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# A Clinical Audit on Sonological Differential Diagnosis in Gall Bladder Wall Thickening

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## HIGHLIGHTS

1. Evaluating sonographic patterns in gallbladderthickening.
2. Audit on diagnostic accuracy for gallbladder thickening.
3. Sonological findings in gallbladder wall diseases.
4. Comparing differential diagnoses in gallbladder thickening.
5. Clinical audit on gallbladder sonology interpretations.

## ARTICLE INFO

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## ABSTRACT

Gallbladder wall thickening is a controversial topic among radiologist for being frequently found and for having been considered, for a long time, a sign highly suggestive acute cholecystitis. Such a concept has been undergoing changes as a result of a greater experience of the professionals involved in imaging diagnosis and the considerable technological development of ultrasonography (US) apparatuses.[1] Ultrasonography is the initial imaging method for diagnostic approach and evaluation of the biliary system, as it is widely available, safe, innocuous and non-expensive.[2] This method allows the detailed realtime study of the gallbladder, besides the evaluation of other findings that contribute to the final diagnosis, thus avoiding unnecessary cholecystectomies and their complications.[3-5] **Objective:** To enumerate the various clinical entities that may cause diffuse thickening of the gallbladder wall on Ultrasonography. **Methods:** A prospective study was conducted among 50 patients of all age and sex with right upper abdominal pain who were advised ultrasound imaging, selected through Simple Random Sampling. A predesigned, pretested, validated checklist was used to collect the required data from medical records of patients during the period of June 2011 – November 2013.Association between variables were estimated with Mc Nemar's test. **Results:** Cholecystitis was found to be the most common cause of GB wall thickening followed by Dengue Viral Infection. The maximum GB wall thickness was found to be 11mm with maximum incidence noted at 5 mm. The incidence of GB wall thickening peaked in two age groups : 40-49 and 60-69 years. **Conclusion;** As the results of the study suggest, secondary causes including type of food, BMi status of the patients, medications for other co-morbidities etc were statistically ssociated with mild thickening (4 -7 mm.) of gallbladder wall. However, primary causes like Cholecystittis, Carcinoma of the Gall bladder etc. were significantly associated with marked thickening og the gall bladder ( > 7mm.) , and with few causes of gall bladder growth showing (11 mm)of wall thickness. Ultrasonography is the method of choice for the study of the gallbladder, with a high sensitivity in the detection of gallbladder wall thickening.

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## INTRODUCTION

Gallbladder wall thickening is a controversial topic among radiologist for being frequently found and for having been considered, for a long time, a sign highly suggestive acute cholecystitis. Such a concept has been undergoing changes as a result of a greater experience of the professionals involved in imaging diagnosis and the considerable technological development of ultrasonography (US) apparatuses[1]. Ultrasonography is the initial imaging method for diagnostic approach and evaluation of the biliary system, as it is widely available, safe, innocuous and non-expensive[2]. This method allows the detailed realtime study of the gallbladder, besides the evaluation of other findings that contribute to the final diagnosis, thus avoiding unnecessary cholecystectomies and their complications[3-5]. Hence this study was undertaken to analyse the various clinical conditions that may be significantly associated with various stages of gall bladder thickening.

## METHODS

A prospective study was conducted among 50 patients of all age and sex with right upper abdominal pain who were advised ultrasound imaging, selected through Simple Random Sampling. Patients who had complaints of Pain Per Abdomen were assessed by a Clinical surgeon and referred to the Radiology Department. Patients were ten screened for gall bladder wall thickening. According to several authors, the upper limit for normality of the gallbladder wall thickness is 3 mm[1,2]. However, in patients under inappropriate fasting, the parietal thickness may exceed such a limit because of the organ's smooth muscle contraction[8]. So, 8-hour fasting before the examination was recommended. Normal size of the gallbladder on ultrasonography is approximately 10 cm in length and 4 cm in width (depending on the amount of bile). Gallbladder wall thickening is classified as mild (between 4 and7 mm), marked (> 7 mm), and in focal or diffuse. A pretested, validated checklist was used to collect the required data from medical records of patients during the period of June 2011 – November 2013. Patients with metabolic disorders were excluded from the study. Sample size was calculated using Cochran's formula based on a study conducted by Pandey M, Sood BP et al published in the Journal of Clinical ultrasound in the year 2000[4]. Simple Random Sampling was done to identify the participants from a total of 139 patients. Informed written consent was taken from the study participants. Cross verification of the data done from the participants through phone and email done whenever deemed necessary.

## ETHICS

The Institutional Ethical Committee has reviewed and approved this study at each stage.

