



Radiodiagnosis

COMPARATIVE EFFICIENCY OF ULTRASONOGRAPHY AND MAGNETIC RESONANCE IMAGING IN DETECTION OF GALLSTONES TAKING OPERATIVE FINDINGS AS GOLD STANDARD

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ABSTRACT

BACKGROUND: Gall stone disease is a fairly common problem encountered in surgical practice. Obese, middle aged females, as we all know, are the common victims. Considering the morbidity and a definite risk for carcinoma of gall bladder, an early diagnosis and treatment –i.e. cholecystectomy is mandatory. In this article, we have endeavoured to decipher the comparative efficiency of USG and MRI in detection of gall stones using intra-operative findings as gold standard.

AIMS: To evaluate the comparative efficacy of Ultrasound and Magnetic Resonance Imaging (MRI) in reaching a definitive diagnosis of gall stones.

MATERIAL AND METHODS: A total of 120 cases of clinically suspected cholelithiasis were included in our study. All of them were subjected to USG and MRI. Patients were interrogated with 2-5 MHz convex transducer of HD-7 USG machine (Philips) in a completely fasting state and 1.5 Tesla MRI machine using protocol for MRCP. Data were analysed, sensitivity and specificity of both modalities were calculated and compared using ANOVA method.

RESULTS: Of the 120 clinically suspected cases of cholelithiasis, ultrasonography detected 100 cases of gall stones. MRI could detect 84 cases while actually 96 cases had actual gall stone disease as seen at surgery. USG could not detect one case with gall stone while it misinterpreted 3 cases of calcified sludge and 2 cases of polyps as gall stones.

CONCLUSION: Ultrasonography is superior to MRI in detecting gall stones and we recommend sonographic evaluation of every case of clinically suspected cholelithiasis where MRI gives negative results.

KEYWORDS : Ultrasonography, Magnetic -Resonance Imaging, Cholelithiasis, Adenocarcinoma.

INTRODUCTION:

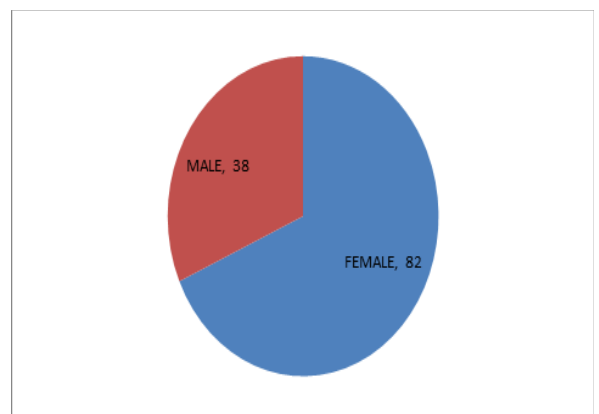
Gall stone disease is a very common problem encountered by surgeons cutting across races and religions.¹ However middle aged obese females with fair complexion are most commonly affected.² Three types of gall stones exist-cholesterol stone, pigment stone and mixed stone.³ It causes significant morbidity in form of recurrent pain abdomen and symptoms mimicking acute gastritis. Long standing cases have a definite risk of adenocarcinoma of gall bladder.⁴ Considering its morbidity and its significance as a precursor of omen –diagnosis and cholecystectomy is warranted at the earliest. Both USG and MRI can detect gall stones. Ultrasound is the primary mode of imaging followed by Magnetic Resonance Imaging.⁵ MRI has its added advantage of detecting choledocholithiasis with greater degree of sensitivity and specificity.^{6,7} MRI helps to distinguish gall stone types.⁸ However detection rate of gall stones by MRI alone is quite poor. In this study, we have tried to compare the relative efficiency of USG and MRI in detection of gall stones.

MATERIAL AND METHODS: A total of 120 cases with clinically suspected gall stone diseases referred from departments of General Surgery and Medicine, Bankura Sammilani Medical College, Bankura, West Bengal, India, were included in our study. Patients were first interrogated with 2-5 MHz convex transducer of HD7 (PHILIPS) ultrasonography machine. Then they were subjected to MRI (1.5 Tesla) using MRCP protocol. Patients were kept in fasting state prior to both the modalities. Findings were interpreted separately by two radiologists and one was blinded to the results of another. Findings of both modalities were compared with those seen at surgery. Sensitivity and specificity of both USG and MRI were calculated and compared.

