

A Retrospective Study to Determine the Thickness of the Gallbladder Wall and its Outcomes on Patients Undergoing Laparoscopic Cholecystectomy

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Abstract: ***Background:** Elective laparoscopic cholecystectomy (LC) has replaced open cholecystectomy as the gold standard for treating symptomatic gallstone disease. With the advent of this procedure has led to smaller incision, less pain and shorter hospitalisation. USG scan provides a decent anatomical information and therefore is indicated for a decent anatomical delineation. Despite the fact that such a finding is seen in a variety of different medical disorders, gallbladder wall thickening is a common finding and has attracted significant study because it is thought to be a defining feature of acute cholecystitis. The aim of this study was to evaluate preoperative gall bladder wall thickness by ultrasonography and assess its impact on the outcome of laparoscopic cholecystectomy, including conversion rate, operative time, and postoperative hospital stay. **Materials and Methods:** The study was approved by institutional ethical committee. We retrospectively analysed the thickness of gall bladder wall with usg reports and the postoperative period of 107 patients who underwent Laparoscopic Cholecystectomy from april 2023 to april 2024 in RL JALAPPA hospital. All the patients who underwent laparoscopic Cholecystectomy for gall stone disease were included. gall bladder malignancies and perforation were excluded. **Results:** In patients with gall bladder wall thickness more than 5mm there was a conversion rate of 6.54%, significantly prolonged intraoperative period and prolonged hospital stay when compared to patients with gall bladder wall thickness less than 5mm. **Conclusion:** Based on this study, we infer that gall bladder wall thickness is one of the indicator for increased conversion rate, increased intraoperative time and postoperative hospital stay.*

Keywords: Laparoscopic cholecystectomy, USG, Gallbladder wall thickness, Conversion rate, intraoperative time, postoperative hospital stay.

1. Introduction

Cholelithiasis, commonly known as gallstones, is a condition characterized by the formation of solid particles or calculi within the gallbladder. Gallstones can vary in size and composition, with the most common types being cholesterol stones and pigment stones.¹

The formation of gallstones is often attributed to an imbalance in the substances that make up bile, such as cholesterol, bile salts, and bilirubin. Factors that increase the risk of developing gallstones include obesity, rapid weight loss, certain medical conditions such as diabetes and cirrhosis, and a family history of gallstones.²

Many people with gallstones may not experience any symptoms and may only discover their presence during routine medical exams or imaging tests. However, when gallstones obstruct the flow of bile from the gallbladder, they can cause symptoms such as sudden and intense pain in the upper right abdomen, nausea, vomiting, and jaundice.³

Treatment for cholelithiasis depends on the presence and severity of symptoms. Options range from watchful waiting and dietary changes to medications aimed at dissolving

gallstones. In cases where gallstones cause recurrent pain or complications such as cholecystitis or blockage of the bile ducts, cholecystectomy may be recommended.⁴

Cholecystectomy is one of the most common surgeries performed worldwide and is typically recommended when conservative treatments fail to alleviate symptoms or when there are complications such as infection or gallbladder perforation. This procedure can be performed through traditional open surgery or laparoscopically, which involves smaller incisions and generally results in quicker recovery times and less post-operative pain.⁵

USG is highly effective in visualizing gallstones within the gallbladder. Gallstones appear as bright, echogenic (reflective) structures within the gallbladder on the ultrasound image. The size, number, and location of the stones can be accurately assessed. It allows clinicians to evaluate the gallbladder wall thickness, which can indicate inflammation.⁶

2. Objectives

To evaluate the preoperative gall bladder wall thickness using a USG scan and determine the effects of gall bladder thickness on laparoscopic cholecystectomy for outcomes

Volume 13 Issue 7, July 2024

Fully Refereed | Open Access | Double Blind Peer Reviewed Journal

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such as conversion rate, operational time, and postoperative hospital stay.

3. Methodology

Study Design, Sample Size and Source of Data:

The study was approved by institutional ethical committee. We retrospectively analysed the thickness of gall bladder wall with usg reports and the postoperative period of 107 patients who underwent Laparoscopic Cholecystectomy from april 2023 to april 2024 in RL JALAPPA hospital.

Inclusion Criteria:

All the patients who underwent laparoscopic Cholecystectomy in RLJH within the time period for gall stone disease were included in the study.