## STATISTICS

All the data was entered into, coded and decoded in MS EXCEL. It was analyzed using SPSS versio 19.0 in which statistical significance was determined with Mc Nemar's test. A p value less than 0.05 was taken as statistically significant.

## RESULTS

In total, details of 50 patients were collected. Among these, majority patients (18 in number) belonged to the age group 60-69 years and 40-49 years. 6 participants were aged less than 18 years. The mean age of peatients taken for this study is 33.05. 67.5% of the study subjects were Males and the remaining were Females. In 54% of the patients, there were no primary causes that lead to Gall Bladder wall thickening. It was only a secondary finding. However, in the remaining 46% cases, there was an identified primary cause that leads to Gall bladder wall thickening. The most common causes of gall Bladder thickening were Cholecystitis (30% cases), Dengue Viral Fever (16% cases) Cirrhosis of the Liver and Pancreatitis (12% cases each) etc. The mean duration of hospital stay of the patients was 10.19 days.

Table 1. Association between Category of GB wall thickening with Primary and Secondary Causes

| **Category** | With Primary Cause | | Secondary Cause | |
|---|---|---|---|---|
| Mild | 08 (66.7%) | 07 (77.8%) | 20 (86.9%) | 03 (50.0%) |
| Moderate | 04 (33.3%) | 02 (22.2%) | 03 (13.1%) | 03 (50.0%) |
| Total | 12 (100.0%) | 09 (100.0%) | 23 (100.0%) | 06 (100.0%) |
| p-value 0.001 | | | | |

The maximum GB wall thickness was found to be 11mm with maximum incidence noted at 5 mm. The incidence of GB wall thickening peaked in two age groups : 40-49 and 60-69 years. Most of the gallbladder wall thicknesses measured were greater in men (72%) than in women (28%). Most of the patients presented with symptoms of vomiting , right upper quadrant abdominal pain or non specific pain and fever. However some of the cases were asymptomatic

| Table 2. Gall Bladder Wall Thickening associatedwith Age & Gender | | | | |
|---|---|---|---|---|
| **Category** | **Age(years)** | | **Gender** | |
| | <18 | ≥18 | Female | Male |
| Mild | 02 (33.3%) | 36 (81.8%) | 24 (70.6%) | 14 (87.5%) |
| Moderate | 04 (66.7%) | 08 (18.2%) | 10 (29.4%) | 02 (12.5%) |
| Total | 06 (100.0%) | 44 (100.0%) | 34 (100.0%) | 16 (100.0%) |
| **Age *p value <0.05*** Sex *p value = 0.331* | | | | |

