Biliary Lithiasis : Prevalence and Ultrasound Profile in a Service Hospital

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Abstract

Real time gray scale ultrasonography of upper abdomen was carried out in 1237 cases for varied indications. Overall prevalence of biliary lithiasis was 11.56% with female to male ratio of 4:1. Fifty years and below, female to male ratio was 6.5:1. 88.8% cases of biliary lithiasis were 60 years and below. Gall bladder dyspepsia (61.5%) and right upper quadrant pain (41%) were the main presenting features of biliary lithiasis. 26 patients (18%) presented with acute abdomen. Asymptomatic gallstones were found in 25 (17.5%) cases. Solitary calculus was less common than multiple calculi with a ratio of 1:4. Amongst cases of multiple calculi the small sized (2-4 mm) variety was the maximum (49%) followed by medium sized (5-10mm) and large sized (>10mm) calculi respectively.

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Introduction

Sonography is known to be highly reliable in the diagnosis of gall bladder diseases. Few structures lend themselves more readily to study with ultrasound than the gall bladder. The ability to image the gall bladder in multiple planes rapidly and easily, makes sonography very useful for patients of right upper quadrant pain especially due to gallstones. With better understanding of sonographic appearance of gall bladder, greater than 90% accuracy has been observed in the diagnosis of gallstones [1,2]. The use of diagnostic ultrasonography allows determination of prevalence of biliary lithiasis in a representative sample of general population. We present clinical and ultrasound profile of patients diagnosed as having biliary lithiasis at the department of radio diagnosis of a service hospital.

Material and Methods

The patient population consisted of those (outdoor as well as indoor cases) referred for ultrasonography of upper abdomen. All patients were instructed to report on empty stomach after overnight fasting. Before examination of each case, particulars of each patient and clinical symptoms were noted. All examinations were done with 5MHz electronic convex transducer (Wipro GE-RT 3200 Advantage II). In emergency situation, patients were examined as and when required (however, in those situations also patients were mostly on IV fluids). Initially, all patients were scanned in supine position. Subsequently, scanning was done in left lateral decubitus, lateral oblique and sitting positions wherever required. Gall bladder was examined at least in two planes and in two positions to obtain satisfactory visualisation. Whenever gall bladder was not satisfactorily visualised inspite of adequate fasting, the patients were instructed to report next day for ultrasonography.

Gall bladder calculus was diagnosed on the basis of shadowing mobile echogenic foci within bile filled gall bladder lumen. In case of contracted gall bladder (as it happens in sequel of chronic cholecystitis), diagnosis of calculi was made on the basis of identification of strong echogenic foci in the gall bladder fossa and demonstration of the wall echo, stone echo, acoustic shadow (WES) triad. Differentiation between contracted gall bladder with echogenic foci and duodenal gas was made by giving water to the patient to drink and observing duodenal peristalsis.

Ultrasound diagnosis of acute cholecystitis was made when the following findings were present in varying combinations : wall thickening, irregularity of the mucosa (with or without sloughing), separation of layers of the wall, calculus within the lumen, fluid accumulation in and around gall bladder fossa and tenderness when the gall bladder was pressed by the transducer (sonographic Murphy's sign). Ultrasound features of chronic cholecystitis included the following : gall stones, wall thickening, hyper-reflectivity of the wall, contracted gall bladder with no demonstrable lumen (inspite of adequate fasting), echogenic foci with marked acoustic shadowing behind gall bladder fossa [3,4]. Wall thickening more than 3 mm was considered significant.

After diagnosis of biliary lithiasis, size and number of the stones were noted in each case. All sonographic data was recorded separately. The investigator analysing sonographic findings was blinded to the patient particulars and symptomatology. All data was collected, tabulated and analyzed at the end of the study. Statistical validity was achieved with Chi square test and $p < 0.05$ was considered significant.

Results

Between April 1999 and January 2001, 1237 patients underwent upper abdominal ultrasonography for varied indications. A total of 143 (11.56%) patients were found to

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Fig. 1 : Age and sex pattern

have biliary lithiasis. The age and sex pattern is illustrated in Fig-1. Overall female to male ratio was 4:1. The sex ratio (female:male) 50 years and below was 6.5:1 and above 50 years was 2:1. The youngest male and female patients were of 34 and 13 years respectively. The oldest male and female patients were of 85 and 78 years respectively. Majority of patients (127, 88.8%) were 60 years and below with 90 (62.9%) being 50 years and below.

Majority of patients had gall bladder dyspepsia 88 (61.5%) and right upper quadrant pain 59 (41%) for some time before diagnosis of biliary lithiasis. 25 patients (17.5%) had asymptomatic gallstones. These patients were amongst those who reported for problems not directly related to hepatobiliary system (e.g. evaluation of kidney and adrenal in hypertensives). Gallstones were incidentally detected during scanning. 1 (0.69%) patient had strong family history of gallstones. Symptomatology at presentation is illustrated in Table 1. Based on the number and size of the calculus at sonography, patients were divided into the following groups:

Group I : Solitary calculus : usually large (>10mm) at the time of diagnosis.

