Original Research Article

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Study of the degree of gall bladder wall thickness and its impact on outcomes following laparoscopic cholecystectomy in JSS Hospital

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ABSTRACT

Background: Elective laparoscopic cholecystectomy (LC) is presently the gold standard for management of symptomatic gall stone disease, replacing open cholecystectomy. The objective of this study was to measure gall bladder wall thickness preoperatively on ultrasound in patients with symptomatic gallstone disease and to establish its role as a prognostic indicator for complications during or following laparoscopic cholecystectomy.

Methods: Gall bladder wall thickness was measured by ultrasonography in 151 patients who presented with Gallstone disease and underwent laparoscopic cholecystectomy for gallstone disease in the JSS Hospital in the given time period. They were then divided into 4 groups depending upon the wall thickness. Normal (upto 2 mm), mildly thickened (>2 to 4 mm), moderately thickened (>4 to 6mm), severely thickened (>6 mm). The incidence of intra and post-operative complications were monitored and compared between the four groups.

Results: The incidence of complications was found to be significantly higher in patients with mildly and moderately thickened gall bladder walls (53.1% and 83.3% respectively) as compared to gall bladders with normal wall thickness (10.5%). Average postoperative length of stay in hospital was significantly higher in patients with thickened walls as compared to patients with normal thickness.

Conclusions: With wall thickness of greater than 2 mm, the complication and conversion rates are extremely high. An increase in the thickness of the gall bladder wall leads to an increased risk of complications and conversions as well as an increased length of stay in hospital post operatively. Patients with thickened gall bladder walls accounted for only 30% of the study population but they experienced the maximum number of complications (72.5%) and conversions to open (71.4%).

Keywords: Gall bladder thickness, Gall stone disease, Laparoscopic cholecystectomy, Prognosis, Ultrasound

INTRODUCTION

Elective laparoscopic cholecystectomy (LC) is presently the gold standard for management of symptomatic gall stone disease, replacing open cholecystectomy. Following laparoscopic cholecystectomy, patients usually recover faster, have a shorter length of stay post operatively and have minimal wound related morbidity. Abdominal ultrasound has become the procedure of choice for documenting gallstones and is also useful in identification of associated biliary dilatation when

present. Diseases of the GB are regularly diagnosed by USG because it is superficial in location with no overlying bowel gas. Gallbladder wall thickening is a frequent sonographic finding and has been subject of great interest for being considered as a hallmark feature of acute cholecystitis, despite the fact that such a finding is observed in a number of other medical conditions. A small yet significant proportion of patients undergo conversion to an open procedure and complications such as bile duct injuries, haemorrhage, etc. which increases morbidity. Prediction of conversions and complications is

important for the management of patient's expectations as well as surgeon preparedness. In this study, we are attempting to establish gall bladder wall thickness as a possible preoperative marker of complications that may occur during or after laparoscopic cholecystectomy for gallstone disease.

METHODS

The study was conducted amongst eligible people taken up for laparoscopic cholecystectomy for gallstone disease in JSS Hospital Mysore. Present study was a prospective study carried out on 151 cases which were divided into four groups depending upon the thickness of the gall bladder wall.

- Normal thickness (up to 2 mm)
- Mildly thickened (>2 to 4 mm)
- Moderately thickened (>4 to 6 mm)
- Severely thickened (>6 mm)

Inclusion criteria

Patients undergoing laparoscopic cholecystectomy for gallstone disease in JSS Hospital during the study period.

Exclusion criteria

- Any GB neoplasm, polyp
- All patients in whom USG images are not available
- All patients in whom GB wall thickness cannot be measured
- All patients having cholelithiasis with choledocholelithiasis.

Methodology

All patients presenting with symptoms suggestive of complicated or uncomplicated gallstone disease i.e.

- Pain in the epigastrium and right hypochondrium that exacerbates after eating
- Fever
- Flatulent dyspepsia.

These patients were further evaluated by USG of the abdomen by an experienced sonologist at JSS Hospital. The gall bladder wall thickness was evaluated and recorded in addition to other parameters which suggested gallstone disease (number and size of gallstones, pericholecystic inflammatory fluid etc.)