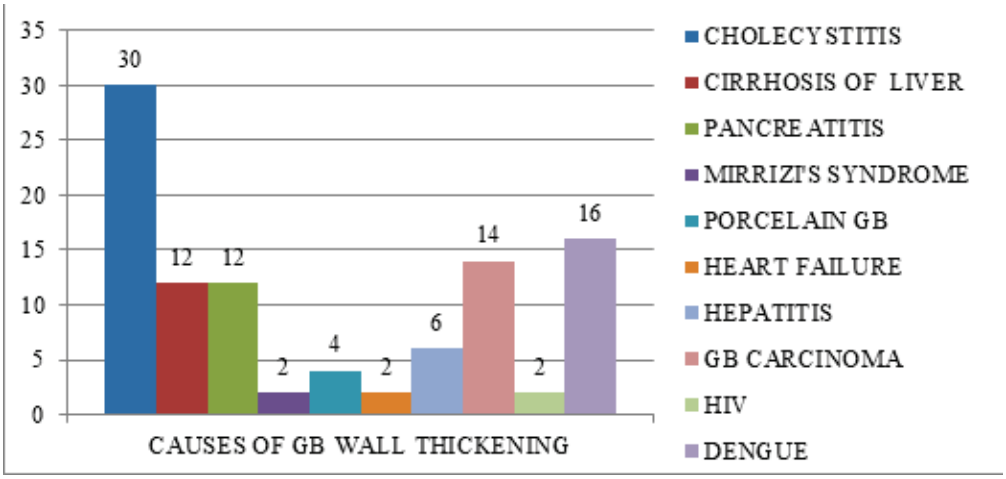


**Figure 1:% Incidence Of Various Causes Of Gall Bladder Wall Thickening (multiple responses recorded)**

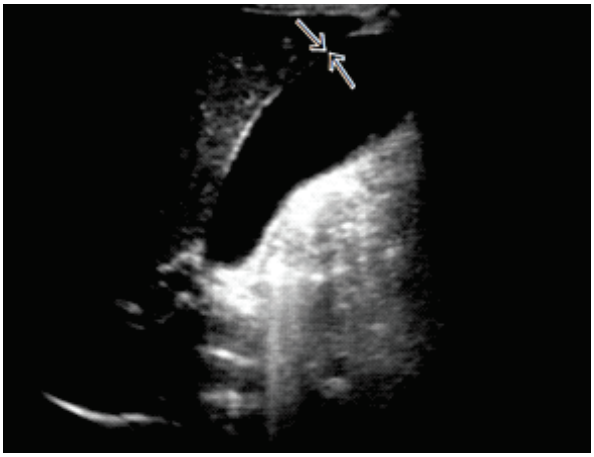

**Figure 2: Longitudinal US image showing site of measurement of gallbladder wall thickness (arrows)**

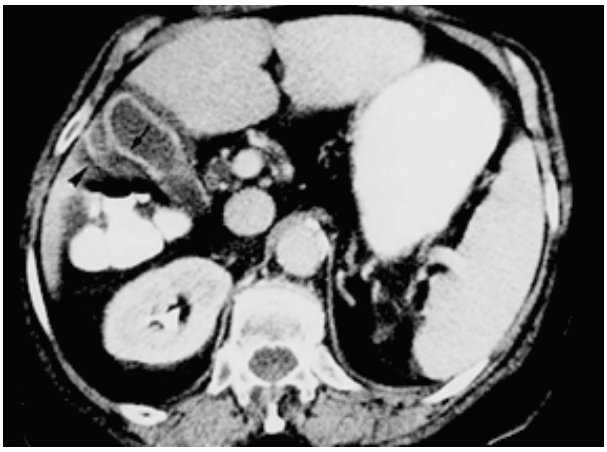

**Figure 3: Contrast enhanced CT shows a "sandwich-like" thickening of the gallbladder wall,**

**DISCUSSION**

In this study, age of the study subjects ranged from 10-89years. The age group of 40-49 years and 60-69 years had the maximum representation (36%) and the age group of 10-19 and 80-89 years had the least representation (10%). It was observed that in this study that 36 (72%) of patients were males and 14 (28%) of patients were females. In this tudy, it was observed that in the current clinical setting of a patient with nonspecific abdominal complaints or symptoms of biliary obstruction, the discovery of a gallbladder or bile duct polyp or mass, gallbladder wall thickening, or biliary stricture is most often indicative of malignancy (14% cases). Pandey M, Sood BP et al J Clin ultrasound 2000;28:227-32 did a study in an attempt to define the sonographic characteristics of gallbladder cancer, their retrospectively analyzed the sonographic findings in 203 cases of gallbladder cancer confirmed by cytology or histopathology. The results of the study was that a mass in the gallbladder and gallbladder wall thickening (> 12 mm) were cardinal sonographic findings of carcinoma.

Ching BH, Yeh BM et al AJR Am J Roentgenol 2007;189:62-6 coducted a study on CT differentiation of adenomyomatosis and gallbladder cancer. The results of this study where that Reviewer 1 detected a morphologic gallbladder abnormality in 17 patients and correctly characterized the abnormality in 14 (82%) of the patients (eight with adenomyomatosis and six with gallbladder cancer). Reviewer 2 detected an abnormality in 18 patients and was correct for 13 (72%) of the patients (eight with adenomyomatosis and five with gallbladder cancer).

In our study, the most common causes of gall Bladder thickening were Cholecystitis (30% cases), Dengue Viral Fever (16% cases)

Cirrhosis of the Liver and Pancreatitis (12% cases each) etc.

A study was conducted Mirvis S E, Vainright J R the results of which revealed that when several imaging procedures were performed over a 6-year period on 56 patients with clinically suspected acute acalculous cholecystitis were evaluated retrospectively, Sonography and CT were both found to be highly sensitive (92% and 100%, respectively) and specific (96% and 100%, respectively). A study was conducted by Parra JA, Acinas O et al to evaluate the sonographic and CT features of Xanthogranulomatous cholecystitis, correlating the pathologic and surgicalfindings. Xanthogranulomatous cholecystitis was pathologically diagnosed in 26 patients from January 1996 to August 1998.

Approximately 64% of the patients presenting with pancreatitis evolve with gallbladder wall thickeningsecondary to extension of the inflammatory process towards locoregional structures[3-5]. Cases of transinfection by hepatitis include diseases such as acquired immune deficiency syndrome (AIDS), dengue and malaria. In patients with AIDS, such finding may be secondary to the utilization of antiretroviral drugs, worsened nutritional status and opportunistic infections of the biliary tract[41].

**CONCLUSION**

• The most common causes of gall Bladder thickening were Cholecystitis, Dengue Viral Fever, Cirrhosis of the Liver and Pancreatitis.

• Ultrasonography is the method of choice for the study of the gallbladder, with a high sensitivity in the detection of gallbladder wall thickening.

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