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A Difficult Laparoscopic Cholecystectomy that can be Predicted by Preoperative Ultrasonography: A Single Institution Study

M. K. Maheshwari[1], Himanshu Verma[2], Zubair Rashid[3]

[1]Professor, Department of General Surgery, Subharti Medical College, Merrut

[2]Junior Resident, Department of General Surgery, Subharti Medical College, Merrut

[3]Assistant Professor, Department of General Surgery, Subharti Medical College, Merrut

Abstract: ***Background: The aim of this study was to determine whether the preoperative USG finding can predict the risk of conversion or difficulty during the laparoscopic cholecystectomy. Materials and methods: 100 patients undergoing Laparoscopic cholecystectomy at Subharti Medical College, Merrut were included. Sonographic parameters like size of gall bladder, wall thickness, Pericholecystic fluid and the size of stone were taken into consideration and difficulties in terms of adhesions around gall bladder, anatomy of calot's triangle and difficulty in peeling off gall bladder from the bed and Gallbladder retrieval were analyzed. Result: In 4 of 100 patients (4%), LC was converted to open procedure. In univariate analysis all the sonographic parameters we had included in this study were statically significant. Conclusion: Preoperative sonographic signs can predict the difficulty in laparoscopic cholecystectomy***

Keywords: Laparoscopic cholecystectomy, Conversion

1. Introduction

Laparoscopic cholecystectomy is a revolutionary change in the treatment of patients with gallbladder stones. Mouret[1] introduced laparoscopic cholecystectomy in 1987. It has rapidly replaced open cholecystectomy as the standard treatment. Advantages of laparoscopic cholecystectomy include reduced hospitalization, decreased morbidity, short recovery time, and better cosmesis.[2-5] In addition, studies evaluating physiologic and biochemical responses show minimal change in the above parameters.[6] However, compared with open cholecystectomy, the incidence of injuries to the bile duct seems to be increased.[7,8] 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 operating time available.[2] Patients with long-standing disease and previous bouts of cholecystitis or pancreatitis are at higher risk of experiencing a difficult procedure or conversion and may be at increased risk of bile duct injury or injury to the adjoining viscera.[7] It would be useful to have some reliable predictive factors for conversion or complications in laparoscopic cholecystectomy. Patients can be selected for laparoscopic cholecystectomy and high-risk procedures and possible complications so that patients can be mentally prepared and can adjust their expectations accordingly.[3]

2. Methods

The study was conducted in the Department of Surgery,Subharti Medical College, Merrut, India from 2014 to 2016 and included 100 patients. All patients with gallstone disease were included in the study. The patients having concomitant common bile duct stones, suspected malignancy, patients below 10 years, those having features of acute pancreatitis, similarily patients having comorbidities and patients not fit for general anaesthesia were excluded. A detailed clinical history and physical examination were carried out. Complete hemogram, liver function tests, chest X-ray and other preanesthetic investigations were carried out before taking the patient for surgery. Preoperative ultrasonography was performed one day before the surgery. Four ultrasonographic parameters were studied, namely gallbladder wall thickness (more than 3-mm thick gallbladder wall thickness was predicted to be a difficult laparoscopic cholecystectomy); gallstone mobility (gallstone impacted at the neck of the gallbladder was taken to be a difficult laparoscopic cholecystectomy); gallbladder size, that is whether gallbladder is contracted or not (contracted gallbladder was predicted to be a difficult laparoscopic cholecystectomy); Size of the stone; Pericholecystic fluid.The laparoscopic surgery was performed by surgeons at our institution experienced in laparoscopic surgery; therefore, the learning curve statistics do not apply to this study. The operating surgeon was blinded to these findings. The operative findings were objectively graded as difficult or easy laparoscopic cholecystectomy according to the following criteria: more than 90 minutes taken for laparoscopic cholecystectomy from insertion of the Veress needle or trocar (in open method of port insertion) until the extraction of the gallbladder, was considered a difficult laparoscopic cholecystectomy. Tear of the gallbladder during dissection with spillage of bile and stones was considered a difficult laparoscopic cholecystectomy. Any laparoscopic cholecystectomy converted to the open procedure was considered a difficult laparoscopic cholecystectomy.