Group II : Multiple calculi :

- Small sized (2-4mm) calculi : usually >10 in number, can go much higher.
- Medium sized (5-10mm) calculi : total number often varies between 5-10.
- Large sized (>10mm) calculi : total number usually varies between 3-5.
- Mixture of medium and large sized calculi.

It was found that almost all patients could be fitted in one of these five categories. The ultrasonographic categorization of gall bladder calculi is summarized in Table 2. The overall ultrasound findings are illustrated in Table 3.

Discussion

Biliary lithiasis is not a new entity. The earliest known gallstone dates back to the 21st Egyptian Dynasty having been discovered in a mummy [5]. Gallstone represents one of the most common causes of morbidity even today. The present study is a prospective analysis of clinico-sonological aspects of biliary lithiasis in a service hospital. Various authors have found prevalence rate of

Table 1

Symptoms at presentation

Dyspepsia	88 (61.5%)
Right upper quadrant pain	59 (41%)
Acute abdomen	26 (18%)
Obstructive jaundice	11 (7.6%)
Vomiting	16 (11%)
Incidental finding	25 (17.5%)

Table 2

Gallstones as found in sonography

Group	Male	Female	Total
Group I	10	23	33 (25%)
Group IIa	07	42	49 (37%)
Group IIb	06	16	22 (16.6%)
Group IIc	03	15	18 (13.6%)
Group IId	02	08	10 (7.5%)

Group I : Solitary calculus

Group II : Multiple calculi

- Small (2-4 mm) calculi
- Medium (5-10 mm) calculi
- Large (> 10 mm) calculi
- Mixed calculi

Table 3

Summary of ultrasonographic findings

Sonographic finding	No of cases
Acute calculus cholecystitis	26 (18%) M-4, F-22
Chronic calculus cholecystitis	38 (26.5%) M-6, F-32
Cholelithiasis only	64 (44.7%) M-10, F-54
Common bile duct calculus	06 (4%)
Common bile duct and gall bladder calculus	04 (2.8%)
Porcelain gall bladder	02 (1.4%)
Gall bladder mass	03 (2%)
Gall bladder and hepatic mass	01 (.7%)
Hepatomegaly	35 (24%)
Splenomegaly	09 (6%)
Non visualization of gall bladder in spite of best efforts	03 (2%)

M - Male; F - Female

biliary lithiasis ranging from 6.12% to 14.4% [6-8]. The overall prevalence of biliary lithiasis as revealed in our study is 11.56%. World wide, almost all studies strongly correlate gallstone prevalence with advancing age and report highest prevalence in the oldest age group [6,9,10]. In contrast, our study shows maximum concentration of cases around 50 years. 90 cases (62.9%) were 50 years and below. 37 (25.8%) and 13 (9%) cases were in the 51-60 and 61-70 years category respectively and only 3 (2%) were 71 years and above. This finding is significant. The female to male ratio in our study is noteworthy. 50 years and below, female to male ratio in our study is 6.5:1; where as the quoted figure in world literature is 2-3:1 [11,12]. This finding is again

significant. Even after 50 years, female to male ratio (2:1) in our study is higher than the published literature. 23 female patients were 30 years and below as compared to no male patient in this age group. All these findings suggest that our female population is susceptible to biliary lithiasis at a much earlier age than the male population.

Majority of our patients experienced dyspepsia (61.5%) and right upper quadrant pain (41%) in varying severity and duration before diagnosis of biliary lithiasis. Biliary lithiasis was incidentally detected in 25 (17.5%) cases. This figure is low as compared to the quoted figure in world literature [8]. The reason for this apparently low figure, could be, that we studied only symptomatic patients pertaining to hepatobiliary or other systems. The same figure would rise once we study apparently healthy volunteers (which would be ideal).

Acute calculus cholecystitis was diagnosed in 26(18%) cases. This figure correlates with earlier studies. Here again, the female patients outnumbered (5.5:1) their male counterparts. Although the number of cases diagnosed as chronic calculus cholecystitis (-)38 (26.5%), appears more than those of acute calculus cholecystitis, the difference is not statistically significant ($p>0.05$). A significant number, 64 (44.7%) patients did not reveal any sign (acute/chronic) of inflammation sonologically although they harboured gallstones.

We have attempted ultrasonic characterization of cholelithiasis based on the number and size of calculus at the time of presentation. It is clear from Table 2, that majority (75%) of our patients had multiple calculi (group II). In the multiple calculi group, the small sized variety 2-4mm (IIa) dominated the list followed by intermediate 5-10mm (IIb) and the large sized >10mm (IIc) ones respectively. Female to male ratio in the case of solitary and multiple calculi groups were 2.3:1 and 4.5:1 respectively. To the best of our knowledge no such study has been done in recent past in the Armed Forces.

Limitation of the study : We have analysed the size and number of gall bladder calculi at the time of presentation. We cannot throw any light on the nature of the gallstone (eg. cholesterol/pigment stone). Chemical/spectrophotometric analysis of postoperative

specimens would have been ideal which is beyond our scope. Gallstone disease represents an important reason of morbidity in our country. Real time gray scale ultrasonography is a useful tool to assess the gallstone burden in a community. Our female population is at higher risk of developing gallstone disease at a much earlier age as compared to the male population.

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