ORIGINAL RESEARCH PAPER
Volume - 11 | Issue - 03 | March - 2022 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

DETERMINATION OF THE GALLBLADDER WALL THICKNESS IN PATIENTS WITH CHOLECYSTITIS AND CHOLELITHIASIS BY ULTRASONOGRAPHY

Surgery

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ABSTRACT

Objective: The objective of the study was to determine the gallbladder (GB) wall thickness in patients with cholecystitis and cholelithiasiswith the help of ultrasonography for the estimation of epidemiology.

Aim: The aim was to estimateepidemiology of the GB wall thickness in patients with cholecystitis and cholelithiasis by ultrasonography.

Materials and Methods: This was a hospital-based case–control study. Patients with cholecystitis and cholelithiasis of age between 15and 70 years of either sex were included in the study. The GB wall thickness was determined in the fasting state. A total of 50 samples,36 cases (with diseased bladder) and 14 controls (with normal bladder) were included in the study.

Results: More than one-third ofcases (38.9%) were between 30 and 40 years. The mean age of cases and controls was 42.22 ± 12.81 and 35.43 ± 11.85 years, respectively.

More than one-third of both cases (36.1%) and controls (35.7%) were males. The GB wall thickness was significantly ($P = 0.005$) higher amongthe cases (4.06 ± 2.28 mm) than that of controls (2.22 ± 0.67 mm). Full distention of the GB was in more than half of both cases (69.4%)and controls (57.1%). Partial distended was in 11.1% of cases and in 21.4% of controls. Contracted (8.3%) and overdistended (2.8%)were only seen among cases. The GB wall thickness of ≥3 mm was among 66.7% of patients and in 14.3% of controls. The GB wallthickness of <3 mm was 92% lower in cases compared to controls (odds ratio = 0.08, 95% confidence interval = 0.01–0.43, $P = 0.001$).

Conclusion: During ultrasonography, a higher degree of the GB wall thickness was found in patients with cholecystitis and cholelithiasisas compared to the control group.

KEYWORDS

Carcinoma, cholecystitis, cholelithiasis, epidemiology, gallbladder wall thickness, ultrasonography

INTRODUCTION

Gallbladder (GB) diseases mostly manifest as gallstonesand GB cancer (GBC). Epidemiological studies shouldfirst find the burden of disease to identify the risk factorsof this disease. Cholelithiasis (gallstones) is the frequentlycommon form of GB disease.[1] It is documented that patientswith symptomatic cholecystolithiasis will progress acutecholecystitis (ACC) more commonly than their asymptomaticcounterparts; thereby, effectively increasing the risk ofcomplications to five times higher (i.e., 20%).[2] The presentstudy was designed to compare the GB wall thickness incholelithiasis and cholecystitis patients with the help ofultrasonography in North Indian population.

MATERIALS AND METHODS

This was a hospital-based case–control study conducted at Department of Surgery, Rajendra Institute of Medical Sciences, Ranchi, Jharkhand December 2019 to November 2020. Patients withcholecystitis and cholelithiasis of age between 15 and 70 yearsirrespective of gender were included in the study (cases).

All patient's cases (36) and controls (14) were advised thenight before that did not eat or drink. Contral groups (normalgallbladder) were collected when patients are having otherabdominal diseases diagnosed by ultrasonography. The GB wall thickness was measured in fasting. Total 50 cases, 36 cases and 14 controls were included in the study.

Statistical Analysis

The results are presented in frequencies, percentages, andmean ± standard deviation. The Chi-square test was used tofind the associations of categorical variables between cases andcontrols. The unpaired *t*-test was used to compare the GB wallthickness between cases and controls. The odds ratio (OR) withits 95% confidence interval (CI) was calculated. The $P < 0.05$ wasconsidered statistically significant. All the analysis was carriedout using SPSS software 16.0 version (Chicago, Inc., IL, USA).

RESULTS

More than one-third of cases (38.9%) and 28.6% of controls werebetween the age group of 30 and 40 years. The average age ofcases and controls was 42.22 ± 12.81 and 35.43 ± 11.85 years,respectively. More than half of both cases (63.9%) and controls (64.3%) were females. No significant ($P > 0.05$)difference was observed in age and gender between cases andcontrols showing comparability of the groups in terms of ageand gender [Table 1]. Smoking was in 13.9% in cases and in14.3% in controls. Alcohol habit was in 11.1% of cases andin 7.1% of controls [Table 2]. The GB wall thickness wassignificantly ($P = 0.005$) higher among cases (4.06 ± 2.28) thanthat of controls (2.22 ± 0.67) [Table 3]. GB wall thickness ≥3 mmwas among 66.7% of patients and in 14.3% of controls. The GBwall thickness <3 mm was 92% lower in cases compared tocontrols (OR = 0.08, 95% CI = 0.01–0.43, $P = 0.001$) [Table 4].

A full distention of the GB was among more than half in bothcases (69.4%) and controls (57.1%). Partial distended was seenin 11.1% of cases and in 21.4% of controls. Contracted distentionwas observed in 8.3% of cases only [Table 5].

