

ROLE OF GALLBLADDER WALL THICKNESS IN PREDICTING LAPAROSCOPIC OPERABILITY PRIOR TO CHOLECYSTECTOMY: A PROSPECTIVE ANALYSIS

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Abstract

Gallbladder-related disease is now one of the commonest indications for elective and emergency surgery. Laparoscopic cholecystectomy was developed as an alternative to open cholecystectomy, which was in practice for more than a century and is now the treatment of choice for gall bladder pathology. This is a prospective study conducted in the Departments of Surgery and Radiodiagnosis, Mata Gujri Memorial Medical College, Kishanganj from April 2022 to April 2023. All patients with symptomatic gallstone disease were included in the study. Pre-operative clinical and ultrasonographic criterias were correlated with the intraoperative difficulties encountered. Out of the 185 patients who were involved in the study 168 cases were performed laparoscopically and 17 cases required conversions to open surgery. Forty-eight patients, out of a total of 185, had a gallbladder wall thickness greater than 3 mm by preoperative ultrasound and 17 of these patients (36%) required conversion to an open cholecystectomy, 8 patients had acute cholecystitis and 8 patients had chronic cholecystitis. Laparoscopic Cholecystectomy reduces the length of hospital stay, intensity of pain in the postoperative period and has better aesthetic effects.

INTRODUCTION

Biliary diseases constitute a major portion of digestive tract disorders. Among these gall stone disease is the most common biliary pathology.^[1] Prevalence of gallstones in India has been estimated to be around 3-5%. Philip Mouret, in France firstly introduced laparoscopic cholecystectomy in 1987, since then minimal invasive surgery still evolving. It has rapidly replaced open cholecystectomy as the standard treatment.^[2] Laparoscopic cholecystectomy is considered as the treatment of choice in cholelithiasis. Ultrasonography is the initial imaging method for diagnostic approach and evaluation of the biliary system, as it is widely available, noninvasive, safe, innocuous and non-expensive. Ultrasonography has been able to reliably detect gall stones in greater than 90 percent of symptomatic patients and the measurement of the thickness of the gallbladder wall by ultrasound is accurate to within one mm in 93 % of patients.^[3] There are 0 to 20 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.

MATERIALS AND METHODS

This is a prospective clinical study that was conducted in the Department of Surgery and Department of Radiodiagnosis at Mata Gujri Memorial Medical College and Lions Seva Kendra, Kishanganj, Bihar, India, between first of April 2022 and thirteenth of April 2023. One hundred eighty five (185) patients were included in this study. We collected the data from patient's files including age, sex, history of illness and operative notes. Preoperative ultrasonography reports which were performed with GE Voluson S10 were included.

Inclusion Criteria

All patients (aged- 18 to 70 years) with features of chronic calculous cholecystitis, electively prepared for laparoscopic cholecystectomy, were included in this study.

Exclusion Criteria

Patients who had previous upper abdominal surgeries

Pregnant patients
 Patients with Carcinoma of Gall bladder and common bile duct stones.
 Patients with features of acute cholecystitis (clinically and investigations)
 Patients with extreme obesity (BMI>30Kg/m2)

- All patients were evaluated by-
 - Hematological and biochemical investigations like CBC, Blood Sugar, Liver Function Test, Kidney Function Test, Bleeding Profiles, ESR.
 - Sonography of the biliary system, done by the same radiologist, after keeping the patient on fast for atleast 8 hours. The wall of gallbladder was carefully evaluated and is considered as thick when its thickness is greater than 3 mm. These sonographic findings were re-verified by the surgeon in the operating room. All patients underwent laparoscopic cholecystectomy which was done using closed method with 4 ports.
- The difficulty in procedures which resulted into conversions were one or more of the following-
 - Adhesions involving the Calot's triangle
 - Excessive bleeding from gallbladder bed while dissection.

RESULTS

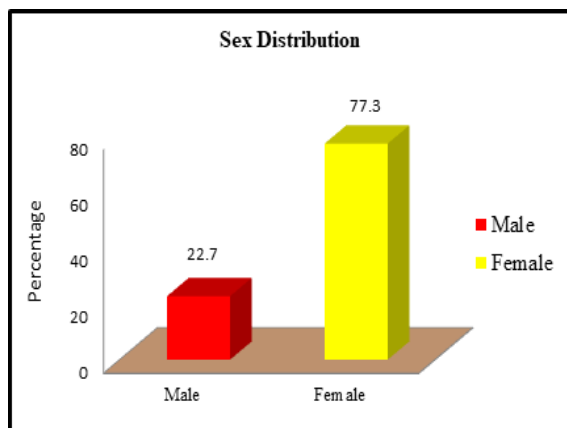


Figure 1: Distribution of study population according to the gender

There were a total of 185 cases included in the study. Of these, 42 cases were male, (22.7%). and 143 cases were female, (77.3%). The male female ratio was 1: 3.40.

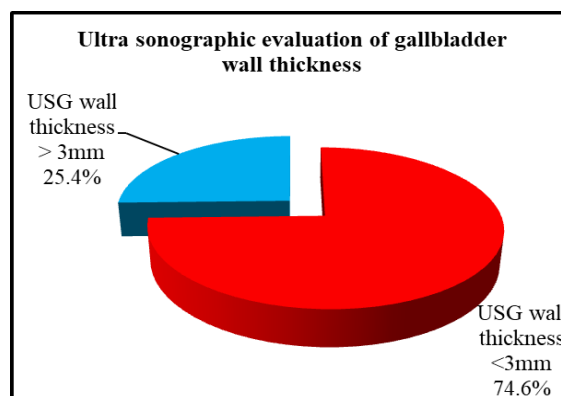


Figure 2: Burden perceived by care giver

According to the figure, out of the total number of cases evaluated, 138 cases (74.6%) had a gallbladder wall thickness less than 3mm, while 47 cases (25.4%) had a gallbladder wall thickness greater than 3mm.



