

Study of Gall bladder contractility in patients of asymptomatic Gall stone

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Abstract

Introduction: The prevalence of gall bladder stone varies widely in different parts of world. Worldwide gall stone disease is increasing. Knowledge of the predictive factors of the development and persistence of symptoms in gall stone patients play a key role in clinical decision making. The aim of this study is to evaluate the presence of predictive factors for biliary pain development in gall stone, stressing the role of gall bladder motility. **Aims and objective:** To study gall bladder contractility in patients of asymptomatic gall stone by ultrasound and to correlate with normal individuals. **Material and methods:** A hospital based observational study was conducted from January 2012 to march 2013. A total of 25 patients with asymptomatic gall stones (group 1) and 25 controls (group 2) were included in the study. **Results:** Ultrasonography volume was found to be significantly more in group 1, both during fasting and after fatty meals, suggesting decreased gall bladder motility in asymptomatic patient. Inter group comparison of gall bladder thickness was statistically significant both during fasting and after fatty meal in group. **Conclusion:** Gall bladder volume was found to be significantly more in asymptomatic cases, both during fasting and after fatty meal. Mean gall bladder wall thickness and mean alkaline phosphatase level was significantly more in patients with gall stones.

Key words: Alkaline phosphatase (ALP), Gall stone disease (GSD), Ultrasonography (USG),

Introduction

The prevalence of gall bladder stone varies widely in different parts of world. Worldwide gall stone disease is increasing [1, 2]. An epidemiological study restricted to rail road workers showed that north Indians have 7 times higher occurrence of gall stone as compared with south Indians [3]. Presence of gall stones detected incidentally in patient who do not have any abdominal symptoms related to gall stone is known as asymptomatic cholelithiasis. The diagnosis is made during routine ultrasound for other abdominal condition.

The consideration of gall bladder motility and further risk factors (small stones, younger age and female gender) may help to predict the clinical course of gall stone patients, define atypical complaints as biliary related and select patients for treatment. Knowledge of the predictive factors of the development and persistence of symptoms in gall stone patients play a key role in clinical decision making. The aim of this

study is to evaluate the presence of predictive factors for biliary pain development in gall stone, stressing the role of gall bladder motility. Gall bladder motility evaluation is a useful diagnostic tool in clinical decision making for gall stone in symptomatic patients; a progressive reduction of gall bladder motility could suggest a “wait and watch” management policy instead of an immediate surgical approach [4]. In this study we compared the effect of presence of gall stone over contractility in case and control group of asymptomatic gall stone patients. Patients with asymptomatic gall stone has less than 20% chances of ever developing symptoms, and the risk associated with prophylactic operation overweigh the potential benefit of surgery in most patients [4,5].

Aims and Objectives

To study gall bladder contractility in patients of asymptomatic gall stone by ultrasound and to correlate with normal individuals. We compared gallbladder volume and wall thickness in patient of asymptomatic cholelithiasis and of normal individuals (control).

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Methodology

A hospital based observational study was conducted from January 2012 to march 2013. A total of 25 patients with asymptomatic gall stones (group 1) and 25 controls (group 2) were included in the study. Consecutive type of convenience sampling was used during the study period to select patients with asymptomatic gall stones.

Inclusion criteria

An ultrasonographic evaluation of fasting gall bladder volume and post-prandial volume was done in all subjects using 3.5 or 5 MHz transducer. The probe was placed on the right subcostal area while the patients were in supine position and angled to obtain images showing largest longitudinal diameter of gall bladder.

The greatest length (L), the greatest width (W) and anteroposterior (H) dimensions and presence of gall stone were recorded. Gall bladder images were obtained after a standard breakfast consisting of egg, milk and pastry (695 kcal, 19.2 gm carbohydrate and 9 gm fat). The gall bladder volume was calculated by ellipsoid ($\pi \times L \times W \times H$).

Results

In our study out of 25 asymptomatic patients 12 were female. The age of the subject ranged from 10–80 years. The mean age in group 1 and group 2 was 48.36 ± 19.15 and 44.28 ± 16.31 years respectively. Age difference was statistically non significant. None of the patient in group 1 had past history of any biliary tract involvement, jaundice, fever, pain or flatulent dyspepsia. In group-1, 13 patients presented with vague abdominal discomfort, 2 with umbilical hernia, 3 with benign hypertrophy of prostate, 5 had renal calculi and 2 patients with appendicitis. None of the patients had symptoms pointing towards biliary tract involvement and were diagnosed with gall stones incidentally during ultrasonography.

