

Prevalence and Causes of Diffuse Gallbladder Wall Thickening Diagnosed by Ultrasound among Patients at Riyadh Hospitals



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Abstract— The thickening of gall bladder wall can be a sign of a certain disease. The main aim of this study is to determine the prevalence and causes of diffuse gallbladder wall thickening among the patients at Riyadh hospitals. This descriptive study was conducted at three different Riyadh hospitals from 13 January to 28 February 2019. A total of 1206 records with abdominal ultrasound reports that included gall bladder wall thickness in the period of study were reviewed. The following data were obtained in a designed data collection sheet: gall bladder wall thickness, the presence of cholecystitis, extra cholecystitis inflammation, cardiovascular disease, diabetes, liver disease, other systemic diseases, malignancy, and adenomyomatosis. Statistical package for the social sciences (SPSS) program was used for data analysis. The study found that there were 82 patients with diffuse gall bladder wall thickening. So the prevalence of thickening in that period is 6.8%. Cholecystitis is the 1st cause, followed by liver diseases, cardiovascular, diabetes, other systemic diseases, adenomyomatosis, extra cholecystitis inflammation, and malignancy. Thickness is higher for those with the diseases than those without it, except for liver diseases and malignancy. The mean of the gallbladder wall thickness increases significantly for those with cholecystitis (P-value = 0.009). The study concluded that the thickened gallbladder wall is a sign of different diseases that should be considered. Another study with a larger sample size is recommended.

Keywords— Gall bladder wall, Thickness, Diffuse thickening, Ultrasound

1. Introduction

Gallbladder (GB) wall thickening is considered when the wall measures more than 3mm (by ultrasound) [Runner et al., 2014]. It is a frequent finding that can be either associated or not associated with gallbladder disease [Vriesman et al. 2007]. The thickening ranges from mild (between 4-7 mm) and severe (>7mm) [Rodrigues et al. 2011]. Abnormal gallbladder wall measurement allows the right diagnosis to be made and avoid unnecessary cholecystectomy [Vriesman A. et al. 2007].

Diffuse gallbladder wall thickening can be associated with gall bladder diseases like cholecystitis, acute or chronic, calculous or acalculous, gall bladder carcinoma, and adenomyomatosis, or diseases not associated with the gall bladder like congestive heart failure, renal failure, hypoalbuminemia, and other systemic disease [Vriesman A. et al. 2007].

Due to the lack of articles regarding this issue, the study aimed to identify the prevalence and causes of gallbladder wall thickening diagnosed by ultrasound at Riyadh hospitals.

2. Methods

volunteer selection and place of the study

The population included adult patients records who underwent an abdominal ultrasound above 18 years

old, male or female. The study was conducted from 13 January to 28 February 2019 at different hospitals in Riyadh, King Abdullah bin Abdelaziz University Hospital, Prince Mohammed bin Abdelaziz Hospital, and King Fahad Medical City. 1206 patients' records with abdominal ultrasound, including GB wall thickness, were reviewed. The picture archiving and communication system (PACS) was used for retrieving data at the hospitals.

Study design

This descriptive study was approved by the local institutional review board (IRB number: 18-0381). The following data were obtained: GB wall thickness, the presence of cholecystitis, extra cholecystitis inflammation, diabetes, other systematic diseases, liver disease, malignancy, and adenomyomatosis. The data collection sheet contained all the variables of the study. Statistical Package for the Social Sciences (SPSS) version 23 software was used for data analysis. The analysis included descriptive statistics, ANOVA t-test to compare between 3 means, and independent sample T-test to compare between 2 means.

3. Results

In this study, 1206 records of patients were reviewed. 82 patients with diffuse GB wall thickening were found. The prevalence of thickening in the period of 13 January to 28 February 2019 is 6.8%. Figure (1) reveals the distribution of diffuse thickened GB wall causes of cholecystitis.

