ORIGINAL RESEARCH PAPER

Volume-8 | Issue-2 | February-2019 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

ROLE OF ULTRASOUND IMAGING IN GALL BLADDER MASSES AND ITS CORRELATION WITH CYTOLOGY OR HISTOPATHOLOGY

Radiodiagnosis

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ABSTRACT

Introduction- Ultrasonography (US) is the most commonly used imaging modality for evaluating GB masses. It is readily available, non invasive, non- ionizing and cost-effective, and hence imaging modality of choice for GB masses. GB carcinoma is the fifth most common gastrointestinal malignancies. Ultrasound imaging has been applied to differentiate malignant from benign lesions.

Material & Method- This study included 50 patients of either sex with gall bladder mass. All patients were referred from SRMSIMS hospital for evaluation.

Results- 50 cases were evaluated by real time ultrasonography and 3 patients were labeled with benign masses & 47 patients as malignant mass on the basis of ultrasonography. Correlated cyto/histopathology. revealed all GB mass malignant and no benign lesion. Sensitivity came out to be 94%.

Conclusion- USG is useful imaging modality for diagnosing Gall bladder disease and can be further substantiated by FNAC /FNB. Thus help in early diagnosis of benign or malignant lesion and their prognosis & treatment.

KEYWORDS

FNAC – Fine Needle Aspiration Needle, FNB– Fine Needle biopsy, GBC- Gall Bladder Carcinoma, US- Ultrasonography,

INTRODUCTION

Gallbladder carcinoma is the fifth most common gastrointestinal malignancy. Imaging detection at early stages of gallbladder carcinoma remains elusive. Clinical presentation of the disease is often vague or delayed relative to pathologic progression.[1]

Ultrasonography (US) is the imaging modality of choice for GB masses. However, US cannot do the staging of tumor. The visualization of lymph nodes and distant metastases is difficult. Indirect signs that suggest the presence of GB masses are as follows:[2]

- GB wall thickening
- Single or multiple intraluminal mass
- Polyps larger than 1 cm in diameter

A mass that arises from the GB may be difficult to differentiate from a mass that arises from the liver. The visualization of gallstones located centrally in a solid mass can help make the diagnosis.[2]

GB wall thickening is nonspecific and may be seen in acute and chronic cholecystitis, heart failure, hypoalbuminemia, hepatitis, and cirrhosis. However, the GB wall thickening in these patients is usually diffuse in contrast to the focal thickening in patients who have GB mass.[3]

The polyps or mass are of homogeneous echotexture without evidence of shadowing. The polyps are usually sessile and only rarely it has a stalk; this is the least common manifestation of GB carcinoma, accounting for 15-25% of patients. Visualization of a polyp that is smaller than 1 cm in the appropriate age group should arouse suspicion for adenoma /adenocarcinoma.

Tumefactive sludge can also mimic an intraluminal mass; usually, this is easy to differentiate by demonstrating the mobility of the sludge. Color Doppler US can also be used; the presence of flow within the lesion indicates that it is a solid mass rather than sludge.[4]

Gallbladder carcinoma spreads early in its course. Early diagnosis would be important in improving prognosis, and accurate staging would help in the choice of the best possible treatment. Recovery is possible if the tumor is confined to the gallbladder or is locally resectable.

Laboratory findings may suggest bile duct obstruction, and tumor markers may be elevated. However, imaging modalities and imaging-guided fine-needle biopsy (FNB) play a crucial role in the diagnosis.