Table 1 : Distribution of demographic profile of patients between cases and controls

Demographic Profile	Cases (n=36), n(%)	Control (n=14), n(%)	p-value[a]
Age (years)			0.17
<30	4(11.1)	5(35.7)	
30-40	14(38.9)	4(28.6)	
41-50	10(27.8)	4(28.6)	
>50	8(22.2)	1(7.1)	
Mean±SD	42.22±12.81	35.43±11.85	
Gender			
Male	13(36.1)	5(35.7)	0.97
Female	23(63.9)	9(64.3)	

[a]Chi-square test. SD: Standard deviation

Table 2 : Distribution of personal habit between cases and controls

Personal Habit	Cases (n=36), n(%)	Control (n=14), n(%)	p-value[a]
Smoking	5(13.9)	2(14.3)	0.91
Alcohol	4(11.1)	1(7.1)	
None	27(75.0)	11(78.6)	

[a]Chi-square test

Table 3 : Comparison of the mean gallbladder wall thickness between cases and controls

Groups	Gallbladder thickness (mm), mean±SD
Cases	4.06±2.28
Controls	2.22±0.67
P[a]	0.005*

[a]Unpaired t-test, *Significant, SD: Standard deviation

Table 4: Comparison of the gallbladder wall thickness between cases and controls

Gallbladder thickness (mm)	Cases (n=36), n(%)	Control (n=14), n(%)	OR (95%CI), P[a]
<3	12(33.3)	12(87.7)	0.08(0.01-0.43), 0.001*
≥3	24(66.7)	2(14.3)	

aChi-square test. *Significant. OR: Odds ratio, CI: Confidence interval

Table 5: Comparison of distention of the gallbladder between cases and controls

Distention of gallbladder	Cases (n=36), n(%)	Control (n=14), n(%)	OR (95%CI), P[a]
Contracted	3(8.3)	0(0.0)	NA
Full	25(69.4)	8(57.1)	
Overdistended	1(2.8)	0(0.0)	
Partial distended	4(11.1)	3(21.4)	
None	3(8.3)	3(21.4)	

[a]Chi-square test. NA: Not applicable (being >1 0s in controls)

DISCUSSION

Cancer of the gall bladder is uncommon; however, it is fifthfrequently common gastrointestinal malignancy and is foundin 1% to 3% of cholecystectomy specimens.[3] 2.5 new casesdetected per 100,000 inhabitants/year. The mortality rate ishigh due to GB as most of the time, it is diagnosed at advancedstages of disease. This is due to the scarcity of symptoms.[4]

Countries having a high incidence of GBC include Chile,Poland, India, and Japan. High incidence of GBC is beingreported among North Indian women (21.5/100,000) andfemale native American Indians (14.5/100,000).[5] In the present study, 38.9% of cases and 28.6% of controls werebetween 30 and 40 years of age. The mean age of cases and controls was 42.22 ± 12.81 and 35.43 ± 11.85 years,respectively. Agrawal et al. reported that most of the patientswere of the age group between 30 and 40 years with an averageage of 37 years of acute and chronic cholecystitis patients.[6]

The percentage of females was higher than males in this studywhich was in consistent with the study by Agrawal et al. inwhich 70% of the acute and chronic cholecystitis patients werefemales.[6] Hasan et al.[7] reported that the youngest patient of this series was 28 years, and the oldest was of 79 years.

Reported that female are more affected than male these ratioare 1:5 -- 1:2. In this study, the GB wall thickness of ≥3 mmwas among 66.7% of patients and in 14.3% of controls. The GBwall thickness of <3 mm was 92% lower in cases compared tocontrols (OR = 0.08, 95%CI = 0.01–0.43, P = 0.001). Agrawalet al.[6] observed that the GB wall was >3 mm in 25.5% ofpatients with acute calculus cholecystitis and >3 mm in 24.5%of patients with chronic calculous cholecystitis. Engel et al.[8]reported that majority of healthy individuals (97%) had the gallbladder wall thickness of <2 mm. Hasan et al.[7] reported thatthere was a strong correlation between cholelithiasis and GBC,with gallstones found in nearly 80% of all cases. GBC can be asfocal or diffuse asymmetric wall thickening in 20%–30% cases.[9]

According to several authors, the upper limit for the normal GBwall thickness is 3 mm. However, in patients with inappropriatefasting, the parietal thickness can be exceeded this limit. Thisis because of the organ's smooth muscle contraction.[4] GBcontraction is recognized in resulting from long-standing chroniccholecystitis.[10] In this study, a full distention of the GB was amongmore than half in both cases (69.4%) and controls (57.1%). Partialdistended was seen in 11.1% of cases and in 21.4% of controls.Contracted distention was observed in 8.3% of cases only.

CONCLUSION

During ultrasonography, a higher degree of GB wall thicknesswas found in patients with cholecystitis and cholelithiasis ascompared to the control group. The individual with the GB wallthickness of 7 mm and above is prone to have cancer; therefore,all such cases should be subjected to biopsy for histopathologicalexamination to rule out the cancer GB for better prognosis.

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