

## ORIGINAL RESEARCH

### Assessment of diseases of gall bladder with ultrasonography

<sup>1</sup>Dr. Annie Agarwal, <sup>2</sup>Dr. Shivani Agarwal

<sup>1</sup>Assistant Professor, <sup>2</sup>Associate Professor, Department of Radio-Diagnosis, National Capital Region Institute of Medical Sciences, Meerut, Uttar Pradesh, India

#### Corresponding author

Dr. Shivani Agarwal

Associate Professor, Department of Radio-Diagnosis, National Capital Region Institute of Medical Sciences, Meerut, Uttar Pradesh, India

Received: 16 August, 2022

Accepted: 18 September, 2022

#### ABSTRACT

**Background:** Emergency conditions involving the gallbladder and the bile ducts are common radiological challenging problems. The present study was conducted to assess diseases of gall bladder using USG.

**Materials & Methods:** 60 patients of gall bladder disease of both genders underwent USG performed with a 3.5-5 MHz probe by scanning in subtotal position. Once the gallbladder was clearly identified, longitudinal and transverse views of the gallbladder were obtained.

**Results:** Out of 60 patients, males were 38 and females were 22. Common pathologies were polyps in 32, benign tumor in 14, cholecystitis in 10 and gall stones with sludge in 4 patients. The difference was significant ( $P < 0.05$ ).

**Conclusion:** Authors found that ultrasound is non-invasive and the least expensive imaging modality for the assessment of the gallbladder diseases. Common pathologies were polyps, benign tumor, cholecystitis and gall stones with sludge.

**Key words:** gallbladder, USG, Stones

#### INTRODUCTION

Emergency conditions involving the gallbladder and the bile ducts are common radiological challenging problems.<sup>1</sup> Imaging provides valuable information for the following reasons to ensure the final diagnosis, as up to 20% of patients clinically classified as having acute cholecystitis have another disease that does not require surgery, to prevent the patient from complications in case of delayed diagnosis and to detect complications which may urge the surgical treatment.<sup>2</sup>

Ultrasonography is the technique of choice in diagnosing gallbladder calculi. In the mid-1970s ultrasound was only accurate enough to use as an adjunct to oral cholecystography but refinements such as gray scale and real-time imaging mean that in experienced hands it has a sensitivity of 96% and a specificity of 93%.<sup>3</sup> Sonography is also the test of choice in the initial evaluation of jaundiced patients. It is an excellent technique for distinguishing between obstructive and nonobstructive jaundice, although it is less accurate in demonstrating the cause of the obstruction.<sup>4</sup> Ultrasound is painless and relatively inexpensive, and has several advantages over oral cholecystography; it doesn't depend on contrast material, causes no adverse reactions or side-effects, is safe during pregnancy, does not expose the patient to radiation, and is less time-consuming.<sup>5</sup> The present study was conducted to assess diseases of gall bladder using USG.

## MATERIALS & METHODS

The present study comprised of 60 patients of gall bladder disease of both genders. All gave their written consent for the participation in the study. Ethical approval was obtained before starting the study.

Data such as name, age, gender etc. was recorded. USG was performed with a 3.5-5 MHz probe by scanning in subcostal position. Scan with the probe in longitudinal plane was performed after applying warm gel to the area after removing clothing away from abdomen with the patient in the supine position. The probe was orientated cephalic. Once the gallbladder was clearly identified, longitudinal and transverse views of the gallbladder were obtained. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