Exclusion Criteria:

- Gall bladder neoplasm
- Gall bladder polyp
- Cholangitis
- Perforated gall bladder
- Choledocholithiasis

Data Collection:

After obtaining the ethical clearance for the retrospective study, all patients who underwent laparoscopic cholecystectomy in R. L. Jalappa Hospital, Tamaka were included. Data was collected retrospectively from prospectively maintained hospital database. Information was taken from medical record department. All variables needed for the study were recorded.

Statistical Analysis:

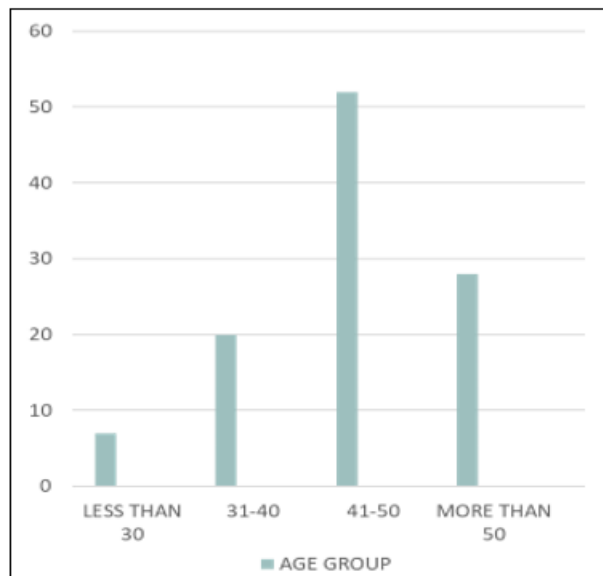
After collecting, the Data were compiled using Microsoft excel and analysis was done using SPSS software version 16. All continuous variables were represented as Mean and standard deviation and categorical variables were expressed percentages and proportions. The test of significance was unpaired (independent) test. The test was considered significant if p value was <0.05 for 95 % confidence intervals.

4. Results

Age Distribution:

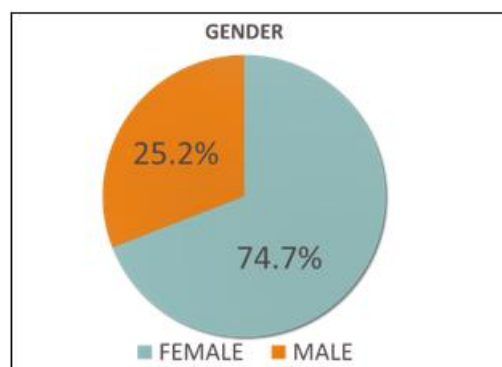
Based on the study analysis maximum number of gall stone patient were of the age group - 41 - 49 followed by age group more than 50.

Mean age was 45.4, with standard deviation 16.27



Gender Distribution:

In this study, there were 80 females and 27 males.



Gall Bladder Wall Thickness:

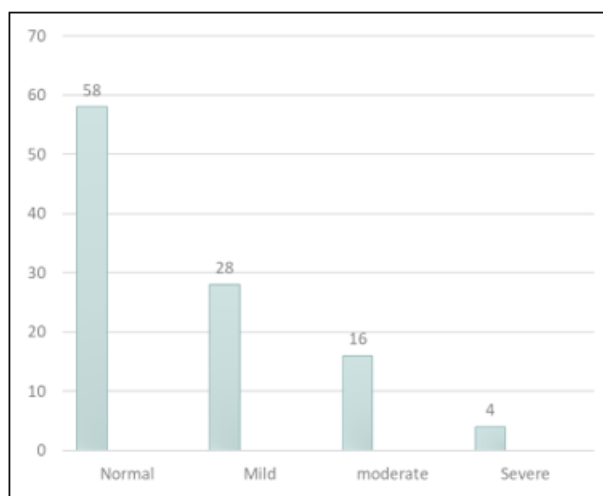
study was conducted based on the following findings in the plain USG scan

Normal thickness (up to 2 mm)

Mildly thickened (>2 to 4 mm)