MATERIAL & METHODS

Inclusion criteria:

1. All patients referred for Gall bladder masses were included in this study.

Exclusion criteria:

1. Post-operative patients

A complete history of the patient was taken. Following this, Ultrasound including Color Doppler using 1 – 4 MHz curvilinear probe was performed on Ultrasound ACUSON S-2000 (Siemens). The ultrasound findings were recorded in proforma of each patient. After prerequisite blood examination & taking consent of the patient, FNAC/ FNB were performed if needed and material was sent for cyto/ histopathological examination. The lesion was localized under USG guidance. 2-3 ml of xylocaine was infiltrated into the skin and subcutaneous tissue after proper skin testing. Patient was prepared, cleaned with betadine and cut sheet was used.18-22 gauge needle was introduced upto the lesion in gallbladder.10 ml disposable syringe was attached with the L.P needle. Slides were made, put in the solution (formalin) and sent for cytological examination. Biopsy procedure if needed was also performed in similar way using Bard semiautomatic Core biopsy instrument & sent for histopathological.

RESULT

The present study was conducted in the Department of Radiodiagnosis, Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly, Uttar Pradesh in 50 patients presenting with symptoms suggestive of a Gall Bladder mass.

Table 1: Age distribution

	Age distribution	Frequency
Age groups	31-40 years	04 (8%)
	41-50 years	14 (28%)
	51-60 years	02 (4%)
	61-70 years	27 (54%)
	71-80 years	03 (6%)

The study population consisted of 27 (54%) patients from 61 - 70 years followed by 14(28%) from 41-50 years followed by 4 (8%) from 31-40 years followed by 3(6%) from 71-80 years followed by 2(4%) from 51-60 years.

Table 2: Sex distribution

Sex distribution	Frequency (Total 50 cases)
Male	15 (30%)
Female	35 (70%)

Out of 50 patients, 35 (70%) patients were reported as female and 15 (30%) as male.

Table 3: Clinical symptoms of Gall Bladder mass

Clinical symptoms	Frequency (Total 50 cases)
Pain	40 (80%)
Nausea & Vomiting	6 (12%)
Jaundice	2 (4%)
Weight loss	1 (2%)
Loss of Appetite	1 (2%)

Loss of Appetite1 (2%) Out of 50 cases, pain was reported by 40(80%) patients, nausea and vomiting by 6(12%), jaundice by 2 (4%), weight loss by 1(2%) and loss of appetite by 1 (2%) patients.

Table:3: Ultrasonographic findings in patients-

Ultrasonographic Findings		Total No. Of Cases= 50
Grey Scale	Cholelithiasis	45 (90%)
	Sludge	5 (10%)
	Direct Invasion	35 (70%)
	Indirect Invasion	15 (30%)
	Mass Replacing GB Lumen	18 (36%)
	Asymmetric Wall thickening	30 (60%)
	Intra- Luminal Polypoid	2 (4%)
Color doppler	Avascular	36 (72%)
	Vascular	14 (28%)

Out of 50 patients, On grey scale imaging, cholelithiasis came out in 45 (90%) patients, sludge 5 (10%), Direct invasion 35 (70%), Indirect Invasion 15(30%), Mass Replacing GB Lumen 18(36%) , Asymmetric Wall thickening 30(60%) , Intra- Luminal Polypoid 2(4%) and on color Doppler imaging , Avascularity in 36 (72%) and Vascularity in 14(28%) patients.

Table 4: Benign and Malignant masses on basis of Ultrasonography

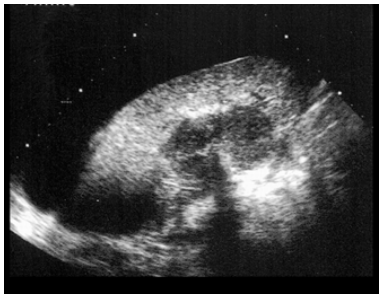
Diagnosis	Frequency	Percentage
Benign	3	6%
Malignant	47	94%

Out of 50 patients, 47 patients were labeled as malignant and 03 were labeled as benign because they were reported as chronic cholecystitis on ultrasound imaging.