Those patients in whom the diagnosis was confirmed were advised to undergo surgery provided there was no evidence of choledocholelithiasis. Those willing to undergo surgery were then divided into four groups as described above on the basis of their gall bladder wall thickness. Patients were then planned for surgery either during the same or different hospital admission depending upon their mode of presentation and patient

preference. Upon admission, a detailed history was taken including any co-morbid conditions or prior abdominal surgeries. Their intra operative findings and post-operative course of stay in the hospital were scrutinized keenly. Complications if any were recorded. If any laparoscopic surgery was converted to an open procedure, the same was recorded along with the reason for doing so.

We have broadly divided the complications encountered during and after surgery as follows:

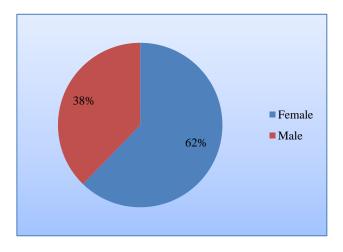
- Adhesions
- Hemorrhage
- Injury to biliary structures
- Bile leak post operatively
- Surgical site infections
- Post-operative cardiac/respiratory complications

The date on which the patient was discharged from the hospital by the attending surgeon was used for calculating the post-operative length of stay in the hospital. Patient was followed up till suture removal which was usually on the tenth post-operative day.

RESULTS

Out of 151 individuals, 94 (62.3%) of the study population were females and 57 (37.7%) were males. The mean age of the study population was 47.1 years with a SD of 13.9 years.

Table 1: Sex distribution of the population.



There were 105 patients (69.5%) in the normal group, 32 patients (21.1%) in the mildly thickened group, 12 patients (7.9%) in the moderately thickened group, and 2 (1.3%) patients in the severely thickened group.

Maximum incidence of conversions seen in moderately thickened group (25%) followed by 6.3 % in mildly thickened group and 1.9% in the normal wall thickness group. No conversions seen in the severely thickened group. This association between increasing wall thickness

and increased incidence of conversion to open was found to be statistically significant.

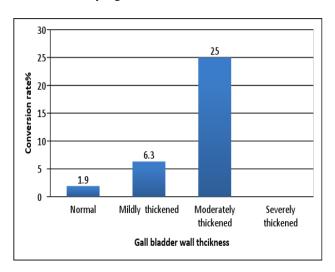


Table 2: Represents the association between degree of gall bladder wall thickness and incidence of conversion to open.

There is a positive association between pre-operative GB wall thickness and post-operative length of stay in hospital. The greater the gall bladder wall thickness the greater the post-operative length of stay in the hospital as indicated by N value of 15.

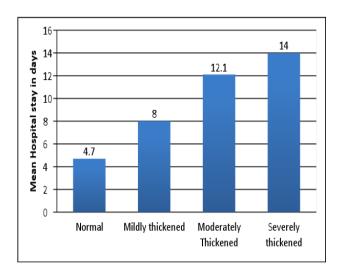


Table 3: Correlation between degree of gall bladder wall thickness and post op length of stay in hospital.

In the normal thickness group, mean post op length of hospital stay was found to be 4.7days. In the mildly thickened group, it was 8 days. In the moderately thickened group, mean post op length of stay was 12.1 days and in patients with severely thickened gall bladders, mean post op length of stay was 14 days. The inference that can be drawn is that greater the degree of GB wall thickness greater is the mean post op length of stay in hospital. This association was found to be highly statistically significant.

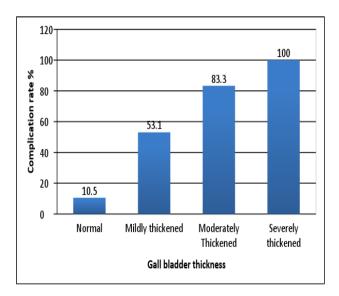


Table 5: Represents an association between degree of gall bladder wall thickness and incidence of complications in the intra and post-operative period.

Complications were seen in a total of 26.4% either intra or post operatively. Maximum incidence seen in the severely thickened group (100%). Complications during or after Lap. Cholecystectomy were encountered in 53.1% of patients in the mildly thickened group. Around 83.3% patients had developed intra or post-operative complications in the moderately thickened group. Only 10.5% patients in the normal thickness group had a complication during or after Lap cholecystectomy. Total incidence of patients with purely post-operative complications were 15.2%. This association was found to be highly statistically significant.

DISCUSSION

Laparoscopic cholecystectomy is one of the most commonly performed minimally invasive surgeries worldwide. Although a majority of them are completed successfully, many still undergo complications and conversion to an open procedure. Identification of the predictive factors for complications and conversion is very important as it would greatly benefit surgeon preparedness as well as the patient's expectations.