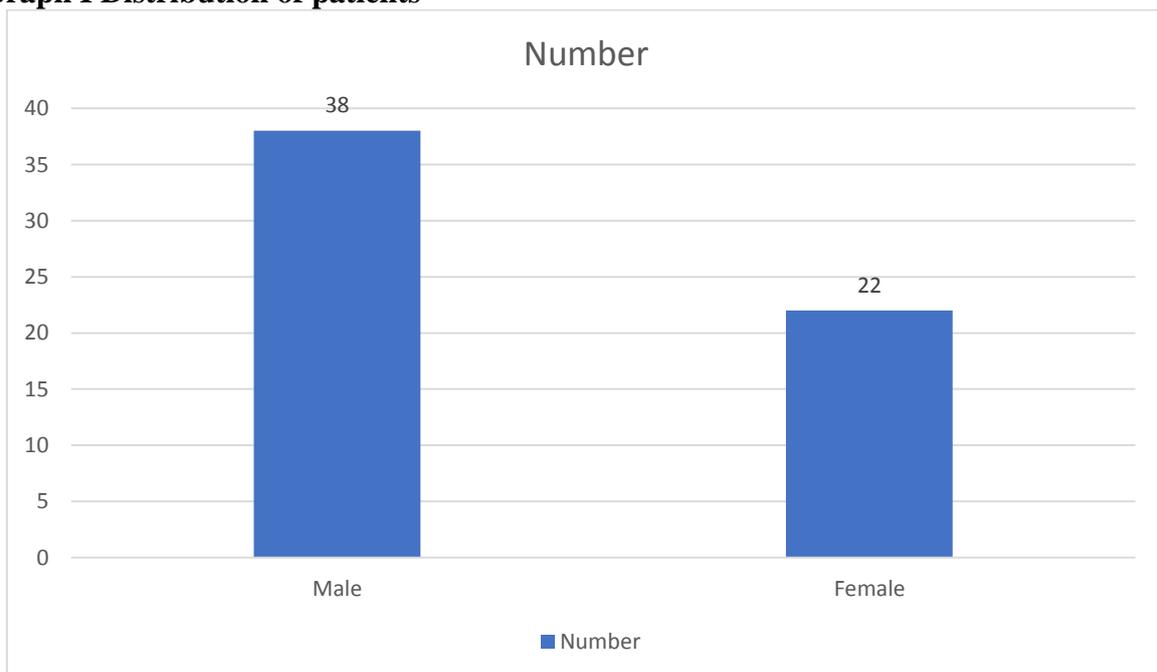
## RESULTS

**Table I Distribution of patients**

Total- 60		
Gender	Males	Females
Number	38	22

Table I, graph I shows that out of 60 patients, males were 38 and females were 22.