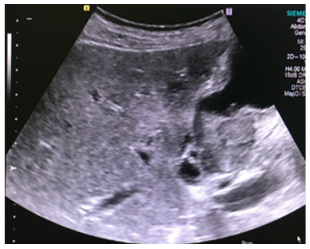
Table 5: Correlation of USG findings of GB mass with Cytology or Histopathology-

USG FINDINGS		FNAC/ Biopsy FINDINGS	
Benign	Malignant	Benign	Malignant
3	47	NIL	50

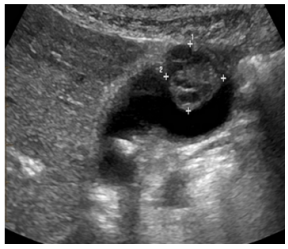
Out of 50 patients, ultrasonographic findings correlated with cyto/ hisptopathological findings in 47 patients. In remaining 03 patients, there were ultrasongraphic- cyto/ hisptopathological findings dissociation. These 47 patients were true positive for malignancy and 03 were false negative. These false negative lesions were labeled as benign because these were reported as chronic cholecystitis on ultrasound imaging that proved to be GB adenocarcinoma on FNAC/Biopsy.



Case No-1 Transverse sonogram shows an irregularly marginated hypoechoic mass with faint acoustic shadowing likely calculus in the gallbladder fossa. Interface with liver parenchyma is indistinct and large amount of ascites is noted.

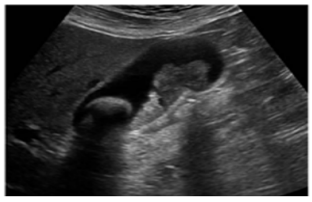


Case No-2 Heterogeneous mass in gall bladder lumen

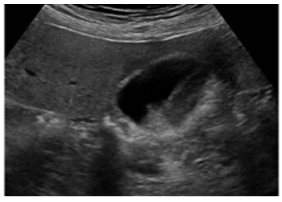


Case No-3 Polypoidal mass in gall bladder fundus

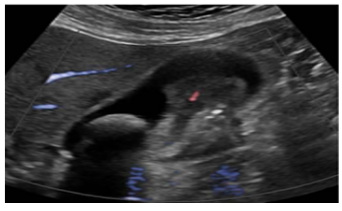
Case No.-4



A. Longitudinal scan shows polypoidal lesion with calculus and sludge in gall bladder fundus

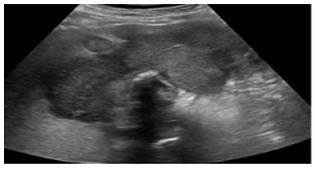


B. Transverse scan shows polypoidal lesion with sludge in lumen

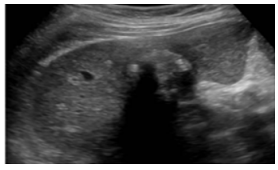


C. Color Doppler- Longitudinal scan shows vascularity in lesion in gall bladder fundus

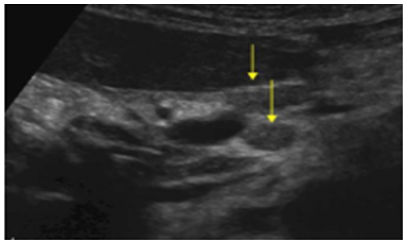
Case No.-5



Heterogeneous mass in gall bladder fossa and its direct infiltration in hepatic parenchyma

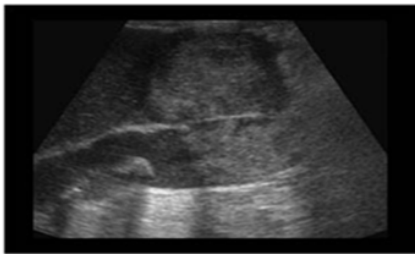


Heterogeneous mass in gall bladder fossa with direct infiltration in liver parenchyma



