrhotic liver). Class IV difficulty: Difficulty in exploration of gallbladder due to

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Sharma et al; Preoperative Ultrasonography as a Predictor of Difficult Laparoscopic Cholecystectomy

intraabdominal adhesions including technical problems. Laparoscopic cholecystectomy (LC) is the standard of care for patients with cholelithiasis. Several randomized controlled trials and systematic reviews have demonstrated the effectiveness and safety of LC for the treatment of symptomatic cholelithiasis.^[1-4] The rapid acceptance of LC as the standard of care for patients with gallstones has been attributed to several benefits including decreased patient morbidity, faster recovery, and shorter hospital stay when compared to open cholecystectomy.^[5-7]

LC is one of the first laparoscopic procedures performed by surgical trainees. Despite the establishment of formal training in laparoscopic surgery and the improvement in laparoscopic technology, still, there is a perception that performance of LCs in teaching hospitals with continuous inflow of trainees may be attended with difficult LC, increased conversion, and complication rates.^[8] While several studies have reported a variable assembly of different preoperative and operative risk factors associated with difficult LC and conversion to open cholecystectomy,^[9-13] the performance of surgical trainees with different training backgrounds has not been adequately addressed.

Although conversion of LC to open cholecystectomy is considered an important outcome of LC, however, currently, conversion rate is less common (2.6%–5.2%) than other surrogate parameters of difficult LC such as operative time more than 60 min, adhesions in the Triangle of Calot, cystic artery injury, or spillage of stones.^[14] This study was conducted to look for some predictive factors on ultrasonography of gallbladder that can give the surgeon some idea about the potential difficulty and complications that may be encountered during the course of laparoscopic cholecystectomy.

Aim & Objective:

The aim of the present study is to see whether preoperative Ultrasonography can predict a difficult laparoscopic cholecystectomy. Objective will be to develop an ultrasound based scoring system for predicting an easy or difficult laparoscopic Cholecystectomy and also to compare it with surgical findings.

MATERIALS & METHODS

50 patients of cholelithiasis, selected from surgical OPD of Maharishi Markendeshwar Medical College and Hospital, Kumarhatti, Solan who fulfilled all inclusion and exclusion criteria for the study underwent elective laparoscopic cholecystectomy. Ultrasonography was done pre-operatively on all cases by a single radiologist in the same settings.

Inclusion criteria: Age between 18 & 65 yrs
Gender: Both males as well as females,
Symptomatic gallstone disease patient. Patients willingly giving consent will be included in the study

Exclusion criteria:

1. Patients with common bile duct stone
2. Acute cholecystitis
3. Acute pancreatitis
4. Known carcinoma gallbladder
5. Peritonitis
6. Cholangitis
7. Where reason for conversion to open cholecystectomy is equipment failure, anaesthetic complications or presence of other co-morbidities and contraindication to laparoscopic surgery were excluded from the study.

Ultrasound findings of 50 patients will be taken for the study. Four operative parameters (time taken, biliary leakage, duct or arterial injury, and conversion) will be analyzed. LC classified as easy or difficult based on criteria of difficult LC. DLC will be classified as class I to class IV based on DLC criteria. The following ultrasound findings will be analyzed: GB wall thickness, pericholecystic collection, distended GB, impacted stones, multiple stones, CBD diameter and liver size.

RESULTS

Table 1: Total number of patients were 50

Gender	Total number of patients
Male	35
Female	15

Table 2: Wall thickness

Wall thickness	Number of patients
1-2mm	15
2-3mm	20
3-4mm	5
4-5mm	5
5-6mm	5

Table 3: Gall bladder transverse diameter

Gall bladder transverse diameter	Number of patients
2-3cm	30
3-4cm	10
4-5cm	6
5-6cm	4

Table 4: Pericholecystic fluid

Pericholecystic fluid	Number of patients
Present	10
Absent	40

Table 5: Impacted stones

Impacted stones	Number of patients
Present	19
Absent	31

Table 6: Multiple stones

Multiple stones	Number of patients
Present	33
Absent	17

Table 7: Common Bile Duct Diameter

Common bile duct diameter	Number of patients
3-4 MM	4
4-5MM	17
5-6 MM	19
6-7MM	10

Table 8: Operating Parameters

Time of surgery	Number of patients
<1HOUR	35
1-2 HOUR	10
2-3HOUR	5
>3 HOUR	NIL

Table 9: Biliary Leakage/Spillage of Stones

Biliary leakage	Number of patients
Present	10
Absent	40

Table 10: Adhesion In Triangle of Calot

Adhesion In Triangle of Calot	Number Of Patients
Present	17
Absent	23

Table 11: Duct or Artery Injury

Duct Or Artery Injury	Number Of Patients
Present	11(Artery Only)
Absent	39

Table 12: Conversion to Open

Conversion To Open	Number Of Patients
Present	2
Absent	48

DISCUSSION

Sanders RC in there study found that the finding of gallbladder wall thickening is suggestive evidence of acute cholecystitis, but it is not a pathognomonic finding.^[18]

Mittalgodu Anantha Krishna Murthy Vivek, Alfred Joseph Augustine, and Ranjith Rao in there study came to the conclusion that features like distended or contracted gallbladder, intra-peritoneal adhesions, structural anomalies or distortions and the presence of a cirrhotic liver are signs that are associated with subsequent difficulties during the surgery.^[19]

Serdar Yol, Adil Kartal, showed in his study that in men with symptomatic gallbladder stones, inflammation and fibrosis occur more than they do in women with the same disease. This translates into difficult dissections during laparoscopic cholecystectomy and a higher rate of conversion to open surgery in male patients.^[20]

Prashant S Dhanke, Subodh P Ugane, in there study came to the conclusion that prior hospitalization, BMI > 27.5, palpable gallbladder, thick gallbladder wall on USG, impacted stone at the neck and pericholecystic collection are strong predictors of

difficult laparoscopic cholecystectomy. Furthermore, keeping in mind that the scoring system was applied as a whole the proposed scoring system had a positive prediction value for easy prediction of 94.05% and for difficult prediction of 100%.^[21]

Urbano, D, Di Nardo, R., De Simone, in there study showed that preoperative investigations do not seem to be useful in predicting biliary and vascular complications, whose prevention lies in the adoption of correct surgical technique and a low threshold for conversion.^[22]

Ravindra Nidoni, Tejaswini V Udachan, in there study That difficult laparoscopic cholecystectomy and conversion to open surgery can be predicted preoperatively based on number of previous attacks of cholecystitis, WBC count, Gall bladder wall thickness and Pericholecystic collection.^[23]

CONCLUSION

The difficult laparoscopic cholecystectomy can be predicted preoperatively based on number of previous attacks of cholecystitis, WBC count, Gall bladder wall thickness and Pericholecystic collection, number of stones, gall bladder transverse diameter.

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Sharma et al; Preoperative Ultrasonography as a Predictor of Difficult Laparoscopic Cholecystectomy

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