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Original Research Article

Role of gallbladder wall thickness in predicting laparoscopic operability prior to cholecystectomy: a retrospective analysis

Saurabh Agrawal, Priyank Pathak*, Rihan Zaidi

Department of Surgery, Swami Rama Himalayan University, Jollygrant, Dehradun, Uttarakhand, India

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***Correspondence:**
Dr. Priyank Pathak,
E-mail: priyank56pathak@yahoo.co.in

ABSTRACT

Background: Laparoscopic cholecystectomy is the gold standard procedure for cholecystitis. There are variable rates of conversion of laparoscopic cholecystectomy to open cholecystectomy. Various studies have highlighted gall bladder wall thickness of > 3mm as an independent risk factor for conversion. The purpose of our study is to predict the feasibility of cholecystectomy laparoscopically bases on the pre-operative ultrasound guided measurement of gall bladder wall thickness.
Methods: It is a retrospective study conducted in the Department of Surgery, Himalayan Institute of Medical Sciences (HIMS) from June 2016 to September 2017. Patient's pre-operative complete haemogram, liver function tests were also analyzed. Gallbladder wall thickness was estimated by using the maximal obtainable measurement at the fundus. A thin gallbladder wall was less than 3 mm in diameter. A thick gallbladder wall was 3 mm or greater in diameter.
Results: A total of 192 patients were included in this study. Most of the patients were of the age group between 30-40 years, with average age of 37 years and 70% of the patients were females. Out of 192, 176 patients underwent laparoscopic cholecystectomy and 16 patients required conversion to open surgery. Ninety patients (46.8%) had cholecystectomy for acute cholecystitis and one hundred two patients (53.15%) had cholecystectomy for chronic cholecystitis. The gallbladder wall was found to be greater than 3 mm in 23 patients (25.5%) with acute calculous cholecystitis and greater than 3 mm in 25 patients (24.5%) with chronic calculous cholecystitis. Forty-eight patients, out of a total of 192, had a gallbladder wall thickness greater than 3 mm by preoperative sonography and 16 of these patients (33.3%) required conversion to an open cholecystectomy.
Conclusions: Gall bladder wall thickness bases on ultrasound is a good predictor for difficult cholecystectomy and conversion to open surgery.

Keywords: Laparoscopic cholecystectomy, Ultrasound gall bladder wall thickness

INTRODUCTION

Gallbladder-related disease is now one of the commonest indications for elective and emergency surgery. Laparoscopic cholecystectomy (LC) was first developed in Europe in the mid-1980s as an alternative to open cholecystectomy, a procedure that had been performed for more than a century and is now the treatment of choice for gall bladder pathology.[1] Laparoscopic Cholecystectomy has advantages when compared to laparotomy, such as reducing the length of hospital stay, incidence and intensity of pain in the postoperative period, better aesthetic effects and minor surgical trauma.[2] However there are still 3.6 to 13.9 percent conversion rates in local and international studies and in a number of studies gall bladder wall thickness more than

3mm on ultrasound, has been shown to have a positive relation with an increased conversion rate to open cholecystectomy.[3,4] Presently in our settings, ultrasonography is the modality of choice for measuring gall bladder wall thickness because it is economical, easily available and noninvasive with accuracy of 92%.[5]

Dinkel et al revealed the gallbladder wall thickening is the most sensitive indicator of technical difficulties during LC.[6] Measurement of the thickness of the gallbladder wall by ultrasound is accurate to within 1 mm in 93% of patients.[7]

The purpose of the present study was to determine the value of pre-operative (pre-op) US measurement of GB wall thickness in predicting the success of LC and also to find frequency of conversion to open procedure in patients undergoing laparoscopic cholecystectomy with a gall bladder wall thickness of more than 3 mm as determined on pre-operative ultrasound.

METHODS

It is a retrospective study conducted in the Department of Surgery, Himalayan Institute of Medical Sciences (HIMS), Swami Ram Nagar, Dehradun from June 2016 to September 2017. All patients with symptomatic gallstone disease were included in the study. Patients with common bile duct stones (CBD stones) or any other CBD pathology, jaundice, or abnormal liver function tests (LFT), and patients who had undergone previous abdominal operations (upper abdominal) were excluded from the study. Patient's pre-operative complete haemogram, liver function tests were also analyzed.

Preoperative ultrasonography was performed a day before the surgery or if the patient had an ultrasound report performed within last one week were included; any ultrasonography done before that was not taken into account and a repeat scan was done.