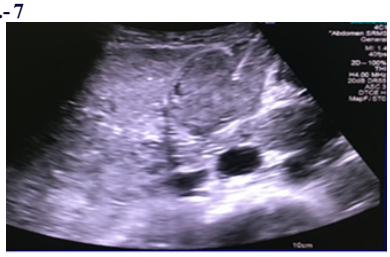
Periportal lymphadenopathy

Case No.- 6



Direct infiltration in hepatic parenchyma secondary to gall bladder mass

Case No.- 7



FNAC Needle in gall bladder lumen showing heterogeneous mass

DISCUSSION

"Role of ultrasound imaging in gall bladder masses and its correlation with cytology or histopathology" is a hospital based prospective study comprising 50 patients, conducted in the department of Radiodiagnosis and Imaging, Shri Ram Murti Smarak Institute of Medical Sciences & hospital, performed during November 2016 to April 2018. Evaluation of various gall bladder masses were done on the basis of characteristic imaging features of the masses with cyto/histopathological correlation. These cases were evaluated by ultrasound, Color Doppler and FNAC/Biopsy.

The mean age of incidence of gall bladder masses was 59 yrs with an age range of 38-79yrs. In terms of sex distribution of gallbladder carcinoma, a female preponderance was observed in our study comprising of 35 patients (70%).

Ioannis T. Konstantinidis et al., (2011) in their retrospective review of gallbladder ultrasound reports and clinic pathologic data of patients with a GB carcinoma identified on US reported median age 52 years (range=11–87 years) and 147 (69%) were females which was similar to our study[5].

Levy et al (2001) studied the role of radiologic-pathologic correlation in Gallbladder carcinoma and also reported that it affects women more frequently than men and symptoms at presentation are vague and are most often related to adjacent organ invasion. In ours study we found the most common complaint was pain in upper right quadrant constituting 40 (80%) cases, followed by nausea & vomiting 6 (12%), jaundice 2 (4%), weight loss 1 (2%) and loss of appetite 1(2%)[6].

Ghafoor et al (2017)[7] in their study of 42 patients, approximately 40% had irregularly thickened wall and 21.2% diffusely thickened wall on USG & showed hepatic parenchymal invasion to be 22.5% on USG & showed hepatic parenchymal invasion to be 22.5% on USG. In ours study of 50 patients, focal or diffuse asymmetric wall thickening in 30 (60%) patients followed by mass replacing gall bladder lumen in 18 (36%) patients, by intra- luminal polypoid in 2 (4%). The discrepancy may be due to high percentage 45 (90%) of cholelithiasis associated in ours study, which is a well- established risk factor for the development of gallbladder carcinoma. Gallstones cause chronic irritation and inflammation of the gallbladder, which leads to mucosal dysplasia and subsequent carcinoma.

Hundal and Shaffer (2014) [8] relates to the gallbladder lacking a serosal layer adjacent to the liver, enabling hepatic invasion and metastatic progression. In ours study, direct invasion of liver parenchyma was noted in 35 patients (70%) and indirect invasion (metastasis) in 15 patients (30%).

In 2012, Lin-Na Liu et al concluded Ultrasound (US) is accepted as the primary imaging modality in the assessment of gallbladder (GB) disease, which is due to its inherent superiority in comparison to other imaging modalities such as real-time scanning, easy manipulation, cost-effectiveness, no radiation, high resolution, and repeatability. Despite of its obvious superiority, there is difficulty in making the definite diagnosis for GB carcinoma under some circumstances. The differential diagnosis includes the more frequently encountered inflammatory conditions of the gallbladder, adenomyomatosis, polyps, biliary sludge, and other hepatobiliary malignancies. Therefore, it is necessary to develop new US techniques to improve the diagnosis of GB diseases and facilitate the early diagnosis of GB carcinoma.[9]

In our study of 50 cases, 47 were true positive for malignancy and 03 were false negative. These false negative lesions were labelled as benign because these were reported as chronic cholecystitis on ultrasound imaging. However, these lesions proved to be GB adenocarcinoma on FNAC/Biopsy.Our study showed sensitivity of 94% in diagnosing various lesions by confirming these diagnoses using image guided FNAC/FNAB. This shows excellent correlation between radiological diagnosis and histological/cytological diagnosis of various GB masses.