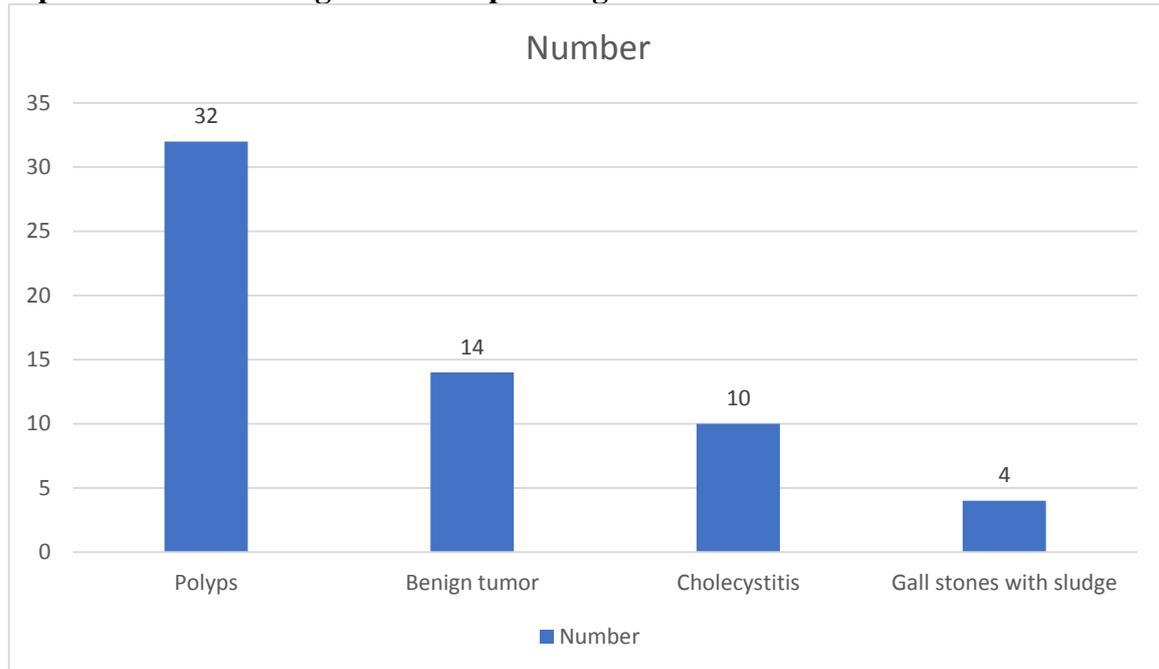
**Graph I Distribution of patients**



**Table II Assessment of gall bladder pathologies**

Pathologies	Number	P value
Polyps	32	0.01
Benign tumor	14	
Cholecystitis	10	
Gall stones with sludge	4	

Table II, graph II shows that common pathologies were polyps in 32, benign tumor in 14, cholecystitis in 10 and gall stones with sludge in 4 patients. The difference was significant (P < 0.05).

**Graph II Assessment of gall bladder pathologies**

## DISCUSSION

Connective tissue around the neck of the gallbladder and cystic duct areas can produce dense echoes with distal shadowing. Inexperienced ultrasound operators may mistake this shadowing for stones in the neck of the gallbladder or common bile duct.<sup>6</sup> The gallbladder wall's normal thickness is up to 3 mm and produces a thin linear echo. Wall thickening from chronic inflammation or edema can be detected by ultrasound.<sup>7</sup> The present study was conducted to assess diseases of gall bladder using USG.

We found that out of 60 patients, males were 38 and females were 22. In the ultrasonic image, gallstones appear as foci of dense echoes within the gallbladder lumen. These echoes do not depend on the stone's chemical structure or calcium content. Because of their high absorption of the ultrasonic beam, gallstones cast an acoustic shadow behind them. This characteristic is important in diagnosis. A less obvious stone impacted in the neck of the gallbladder also produces a shadow.<sup>8,9</sup> When using 'real-time' scanners a further criterion for diagnosing gallstones is demonstrated movement of the echogenic focus within the gallbladder when the patient changes position. Ultrasound can detect gallstones to about 1 mm in size but unless these very small stones are aggregated, they usually do not cast an acoustic shadow.<sup>10,11</sup>

We found that common pathologies were polyps in 32, benign tumor in 14, cholecystitis in 10 and gall stones with sludge in 4 patients. Shea et al<sup>12</sup> concluded that chole-scintigraphy had the best sensitivity and specificity in the detection of acute cholecystitis, whereas US had a sensitivity of 88% and a specificity of 80%. Shea et al by using state-of-the-art methods for the meta-analysis of diagnostic accuracy studies: in this systematic review, they observed that chole-scintigraphy has the highest diagnostic accuracy of all imaging modalities in the detection of acute cholecystitis.

Hamdan et al<sup>13</sup> performed ultrasound scanning in 150 patients with GB disease. 76 Patients (50.60%) were males and 74 patients (49.40%) were females. Range of age group of accumulation for gallstone presence was (26 - 58) years and most common in females than males. Incidence of gallstone are 88% (58.7%) patients (female 34.7% and 24% male). And ratio of incidence is between female to males 13:9. Other pathologies of gallbladder were found to be cholecystitis 16.60%, polyp with sludge 16.60%, benign tumor 1.30%, normal 6.70% Ultrasonography is a single imaging modality sufficient for evaluation of patient with

suspected gallbladder pathologies which can provide information about the presence of gallstone and more over about site and cause of biliary tract obstruction. Ultrasound is highly sensitive and specific means for diagnosis of the gallbladder stones.