During ultrasonography, special emphasis was paid to gallbladder wall thickness. Gallbladder wall thickness was estimated by using the maximal obtainable measurement at the fundus. A thin gallbladder wall was less than 3 mm in diameter. A thick gallbladder wall was 3 mm or greater in diameter.

Surgeons at our institution experienced in laparoscopic surgery performed the laparoscopic surgery; therefore, the learning curve statistics do not apply to this study. Conversion to open procedure was taken as the criteria for difficult cholecystectomy due to any reason like bleeding in operative field, dense peritoneal adhesions, adhesions at the Calot's triangle other than anesthetic factors.

RESULTS

A total of 192 patients who underwent laparoscopic cholecystectomy and whose preoperative ultrasonography report could be retrieved were included in this study.

Most of the patients were of the age group between 30-40 years, with average age of 37 years. 70% of the patients were females. Of the 192 consecutive patients who underwent cholecystectomy for symptomatic gallbladder disease, 176 (91.66%) were performed laparoscopically and 16 cases (8.3%) required conversion to open surgery.

Table 1: Total number of cases and their division on basis of USG wall thickness and type of surgery.

Parameters	Total cases	USG wall thickness <3 mm	USG wall thickness > 3 mm	Laparoscopic cholecystectomy	Laparoscopic to open cholecystectomy with USG wall thickness > 3 mm
Acute cholecystitis	90	67	23	82	8
Chronic cholecystitis	102	77	25	94	8

Ninety patients (46.8%) had cholecystectomy for acute cholecystitis and one hundred two patients (53.15%) had cholecystectomy for chronic cholecystitis. There was no case of acalculus cholecystitis. The gallbladder wall was found to be greater than 3 mm in 23 patients (25.5%) with acute calculous cholecystitis and greater than 3 mm in 25 patients (24.5%) with chronic calculous cholecystitis.

Forty-eight patients, out of a total of 192, had a gallbladder wall thickness greater than 3 mm by preoperative ultrasound and 16 of these patients (33.3%) required conversion to an open cholecystectomy, 8 patients had acute cholecystitis and 8 patients had chronic cholecystitis (Table 1).

DISCUSSION

Within a short span of time since its introduction, laparoscopic cholecystectomy has become widely accepted as the procedure of choice for symptomatic gall bladder disease and now the surgeons have started taking up more complex and difficult cases.[8] LC being the gold standard treatment of symptomatic cholelithiasis and it being performed increasingly in short-stay or outpatient settings. Prediction of the risk of conversion is an

important aspect in the planning for surgery, as it will concomitantly prolong hospital recovery and increase the cost and hospital stay for the patient.

Also, it may benefit patients because they can be informed of the possibility of complications and it will mentally prepare the patient and patient can adjust his or her expectations accordingly. Additionally, the surgeon can directly perform the classical open cholecystectomy in the patients with presumed difficult surgery thus saving operating time and the conversion rate. Many studies have been published with a scoring system to predict difficult LC, but most of them are complex, use large number of determining factors, and they are difficult to use in day today practice and many of these scoring systems cannot be applied preoperatively.[9]

Lots of studies have been published in the Western literature on the predictive use of ultrasonography, but little data exist about Indian patients. In the present study, the conversion rate in patients with GB wall thickness> 3mm was around 33.3% which is similar to reported in multiple other studies in which the conversion rate of various studies ranges from 1.5% to 35.[10-13] Dinkel et al studied that sensitivity, specificity, positive predictive value and accuracy of wall thickening as an indicator of technical difficulties were 66.7%, 94.1%, 84.2%, and 85.3% respectively.[6] Lal et al, found that the positive predictive value of ultrasonography for predicting difficult laparoscopic cholecystectomy was 80.95% and the positive predictive value for predicting conversion to open cholecystectomy was 61.90%.[14]

In healthy population, 97% of individuals have GB wall thickness <2 mm.[15] Thickened GB wall at preoperative US is a sign of present inflammation or fibrosis due to cholecystitis. Jantsch et al claims that GB wall thickness > 4 mm is a frequent finding in AC.[16]

Thickened GB wall was identified as a risk factor in LC to OC conversion in almost many studies and Fried et al and Corr et al also concluded that GB wall which is 3 mm and thicker significantly makes more difficult dissection of GB.[17,18] In the present study, ultrasonography has proven to be a reliable and accurate diagnostic examination for biliary tract disease. In our study, we found a good correlation between gallbladder wall thicknesses with conversion to the open procedure.