Table 1: Intra group comparison of gall bladder wall thickness

Group	Wall thickness in mm	Mean	p-value
Group 1	Fasting	2.41	<0.01
	After fatty meal	2.57	
Group 2	Fasting	2.21	0.95
	After fatty meal	2.23	

There was significant increase in wall thickness in patients with asymptomatic gall stone disease as compared to control. Ultrasonography volume was found to be significantly more in group 1, both during fasting and after fatty meals (21.9 vs 12.9ml and 13.1 vs 4.6 ml), suggesting decreased gall bladder motility in asymptomatic patient [Table 2].

Fasting gall bladder volume is significantly more in group 1 with p-value <0.01 [Table 3]. Intergroup comparison of gall bladder volume was statistically significant (p-value <0.01), with higher volume after fatty meal, in group 1 [Table 4]. Gall bladder wall thickness was more in group 1, both in fasting [Table 3] and after fatty meal [Table 4], with p-value <0.05. Intragroup comparison of gall bladder wall thickness shows that the wall thickness is more in group 1 as compared to group 2 (2.41 vs 2.21 mm and 2.57 vs 2.23 mm) [Table 1].

Table 2: Intra group comparison of ultrasonography volume

Group	Volume in ml	Mean	p-value
Group 1	Fasting	21.9	<0.01
	After fatty meal	13.1	
Group 2	Fasting	12.9	<0.01
	After fatty meal	4.6	

Ultrasonography volume was found to be significantly more in group 1, both during fasting and after fatty meals.

Table 3: Inter-group comparison of gall bladder thickness and ultrasonography volume (fasting)

Overnight fasting	Group	Mean	Standard deviation	P value
Gall bladder thickness	1	2.41	1.62	<0.05
	2	2.21	0.5	
Gall bladder volume	1	21.9	8.9	<0.01
	2	12.9	3.7	

Both volume and wall thickness is significantly higher in group 1 during fasting

Table 4: Inter-group comparison of gall bladder thickness and ultrasonography volume (after fatty meal)

After fatty meal	Group	Mean	Standard deviation	P value
Gall bladder thickness	1	2.57	1.58	<0.05
	2	2.23	0.5	
Gall bladder volume	1	13.1	8.2	<0.01
	2	4.6	2.0	

Both volume and wall thickness is significantly higher in group 1 after fatty meal

Discussion

In our study 12 patients in group 1 (48%) were females. Bhattacharya series [6] showed 71.4% were females while 28.6% were male. Similar sex preponderance in favour of females was noted in other studies. In the present study mean age in group 1 was 48.36±19.15 years and group 2 was 44.28±16.31 years. We found increased incidence of gall stones in the 6th decade of life. Similar incidence is seen in the studies of Hamdani et al (65 years).

Ultrasonography volume was found to be significantly more in group 1 both during fasting and fatty meals (21.9 vs 12.9 ml and 13.1 vs 4.6ml). Gall bladder motility in asymptomatic patients is decreased as compared to controls (P value of <0.01). Brandt et al, in cross sectional study found that sluggish gall bladder motility was more frequent in asymptomatic patients [7].

Similar results were seen in studies by Nieves MA et al [8]. Brandt et al in a study on symptomatic and asymptomatic gall stone patients along with controls concluded that asymptomatic cholelithiasis is associated with impaired gall bladder function [9].

Intergroup comparison of gall bladder thickness was statistically significant both during fasting and after fatty meals (2.41 vs 2.21mm and 2.57 vs 2.23mm). A study was conducted by Handler SJ et al to evaluate ultrasound of gall bladder wall thickening and its relation to gall bladder disease. The result showed that a thickened gall bladder wall is associated with gall stones [10]. A statistically significant increase in mean alkaline phosphatase was seen in patient with gall stone disease. Naseem A et al [11] found similar result.

Conclusion

Gall bladder volume was found to be significantly more in asymptomatic cases, both during fasting and after fatty meal, suggesting decreased gall bladder motility in asymptomatic gall stone patients compared to controls. Mean gall bladder wall thickness and mean alkaline phosphatase level was significantly more in patients with gall stones.

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