Gallbladder cancer is a highly malignant, rapidly growing and rare tumor. It has a median survival time of less than six months from the time of diagnosis.<sup>14</sup> Part of the reason for this is that patients usually become jaundiced, lose weight and have right upper quadrant abdominal pain only late in the course of the disease.<sup>15</sup> Gallbladder cancers are closely associated with gallstone disease.<sup>16</sup> Recently the incidence of gallbladder cancers in North America and Britain has declined, possibly due to the increased rate of cholecystectomy.<sup>17</sup> The limitation the study is small sample size.

## CONCLUSION

Authors found that ultrasound is non-invasive and the least expensive imaging modality for the assessment of the gallbladder diseases. Common pathologies were polyps, benign tumor, cholecystitis and gall stones with sludge.

## REFERENCES

1. Laing FC, Jeffrey RB Jr. Choledocholithiasis and cystic duct obstruction: difficult ultrasonographic diagnosis. *Radiology* 1983;146(2):475–9.
2. Ryu, J.K., Ryu, K.H. and Kim, K.H. Clinical Features of Acute Acalculous Cholecystitis. *Journal of Clinical Gastroenterology*. 2003; 36: 166-169.
3. Bree, R.L. Further Observations on the Usefulness of the Sonographic Murphy Sign in the Evaluation of Suspected Acute Cholecystitis. *Journal of Clinical Ultrasound*. 1995; 23: 169-172.
4. Theodoro, D. Hepatobiliary. In: Ma, O.J., Mateer, J.R. and Blaivas, M., Eds., *Emergency Ultrasound*, McGraw- Hill, New Delhi. 2007; 177-186.
5. Bennett, G.L. and Blathazar, E.J. Ultrasound and CT Evaluation of Emergent Gallbladder Pathology. *Radiologic Clinics of North America*. 2003; 41: 1203-1216.
6. Rumack, C.M., Wilson, S.R. and Charboneau, J.W. *Diagnostic Ultrasound Volume 1*. 3rd Edition, Elsevier Mosby, Philadelphia. 2005.
7. Ralls PW, Colletti PM, Lapin SA, et al.: Real-time sonography in suspected acute cholecystitis: prospective evaluation of primary and secondary signs. *Radiology* 1985, 155: 767–771. 10.
8. Birnholz JC: Population survey: Ultrasonic cholecystography. *GastrointestRadiol* 1982; 7:165-167.
9. Comfort MW, Gray HK, Wilson JM: The silent gallstone: A ten to twenty year follow up study of 112 cases. *Ann Surg* 1948; 128:931-937.
10. Perpetuo MD, Valdivieso M, Heilbrun IK, et al: Natural history study of gallbladder cancer. *Cancer* 1978; 42:330- 335.
11. Diehl AK, Beral V: Cholecystectomy and changing mortality from gallbladder cancer. *Lancet* 1981; 2:187-189.
12. Shea JA, Berlin JA, Escarce JJ, Clarke JR, Kinosian BP, Cabana MD, Tsai WW, et al.: Revised estimates of diagnostic test sensitivity and specificity in suspected biliary tract disease. *Arch Intern Med* 1994, 154(22):2573–2581.
13. Hamdan et al. Evaluation of gallbladder diseases using ultrasonography. *Indian journal of applied research*. 2019; 1-4.
14. Ferrucci JT: Body ultrasonography, Parts I and 2. *N Engl J Med* 1979; 300:538-542, 590-600.
15. Cooperberg PL, Burhenne HJ: Realtime ultrasonography, diagnostic technique of choice in calculous gallbladder disease. *N Engl J Med* 1980; 302:12 77- 1279.

16. Taylor KJW, Rosenfield AT, Spiro HM: Diagnostic accuracy of gray scale ultrasonography for the jaundiced patient: A report of 275 cases. Arch Intern Med 1979; 139:60-63.
17. Milner J, Hewitt D: The occurrence and treatment of gallbladder disease in Ontario. J Chronic Dis 1972; 25:75-83. 5. Price WH: Gallbladder dyspepsia. Br Med J 1963; 2:138-141.