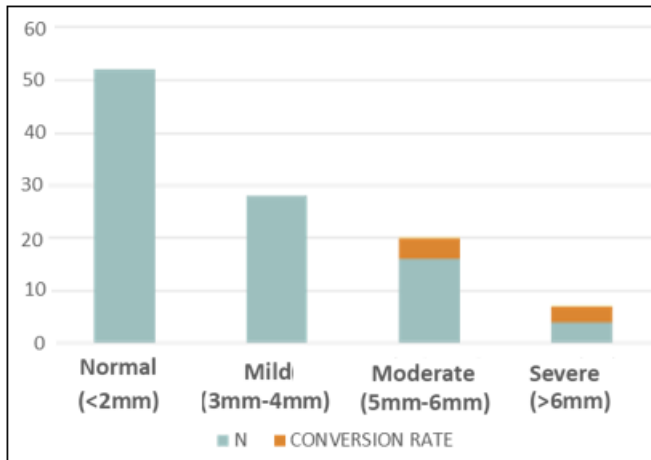
Moderately thickened (>4 to 6mm)

Severely thickened (>6 mm)



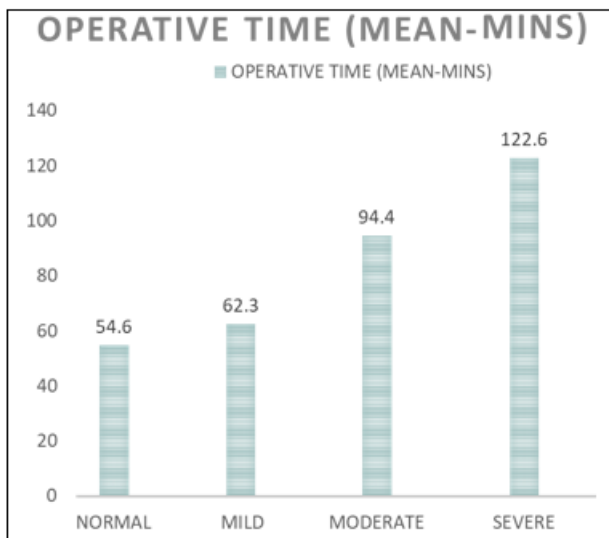
Conversion Rates:

Gall Bladder Wall Thickness	Total No.	Conversion Rate	p Value
Normal (<2mm)	52	0	0
Mild (3mm- 4mm)	28	0	0
Moderate (5mm- 6mm)	16	4	0.0023*
Severe (>6mm)	4	3	0.0001*



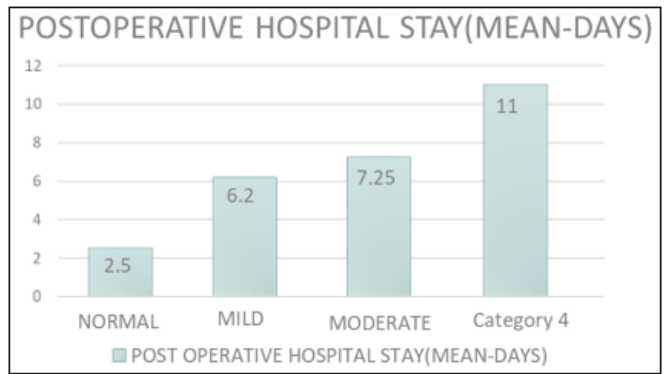
Mean Operative Time:

- Severe group - 122.6minutes
 - Moderate group - 94.4 minutes
 - Mild group - 62.3 minutes
 - normal group - 54.6 minutes
- p value of 0.0043 – significant



Post Operative Hospital Stay:

Mean duration of hospital stay was 2.5 days in normal thickness group, 6.2 days in mild thickness group and 7.25 days in moderate thickness group and in 11 days severe thickness group.
p value of 0.001 – significant



5. Discussion

According to this study, the thicker the gallbladder wall, higher the chances of conversion of laparoscopic to open surgery. Similarly it lengthens the surgical time as well as the total duration of hospital stay.

According to this study conversion rate from lap to open is 4.40% compared to other author study which was 5 - 10% conducted by Chandra et al.7

In this study, 48% of the patients had thicker gallbladder wall and favorable association was seen between gallbladder wall thickness in apposition to conversion rate, intraoperative time, and postoperative hospital stay.

6. Conclusion

Based on this study, we infer that gall bladder wall thickness is one of the indicator for:

- increased conversion rate
- increased intraoperative time
- postoperative time

Limitations:

- Retrospective study
- Less sample size
- Multiple surgeons
- Different approach to surgery

Declarations

Funding: None
Conflict of interest: None
Ethical approval: Taken

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