As far as demographics were concerned 62.3% of the study population were females and 37.7% were males with a F:M ratio of 1.64:1. This is in contrast to rates reported in literature of 4.36.³ Another study done in Taiwan however showed a F:M ratio of 1.02.⁴

Many factors have been identified in literature which are predictive of difficult laparoscopic cholecystectomy, such as male gender, old age, acute cholecystitis, duration of symptoms before surgery.⁵⁻⁸ None of these studies however, have highlighted the thickness of the gall bladder wall as a particularly important pre-operative predictive factor for a difficult surgery.

There is no real consensus on what is a thickened gall bladder wall.³ The cutoff we have used for the present study is a normal wall thickness of upto 2 mm.

As per the present results, the thicker the gall bladder wall, greater was the risk of intra and post-operative complications, greater is the post-operative length of stay and greater was the conversion rate to an open procedure.

Our conversion rate to an open procedure was 4.63% which was slightly lesser than that reported in literature of 5-10%. The cause for conversion in majority of the cases was distorted anatomy secondary to dense inflammatory adhesions which occurred as a consequence of acute cholecystitis or empyema gall bladder. These inflammatory adhesions precluded a safe dissection which eventually led to conversion to an open procedure.

The complication rate in the present series was found to be 26.4%. This included both intra and post-operative complications The total incidence of post-operative complications was found to be 15.2% which is higher than that reported in literature of 6.6%.³ The majority of post-operative complications were bile leak through the drain. Out of 17 cases having a post-operative bile leak through the drain, around 14 stopped spontaneously within 48-72 hours of surgery. 3 underwent a post op ERCP and stenting. None required a revisional surgery.

Post-operative length of stay was another criterion included in the present study as a measurement of outcome after surgery. The average duration of post op stay in hospital was least in the normal thickness group (4.7 days with an SD of 2.4 days) and maximum in the severely thickened group (14 days with an SD of 5.7). Some of the contributory factors for post-operative morbidity were post-operative pain, ileus, bile leak through the drain and surgical site infection. Another factor which caused a slight delay in discharging the patients was the time taken for approval of various government schemes under who's provisions the patients had been admitted.

There were a few limitations associated with the present study. The Ultrasounds were all not done at the same time. The patients who presented on an emergency basis with acute pain abdomen diagnosed as acute cholecystitis usually had an USG done during the same admission. Some of the elective cases however had an USG report that was done months prior as they waited for an appropriate time/appointment for the procedure. There could have been a change in the gall bladder wall thickness in the intervening time period which remained undocumented. Ultrasonography itself is a highly subjective diagnostic modality with accuracy of reports depending upon the expertise or experience of the radiologist. This is especially so in measuring gallbladder wall thickness, as different regions of the gallbladder may have different thicknesses.

Operating time was not studied as there was bound to be marked variability depending upon the expertise and experience of the operating surgeon. It has however been shown that increased operating time too leads to an increase in the incidence of post-operative complications. ¹⁰

The question could be raised that in an acute setting, it could be considered prudent to wait for inflammation to subside rather than subjecting a patient to an emergent surgery. It is possible that even after this delay these patients would still have worse outcomes, as a result of the high degree of previous inflammation. Majority of the patients who underwent emergent surgery presented within 48 hours of onset of symptoms.

CONCLUSION

In conclusion, an increase in the thickness of the gall bladder wall leads to an increased risk of complications and conversions as well as an increased length of stay in hospital post operatively. Patients with thickened gall bladder walls accounted for only 30% of the study population but they experienced the maximum number of complications (72.5%) and conversions to open (71.4%). Post-operative length of stay in the hospital was also found to be prolonged in patients with thickened gall bladder walls. This is also an important factor as expected length of stay in hospital is a commonly encountered query during pre-operative patient counselling.

Ultrasonography itself is a highly subjective imaging modality and having an experienced sonologist on board can greatly improve accuracy in terms of measurement of wall thickness. With wall thickness of greater than 2 mm, the complication and conversion rates are extremely high. This information is of extreme importance in terms of dealing with the patients' expectations pre-operatively along with a significant role in surgeon preparedness for the procedure. It can also be used to guide discussions with the patients as well to obtain informed consent.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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