Section: Surgery

Original Research Article

PREDICTION OF DIFFICULT LAPAROSCOPIC CHOLECYSTECTOMY ON THE BASIS OF PREOPERATIVE ULTRASONOGRAPHY ASSESSMENT: A TEACHING HOSPITAL BASED STUDY

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Received *: 05/07/2024*
Received in revised form *: 14/08/2024*
Accepted *: 24/08/2024*

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DOI: 10.70034/ijmedph.2024.3.101

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2024; 14 (3); 567-571

ABSTRACT

Background: The new accepted gold standard for treating symptomatic gallbladder disease is laparoscopic cholecystectomy. The goal of the current study was to identify some ultrasound preoperative predictor factors that could help surgeons anticipate potential challenges and complications that could arise during a laparoscopic cholecystectomy and necessitate switching to an open procedure. **Subjects and Methods:** 56 patients of cholelithiasis, selected from surgical OPD of Varun Arjun Medical College &Rohilkhand Hospital, Banthara, Shahjahanpur, Uttar Pradesh, 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.
Results: There is a significant statistical relationship between complicated laparoscopic cholecystectomy and preoperative ultrasonography prediction parameters. The ultrasonic measure for gallstone disease that has been examined the most is the thickness of the gallbladder wall. Ultrasonography is the most accurate method for measuring the thickness of the gallbladder wall.
Conclusion: The frequency of prior episodes of cholecystitis, the white blood cell count, the thickness of the gall bladder wall and pericholecystic collection, the quantity of stones, and the transverse diameter of the gall bladder can all be used to predict the difficulty of a laparoscopic cholecystectomy before surgery.

Keywords: Calot's triangle, Difficult, Laparoscopic cholecystectomy, Prediction and Preoperative ultrasonographic prediction.

INTRODUCTION

Prior to a laparoscopic cholecystectomy, preoperative ultrasonography is a helpful screening tool. In addition to the standard diagnostic data, it accurately predicts surgical problems in over half of the instances.[1] When the first cholecystectomy was carried out in 1882 on a 43-year-old male patient who had suffered from gallstone illness for the previous 16 years, Carl Johann August Langenbuch, the procedure's pioneer, it was thought to be the surgical treatment for cholelithiasis. Globally, cholelithiasis, often known as gallstone disease, is a well-known illness. Its estimated annual incidence, which varies little between populations, is 1.39/100 persons.[2] The most popular screening procedure for cholecystitis and cholelithiasis is ultrasonography. The preferred course of treatment for gallstone disease with symptoms is cholecystectomy. When treating symptomatic gallstone disease, laparoscopic cholecystectomy (LC) has progressively supplanted open cholecystectomy (OC) as the gold standard.[3] The advantages of this treatment include better cosmetic outcomes, a shorter hospital stay, an early return to physical activity, and the ability to resume work.[4] Patients who had previously undergone upper abdominal surgery, had acute cholecystitis, empyema, gangrenous gallbladder, cirrhosis, Mirizzi syndrome, or were morbidly obese were initially thought to be contraindications for LC.

The most popular noninvasive, secure, and highly reliable screening method for cholecystitis and cholelithiasis is ultrasonography. Additionally, it can assist surgeons in gaining an understanding of potential challenges that may arise during surgery for that specific patient.[5] Surgeons can choose situations that are suitable for their expertise based on ultrasound findings, with the goal of minimizing surgical time wastage and operating consequences. To help the surgeon and the patient prepare psychologically, some preoperative parameters can accurately predict, based on ultrasonographic data, the likelihood of conversion to an open surgery and the risk of specific problems.[6]Surgical interventions such as laparoscopic cholecystectomy (LC) are frequently carried out. Common clinical factors that can be linked to challenging cholecystectomy include obesity, Mirrizi's syndrome, acute or chronic cholecystitis, and adhesions from prior upper abdominal procedures. In this study, we assessed and graded the laparoscopic cholecystectomy patients who had challenging surgical exploration. The intraoperative results will determine whether DLC patients fall into Class I difficulty: attachment of the duodenum, omentummajus, and transverse colon to the gallbladder fundus. Adhesions in the Calot's triangle and challenges dissecting the cystic artery and cystic duct are class II difficulties. Class III difficulty: Difficulty dissecting the gallbladder bed (gallbladder scleroathrophic, liver bleeding after gallbladder dissection, cirrhotic liver). Class IV difficulty: Intraabdominal adhesions and technical issues making gallbladder exploration challenging. For patients with cholelithiasis, laparoscopic cholecystectomy (LC) is the recommended course of treatment. The efficacy and safety of LC for the treatment of symptomatic cholelithiasis have been shown in a number of randomized controlled trials and comprehensive reviews. Compared to open cholecystectomy, laparoscopic surgery (LC) has been shown to reduce patient morbidity, promote faster healing, and shorten hospital stays, which has led to its quick acceptance as the standard of care for patients with gallstones.[7] One of the first laparoscopic operations that surgical trainees perform is LC. Even with the development of formal laparoscopic surgery training and the advancement of laparoscopic technology, there is still a perception that LCs performing in teaching hospitals with a steady stream of trainees may experience challenging cases, higher conversion rates, and higher rates of complications.[8] Although a variety of preoperative and operative risk variables have been linked to problematic laparoscopic closure (LC) and conversion to open cholecystectomy in multiple studies, the performance of surgical trainees with varying training backgrounds has not received enough attention. While it is acknowledged that converting LC to an open cholecystectomy is a significant outcome of LC, the conversion rate is currently less common (2.6%–5.2%) than other surrogate parameters of difficult LC, such as operating for more than 60 minutes, adhesions in the Triangle of Calot, damage to the cystic artery, or stone spillage.[9] The purpose of this study was to identify some prognostic markers for gallbladder ultrasonography that can help surgeons anticipate probable challenges and difficulties during laparoscopic cholecystectomy procedures. The current study aims to determine if a challenging laparoscopic cholecystectomy may be predicted by preoperative ultrasound. The goal is to create a score system based on ultrasound imaging that may be used to forecast the difficulty of a laparoscopic cholecystectomy and to compare the results with those obtained after surgery.