CONCLUSION

Preoperative ultrasonography should be used as an investigation procedure and is mandatory. Gall bladder wall thickness based on ultrasound is a good predictor of conversion to open surgery. It can help the surgeon to get an idea of potential difficulty that he can face in the particular patient. We expect to study more patients and more parameters, including others clinical and laboratory data, for a better evaluation of the several factors which could predict conversion of laparoscopic cholecystectomy to open cholecystectomy.

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REFERENCES

1. Keulemans YC, Venneman NG, Gouma DJ. New strategies for the treatment of gallstone disease. Scand J Gastroenterol. 2002;236:87-90.
2. Keus F, Gooszen HG, van Laarhoven CJ. Open, small-incision, or laparoscopic cholecystectomy for patients with symptomatic cholecystolithiasis. An overview of Cochrane hepato-biliary group reviews. Cochrane Database Syst Rev. 2010;20(1):CD008318.
3. Lo CM, Fan S, Liu Cl, Lai E, Wong J. Early decision for conversion of Laparoscopic to open cholecystectomy for treatment of acute cholecystitis. Am J Surg. 1997;173(6):513-7.
4. Saleh M, Salammah A. Outcome of Laparoscopic cholecystectomy in acute cholecystitis J Coll Physicians Surg Pak. 2005;17(7):400-3.
5. Handler SJ. Ultrasound of gallbladder wall thickening and its relation to cholecystitis Am J Roentgenol. 1979;132(4):581-5.
6. Dinkel HP, Kraus S, Heimbucher J. Sonography for selecting candidates for laparoscopic cholecystectomy: a prospective study. Am J Roentgenol. 2000;174:1433.
7. Leander P, Ekberg O, Almqvist P. Radiology in laparoscopic cholecystectomy. A retrospective study. Acta Radiol. 1994;35:437-41.
8. Cuschieri A. Laparoscopic cholecystectomy. J R Coll Surg Edinb. 1999 Jun;44(3):187-92.
9. Gupta N, Ranjan G, Arora M, Goswami B, Chaudhary P, Kapur A, et al. Validation of a scoring system to predict difficult laparoscopic cholecystectomy. Int J Surg. 2013;11(9):1002-6.
10. Chen RC, Liu MH, Tu HY, Chen WT, Wang CS, Chiang LC, et al. The value of ultrasound measurement of gallbladder wall thickness in predicting laparoscopic operability prior to cholecystectomy. Clin Radiol. 1995;50:570-2.
11. Grace P, Quereshi A, Darzi A, McEntee G, Leahy A, Osborne H, et al. Laparoscopic cholecystectomy: A hundred consecutive cases. Ir Med J. 1991;84:12-4.
12. Cuschieri A, Dubois F, Mouiel J, Mouret P, Becker H, Buess G, et al. The European experience with laparoscopic cholecystectomy. Am J Surg. 1991;161:385-7.
13. Dubois F, Berthelot G, Levard H. Laparoscopic cholecystectomy: Historic perspective and personal experience. Surg Laparosc Endosc. 1991;1:52-7.
14. Lal P, Agarwal PN, Malik VK, Chakravarti AL. A difficult laparoscopic cholecystectomy that requires

conversion to open procedure can be predicted by preoperative ultrasonography. JSLS. 2002;6:59-63.
15. Engel JM, Deitch EA, Sikkema W. Gallbladder wall thickness: sonographic accuracy and relation to disease. AJR. 1980;134:907-9.
16. Jantsch H, Lechner G, Fezoulidis I, Frank W, Pichler W, Urbanek A, et al. Sonography of acute cholecystitis: Report on 58 cases with correlation to pathomorphological histological findings. Fortschr Geb Röntgen X-Ray Nuclear Med. 1987;147:171-6.
17. Fried GM, Barkun JS, Sigman HH, Joseph L, Clas D, Garzon J, et al. Factors determining conversion to laparotomy in patients undergoing laparoscopic cholecystectomy. Am J Surg. 1994;167:35-41
18. Corr P, Tate JJ, Lau WY, Dawson JW, Li AK. Preoperative ultrasound to predict technical difficulties and complications of laparoscopic cholecystectomy. Am J Surg. 1994;168:54-6.

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