Figure 3: Gall bladder with thickened wall greater than 3mm

Table 1: Association of the gall bladder wall thickness and type of surgery

Type	USG wall thickness < 3mm	USG wall thickness > 3mm
Laparoscopic cholecystectomy	138 (100%)	30(63.8%)
Laparoscopic to open cholecystectomy	0	17(36.2%)
Total	138(75%)	47(25%)

- In the “Laparoscopic cholecystectomy” group, out of the total 138 cases, all cases (100%) had a gallbladder wall thickness below 3mm.
- In the “Laparoscopic to open cholecystectomy” group, out of the total 47 cases which had wall thickness more than 3 mm, 17 cases warranted conversion.
- In the overall dataset of 185 cases, 138 cases (74.6%) had a gallbladder wall thickness below 3mm, while 47 cases (25.4%) had a wall thickness exceeding 3mm.

Table 2: Significance of gallbladder wall thickness measured by ultrasound in prediction of conversion from laparoscopic to open cholecystectomy

Test	Present	No	Absent	No	Total
Positive	True positive	a=30	False positive	c=0	a+b=30
Negative	False negative	b=17	True negative	d=138	c+d=155
Total		a+b=47		c+d=138	185

Statistic	Value	95% CI
Sensitivity	63.83%	48.52% to 77.33%
Specificity	100.00%	97.36% to 100.00%
Positive Likelihood Ratio		
Negative Likelihood Ratio	0.36	0.25 to 0.53
Disease prevalence (*)	25.41%	19.30% to 32.31%
Positive Predictive Value (*)	100.00%	88.43% to 100.00%
Negative Predictive Value (*)	89.03%	83.02% to 93.48%
Accuracy (*)	90.81%	85.70% to 94.56%

The sensitivity was 63.83%, Specificity was 100% and Accuracy was 90.81%.

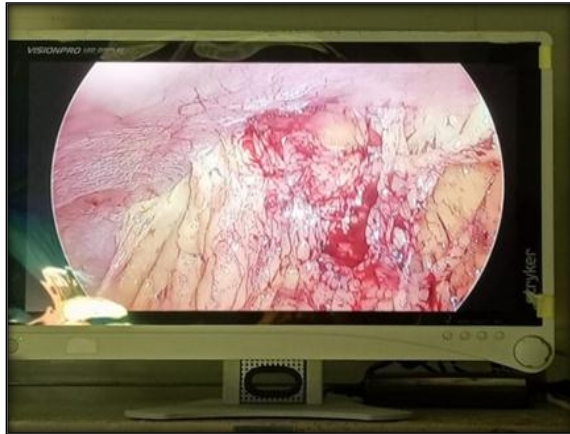


Figure 4: Adhesions encountered Intra-operatively leading to conversion of laparoscopic cholecystectomy into open surgery

DISCUSSION

Laparoscopic cholecystectomy has become the gold standard for the treatment of symptomatic gall stone.^[3] Gallbladder wall thickness on pre-operative ultrasound is an indicator of the presence of inflammation or fibrosis due to previous attacks of cholecystitis. Conversion from a laparoscopic cholecystectomy to an open cholecystectomy is an intraoperative decision by the laparoscopic surgeon when visualization and identification of the operative anatomy is impaired by dense adhesions, edema, fibrosis or anatomical variants such as short cystic duct or an intrahepatic gall bladder.^[4] In this study, gall bladder wall thickness significantly determines the difficulty during surgery and resulting into higher conversion rates. We found that an increased gallbladder wall thickness, greater than 3mm in 47 patients resulted in conversion into open in 17 patients. A study by Mumtaz K. Hanna et al 9 found that 512 patients (37.92%) from 1350 patients had increased gallbladder wall thickness >3mm, 22 Patients (4.3%) of them converted to open cholecystectomy.^[5] A study by Pawan et al 10, found that 24 patients (32.88%) out of 73 patients had difficulty in laparoscopic surgery and 17 of them (23.28%) were converted to open surgery.^[3]

These studies encountered lower conversion rates than our study because of the differential expertise of the operating surgeon. The higher conversion rates in our study could be due to the numerous attacks of acute cholecystitis that the patients

suffered before reporting to the hospital which is the trend generally in rural India.

Thickened gallbladder wall was identified as a risk factor for difficult laparoscopic cholecystectomy in many studies and Sharma et al also concluded that gallbladder wall which is 3 mm and thicker significantly makes more difficult dissection of gallbladder.

CONCLUSION

Meticulous preoperative diagnostic technique is mandatory to provide information for a rational selection of the most effective treatment for cholelithiasis and to avoid intraoperative difficulty and surprise. Presently in our settings, ultrasonography is the modality of choice for measuring gall bladder wall thickness because it is economical, easily available and non-invasive with accuracy of 92%. The conversion of laparoscopic cholecystectomy to open cholecystectomy is not an implosion but to obviate complications which has to be kept in mind by the surgeon.

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