MATERIAL AND METHODS

56 cholelithiasis patients who met the study's inclusion and exclusion criteria and were chosen from the surgical outpatient department of Varun Arjun Medical College &Rohilkhand Hospital, Banthara, Shahjahanpur, Uttar Pradesh, underwent elective laparoscopic cholecystectomy. Pre-operative ultrasonography was performed in the identical circumstances on every instance by a single radiologist.

Inclusion Criteria

Age range: 18 to 68 years Gender: Patients with symptoms of gallstone disease, both male and female. Participants in the study will be those who voluntarily provide consent.

Exclusion Criteria

1. Patients with common bile duct stone
2. Acute cholecystitis
3. Acute pancreatitis
4. Known carcinoma gallbladder
5. Peritonitis
6. Cholangitis

7. The study eliminated cases of equipment failure, anesthetic difficulties, co-morbidities, or contraindications to laparoscopic surgery leading to an open cholecystectomy.

56 patients' ultrasound results will be collected for the study. We will examine four operational parameters: conversion, duct or artery injury, biliary leakage, and time taken. LC categorized as easy or tough according to the challenging LC criterion. According to DLC requirements, DLC will be categorized into classes I through IV. The following ultrasound findings—liver size, impacted stones, numerous stones, distended GB, thick GB wall, pericholecystic collection, and CBD diameter—will be examined.

RESULTS

This study was an observational prospective study carried out on 56 patients who visited to Varun Arjun Medical College &Rohilkhand Hospital, Banthara, surgical OPD and underwent cholecystectomy (Laparoscopic/laparoscopic proceed to open procedure) after being diagnosed as case of cholecystolithiasis [Figure 1 and Table(1-11)].

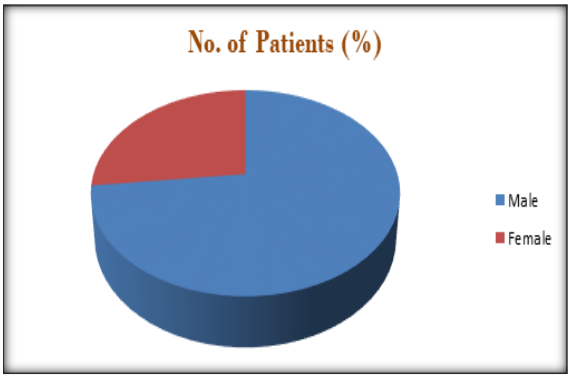

Figure1: Shows the total number of participant's a/c to gender

Table 1: Distribution of participant's a/c to Wall thickness

Wall thickness	No. of patients (%)
1-2 mm	16(28.6%)
2-3 mm	24(42.9%)
3-4 mm	06(10.7%)
4-5 mm	05(8.9%)
5-6 mm	05(8.9%)

Table 2: Distribution of participant's a/c to gall bladder transverse diameter

Gall bladder transverse diameter	No. of patients (%)
2-3 cm	32(57.14%)
3-4 cm	15(26.8%)
4-5 cm	05(8.9%)
5-6 cm	04(7.14%)