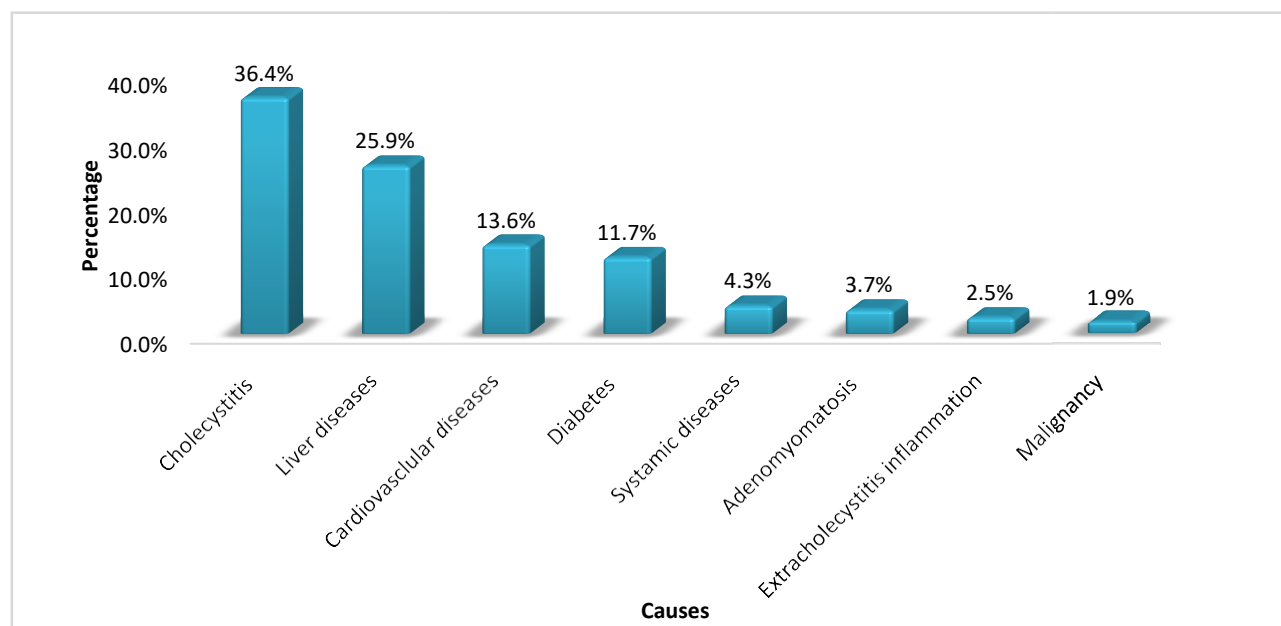


Figure (1): The distribution of thickened GB wall causes

To assess the correlation between the GB wall thickness and causes, ANOVA t-test was used to compare between 3 means regarding cholecystitis, and independent samples T-test to compare between two means regarding other causes of thickening, as shown in table (1).

Table (1): Distribution of GB wall thickness classified by the causes of thickening, the correlation between the GB wall thickening and cholecystitis is significant as indicated by (*)

Cause		No.	Mean \pm StD	P-value
Cholecystitis	Acute	52	6 \pm 1.9	0.009*
	Chronic	7	8.3 \pm 2.6	
	None	23	5.7 \pm 1.7	
Liver diseases	Yes	42	6 \pm 2	0.738
	No	40	6.2 \pm 2	
Cardiovascular diseases	Yes	22	6.7 \pm 2.5	0.089
	No	60	5.9 \pm 1.8	
Diabetes	Yes	19	6.6 \pm 2.4	0.240
	No	63	6 \pm 1.9	
Other systemic diseases	Yes	7	6.3 \pm 2.2	0.799
	No	75	6.1 \pm 2	
Adenomyomatosis	Yes	6	7 \pm 2.7	0.260
	No	76	6 \pm 2	
Extra cholecystitis inflammation	Yes	4	6.5 \pm 3.3	0.687
	No	78	6.1 \pm 2	
Malignancy	Yes	3	4.7 \pm 1.2	0.215
	No	79	6.2 \pm 2	

4. Discussion

Regarding the causes of diffuse GB wall thickening, cholecystitis has the highest frequency, with a percentage of 36.4% [Figure (1)]. According to table (1), patients with highest GB wall thickness have chronic cholecystitis disease, and those with least thickness GB wall don't have this disease. The correlation between thickness and cholecystitis type is significant (P-value= 0.009). This result agrees with a previous study by Runner et al., where their results showed that gallbladder wall thickening is combined with cholecystitis, whether it is acute or chronic [Runner et al. 2014].

This study results showed that liver diseases represent the second cause of thickening [Figure (1)], where GB wall thickness is slightly higher for those without liver disease, as shown in table (1). This result is unexpected, which may be due to other factors. The correlation between thickness and liver disease is not significant (P-value= 0.738). This result is contrary to the study presented by Pathak et al., where they found a significant correlation between liver disease and thickened gallbladder wall [Pathak et al. 2017].

Cardiovascular disease (CVD) is the third cause of thickened gallbladder wall in this study [Figure (1)], where 70% of patients had hypertension, 10% had portal hypertension, and the rest of the patients had ischemic heart failure. The GB wall is thicker among those with CVD with no significant correlation (P-value=0.089). This insignificant correlation might be due to the small sample size. A previous study by Desautels et al. stated that gallbladder wall thickening could be caused by heart failure [Desautels et al.

2015]. Wegener et al. study confirmed the significant increase in the mean gallbladder wall thickness with CVD (P-value less than 0.05) in patients with chronic congestive heart failure [Wegener et al. 1987].

The percentage of patients with gallbladder wall thickening had diabetes mellitus (type 2) is 11.7%, as presented in figure (1), where the GB wall is thicker among diabetic patients than non-diabetic [Table (1)]. This result is compatible with the Noel et al. study that found diabetic patients have a high risk of biliary disease [Noel et al. 2009].

The presented study showed no significant correlation between gallbladder wall thickening and type 2 diabetes based on a P-value of 0.240. This insignificant correlation might be due to the small sample size.

Regarding other systemic diseases, adenomyomatosis, extra cholecystitis inflammatio , and malignancy, the GB walls are slightly thicker than those without the diseases except malignancy. This result may be caused by the small sample size.

5. Conclusion and recommendation

The presence of a thickened gallbladder wall is a sign of various diseases that should be considered. It is recommended that another study should be done with a larger sample size for more accurate results.

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