3. Results

A total of 100 laparoscopic cholecystectomies were performed from 2014 to 2016. The mean age of the patients was 45.4 years, and most patients were 41 to 50 years of age. Of 100 patients, only 31 were males. Of 100 Cases, 4

had to be converted to open cholecystectomy . Three cases were converted due to either dense adhesions at Calot's triangle or the surrounding structures. One case were converted due to a tear of the cystic artery during dissection. 69 laparoscopic cholecystectomies were performed without any difficulty. The mean gallbladder wall thickness in our study was 2.8 mm. The maximum gallbladder wall thickness was 6 mm, and the minimum was 1.8 mm. 32 patients had gallbladder wall thickness more than 3 mm of which 28 cases were found to be difficult on surgery, and of these 28 cases 4 were converted to the open procedure. 15 patients had gallstones impacted at the neck of the gallbladder or Hartman's pouch. The rest of the 85 cases had mobile gallstones. The patients with a gallbladder full of stones with no mobility of the stones due to the gallbladder being totally packed with stones were considered stone impacted at the neck of gallbladder in addition to solitary stone impaction. Of 20 patients with contracted gallbladders, 16 laparoscopic cholecystectomies were surgically difficult, and 4 were converted to the open procedure. The total number of cases predicted to be difficult on ultrasonography was 28, of which 21 were difficult. Of 21 cases that were difficult on surgery, 4 had to be converted to open cholecystectomy.

4. Discussion

Laparoscopic cholecystectomy has become the gold standard for the treatment of symptomatic gallstones, but the procedure is technically more demanding than the classical open cholecystectomy. Greater chances of damage to the common bile duct and surrounding viscera exist. The aim of our study was to evaluate some preoperative factors, which can reliably predict the chances of conversion to the open procedure and the complications during laparoscopic cholecystectomy. Also, it may benefit patients because they can be informed of the possibility of complications and conversion to the open procedure. The patient can be mentally prepared and can adjust his or her expectations accordingly. In addition, the surgeon can directly perform the classical open cholecystectomy in the patients with presumed difficult surgery thus saving operating time and the conversion rate. The risk of organ injury was minimized in our study by using open trocar placement (a Hasson cannula was used). Patients with previous lower abdominal surgeries were also included in our study. Lots of studies have been published in the Western literature on the predictive use of ultrasonography, but little data exist about Indian patients. In our study, we found a good correlation between gallbladder wall thickness with conversion to the open procedure and adhesions in accord with reports in other studies.[2,6,9-12] In 1 study, however, the opposite is reported.[13] Our study shows that stone impaction at the gallbladder neck and certain complications are a good predictor of conversion to the open procedure, which is contrary to the findings in other studies in which stone impaction is shown to have a moderate correlation.[2,10] The main difficulty with stone impacted at the neck or Hartman's pouch is that it hinders holding of the gallbladder during dissection, and also due to impacted stone, the gallbladder is distended with mucus forming the mucocele of the gallbladder, which is even more difficult to hold. In these cases, the gallbladder was emptied of its contents by aspirating the contents making the gallbladder more manageable. The contracted gallbladder is a corollary to the thickened gallbladder wall. The thickened and contracted gallbladder was difficult to dissect because it had dense adhesions with the surrounding structures and in Calot's triangle. Common bile duct size also has a good correlation with conversion to the open procedure and difficulty in surgery, in accordance with findings from previous studies.[2,3] No complications, such as common bile duct injury or injury to adjacent viscera, occurred in our study.

5. Conclusion

From this study, we conclude that preoperative ultrasonography is a good predictor of difficulty in laparoscopic cholecystectomy in the majority of cases and should be used as a screening procedure. It can help surgeons to get an idea of the potential difficulty to be faced in that particular patient. The most valuable assessment the ultrasound can provide is gallbladder wall thickness, gallbladder size, common bile duct diameter, common bile duct stones, and any abnormal anatomy of the biliary tract, if present.

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