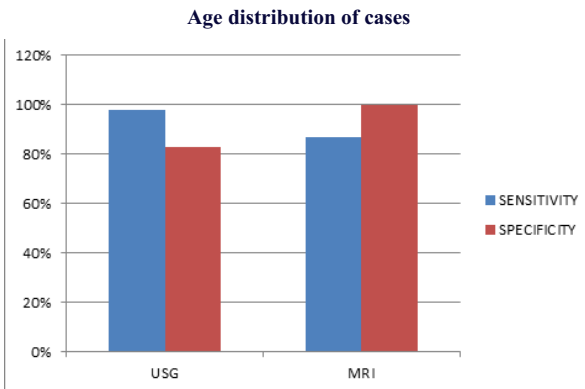
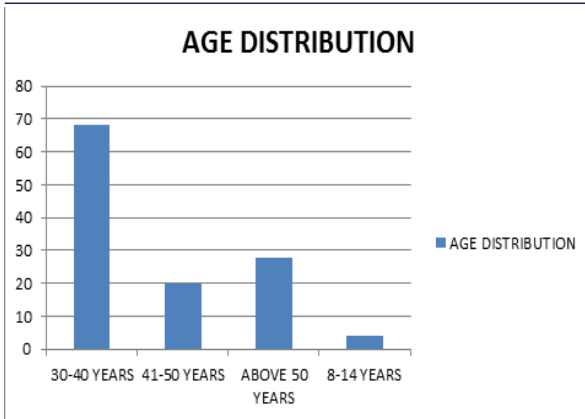
Of the 120 cases sent for evaluation, 82 were females and 38 were males.⁶ 8 cases were between 30-40 years of age, 20 cases were between 41-50 years of age, 28 cases were above 50 years of age. 4 cases were of pediatric age group (8-14 years). On USG 100 cases were diagnosed to have gall stones. One case of gall stone could not be

detected by USG, While 5 cases of USG detected gall stone did not have any gall stone at surgery. Instead, 3 patients had calcified sludge and two cases had polyp misinterpreted in USG as calculi. MRI could detect 84 cases. Larger calculi were easily visualised as signal voids where as smaller ones were not picked up.⁹ The same patients with calculus that USG did not detect, was not detected by MRI also. Cases of sludge (3) and polyp (2) interpreted by USG as calculi were not visualised by MRI at all. The data were plotted in tables were analysed using ANOVA method. Sensitivity and Specificity of USG were 98% and 83% respectively and those of MRI were 87% and 100% respectively assuming those of surgical findings as 100% and 100% respectively.

RESULTS:



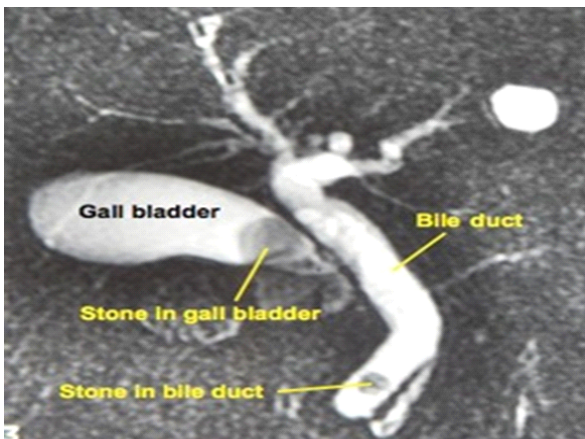
Total number of cases



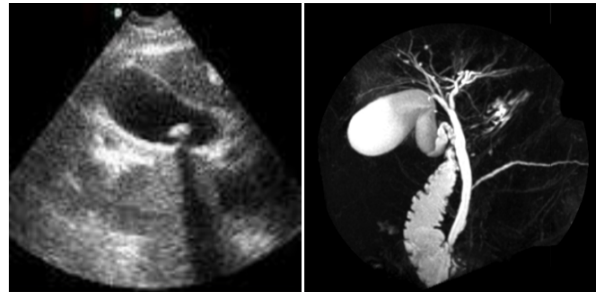
Sensitivity and Specificity of USG and MRI in detecting gall stones



Gall stone with posterior acoustic shadowing detected by USG



Gall stone detected by MRI



Gallstone detected by USG, but not detected by MRI

DISCUSSION: Statistically, gall bladder calculi has a major share of the total surgeries undertaken every day in any medical institute. Fair complexioned fatty females are the main victims. With the advent of USG, diagnosis has become easier. Early diagnosis is of paramount importance considering the ominous association with adenocarcinoma of gall bladder. MRI can also detect gall stones. It has an added advantage of detecting CBD calculi—its accuracy in this regard far surpassing that of USG. However, smaller gall bladder calculi tend to be missed on MRI. In this respect, ultrasonography has an edge over MRI. In our study, 95 out of 96 cases of gall stone disease could be correctly picked up on USG while MRI could detect only 84 cases. The smaller calculi were most frequently missed. There were 5 false positive cases on USG—3 of them had calcified sludge and 2 had polyp showing echoreflexive foci, hence considered as calculi. 1 case missed out on USG was due to impaction at the neck and the neck was overturned. Overall, comparing both the modalities, USG scored over MRI.

CONCLUSION: USG is a superior modality than MRI in detection of gall stone disease. Moreover, it is more easily available now-a-days. Every case of clinically suspected gall stone disease must undergo an ultrasonographic assessment before surgery. All MRI negative cases who did not undergo prior ultrasonography should be re-assessed by USG to exclude the presence of gall stones.

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