Table 3: Distribution of participant's a/c to pericholecystic fluid

Pericholecystic fluid	No. of patients (%)
Present	09(16.07%)
Absent	47(83.9%)

Table 4: Distribution of participant's a/c to impacted stones

Impacted stones	No. of patients (%)
Present	18(32.14%)
Absent	38(67.85%)

Table 5: Distribution of participant's a/c to multiple stones

Multiple stones	No. of patients (%)
Present	39(69.34%)
Absent	17(30.35%)

Table 6: Distribution of participant's a/c to common bile duct diameter

Common Bile Duct Diameter	No. of patients (%)
3-4 mm	05(8.9%)
4-5 mm	20(35.71%)
5-6 mm	22(39.28%)
6-7 mm	09(16.07%)

Table 7: Distribution of participant's a/c to operating time

Time of surgery	No. of patients (%)
<1HOUR	41(73.21%)
1-2 HOUR	10(17.85%)
2-3HOUR	05(8.9%)
>3 HOUR	NIL

Table 8: Distribution of participant's a/c to biliary leakage/spillage of stones

Biliary leakage	No. of patients (%)
Present	08(14.28%)
Absent	42(75.0%)

Table 9: Distribution of participant's a/c to adhesion in triangle of calot

Adhesion In Triangle of Calot	No. of patients (%)
Present	19(33.92%)
Absent	23(41.07%)

Table 10: Distribution of participant's a/c to duct or artery injury

Duct or Artery Injury	No. of patients (%)
Present	11(19.64%)
Absent	45(80.35%)

Table 11: Distribution of participant's a/c to conversion to open

Conversion to Open	No. of patients (%)
Present	03(5.35%)
Absent	53(94.64%)

DISCUSSION

Within the surgical world, laparoscopic cholecystectomy is a surgery that has grown significantly and quickly.[10] Patient demand has been a major driving force behind this. As a result of multiple recent studies proving the procedure's safety, symptomatic cholelithiasis patients now widely consider it to be the best course of treatment.[11]Benefits of laparoscopic cholecystectomy include a shorter recovery period, less time spent in the hospital, and an earlier return to regular activities.[12] It has been clearly shown that laparoscopic cholecystectomy improves pulmonary functioning in the immediate postoperative period as compared to conventional cholecystectomy.

Gallbladder wall thickening is suggestive evidence of acute cholecystitis, although it is not a pathognomonic finding, according to Sanders RC's study.[13]Mittalgodu The study conducted by Anantha Krishna Murthy Vivek, Alfred Joseph Augustine, and Ranjith Rao concluded that certain features, such as a distended or contracted gallbladder, intra-peritoneal adhesions, structural anomalies or distortions, and the presence of a cirrhotic liver, are indicative of potential surgical complications.[14]

In his research, SerdarYol, AdilKartal, demonstrated that inflammation and fibrosis are more common in males than in women with symptomatic gallbladder stones. This results in more male patients converting to open surgery during laparoscopic cholecystectomy and more challenging dissections during the procedure.[15] According to Prashant S. Dhanke and Subodh P. Ugane's study, there are several factors that can indicate a difficult laparoscopic cholecystectomy, including palpable gallbladder, thick gallbladder wall on USG, impacted stones at the neck, and pericholecystic collection. Furthermore, the suggested scoring system had a positive prediction value of 94.05% for easy predictions and 100% for difficult predictions, keeping in mind that the scoring system was applied as a whole.[16]

Preoperative investigations do not appear to be helpful in anticipating biliary and vascular complications, which can be prevented by using appropriate surgical technique and a low threshold for conversion, as demonstrated by the research conducted by Urbano, D., Di Nardo, R., and De Simone.[17] According to a study by RavindraNidoni and Tejaswini V. Udachan, the number of prior cholecystitis episodes, the white blood cell count, the thickness of the gall bladder wall, and pericholecystic collection can all be used to predict the likelihood of a difficult laparoscopic cholecystectomy and conversion to open surgery prior to surgery.[18]

CONCLUSION

The frequency of prior episodes of cholecystitis, the white blood cell count, the thickness of the gall bladder wall and pericholecystic collection, the quantity of stones, and the transverse diameter of the gall bladder can all be used to predict the difficulty of a laparoscopic cholecystectomy before surgery.

According to the study, preoperative ultrasound evaluations can fairly accurately anticipate the level of surgical difficulties during laparoscopic cholecystectomy procedures, and patients can be advised prior to surgery. The likelihood of operating difficulty and conversion to an open procedure can be accurately predicted by the impaction of stone at the gallbladder's neck and the thicker gallbladder wall.

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