Cyto/histopathological Correlation-

Total 50	Usg	Malignant On Cyto/Histo	Benign On Cyto/Histo	Sensitivity
True Positive	47	47	-	-
False Negative	03	03	-	-
Total	50	50	-	94%

Ghafoor et al[7] reported sensitivity and specificity of USG in diagnosing GB carcinoma as 93.9 and 71.4% respectively. **Bhartiya et al**[10] showed Sensitivity of US-guided FNAC was 98.6% and specificity 97.3%. The authors concluded that USG guided FNAC of GB lesion is a very accurate method to diagnose and plan surgery beforehand because of its high sensitivity and specificity. It was concluded that USG is ideal, non-invasive, safe imaging modalities for diagnosis of gallbladder carcinoma. In our study as there was no case of true negative because our inclusion criteria included all patients with clinical suspicion of GB masses. Hence, specificity could not be calculated.

CONCLUSION

Ultrasound scan is widely available good non-invasive tool and can be used for differentiating between GB carcinoma and benign conditions of gall bladder. Clinical diagnosis based on examination/ blood investigations & radiological investigation using ultrasonography can help us to arrive at an accurate diagnosis most of the times. Image guided FNAC/FNB can confirm/dispute radiological diagnosis.

As the USG findings correlated well with cytological/ histopathological findings in the diagnosis of gallbladder masses. It can be concluded that USG is useful imaging modality for diagnosing Gall bladder disease and can be further substantiated by FNAC /FNB. Thus help in early diagnosis of benign or malignant lesion and their prognosis & treatment.

REFERENCES

1. Lai CH, Lau WY: Gallbladder cancer, a comprehensive review. Surgeon; 2008;6(2):10110.
2. Andrén-Sandberg Å. Diagnosis and Management of Gallbladder Cancer. N Am J Med Sci. 2012;4(7):293-9.
3. Barbosa ABR, Souza LRMF, Pereira RS, D'Ippolito G. Gallbladder wall thickening at ultrasonography: how to interpret it? Radiol Bras. 2011;44(6):381–7.
4. Kwon W, Jang J-Y, Lee SE, Hwang DW, Kim S-W. Clinicopathologic Features of Polypoid Lesions of the Gallbladder and Risk Factors of Gallbladder Cancer. J Korean Med Sci. 2009;24(3):481-7.
5. Loannis T. Konstantinidis&SurabhiBajpai&Avinash R. Kambadakone& Kenneth K. Tanabe & David L. Berger &HuiZheng&Dushyant V. Sahani& Gregory Y. Lauwers& Carlos Fernandez-del Castillo & Andrew L. Warshaw& Cristina R. Ferrone; Gallbladder Lesions Identified on Ultrasound. Lessons from the Last 10 Years; J GastrointestSurg DOI 10.1007/s11605-011-1696-2
6. Levy AD, Murakata LA, Rohrmann CA Jr. Gallbladder carcinoma: radiologic-pathologic correlation. Radiographics. 2001 Mar-Apr;21(2):295-314; questionnaire, 549-55.
7. Ghafoor N, Abedin N, Mohiuddin AS. Role of Ultrasound and Computed Tomography in the Evaluation of Gallbladder Malignancy. AKMMC J 2017;8(2):105-11.
8. Hundal R, Shaffer EA. Gallbladder cancer: epidemiology and outcome. ClinEpidemiol. 2014; 6:99-109.
9. Liu L-N, Xu H-X, Lu M-D, et al. Contrast-Enhanced Ultrasound in the Diagnosis of Gallbladder Diseases: A Multi-Center Experience. Katoh M, ed. PLoS ONE. 2012;7(10):e48371. doi:10.1371/journal.pone.0048371.
10. Bhartiya R, Mallick S, Mallik M, Agrawal P, Singh R, Singh RV. Ultrasound-guided fine needle aspiration cytology diagnosis of gall bladder lesions with application of WHO histological classification of tumors on cytoaspirate material. Ann Trop Med Public Health 2017;10:138-42.