

Accuracy of MRCP in Malignant Pancreaticobiliary Diseases

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ABSTRACT

The expanding spectrum of therapeutic options for patients with malignant pancreaticobiliary diseases makes it necessary for the radiologist to precisely assess the etiology, location, level and extent of the disease.¹ This study was undertaken to assess the role of USG and MRCP in the evaluation of malignant pancreaticobiliary diseases. Detection, characterization and comparative evaluation of various malignant pancreaticobiliary diseases was done by USG and MRCP. MRCP provides valuable information of diagnostic, therapeutic, prognostic significance and helps in optimum surgical management of the patient. MRCP is a superior diagnostic modality as compared to USG for diagnosing and evaluating the various malignant pancreaticobiliary diseases.

Keywords: MRCP, USG, malignant pancreaticobiliary diseases, cholangiocarcinoma, Periapillary carcinoma.

INTRODUCTION

Malignant pancreaticobiliary diseases affect a significant portion of the world population. In most of the cases, medical history, physical examination, and clinical and laboratory data, can determine the presence of malignant pancreaticobiliary disease. However, the expanding spectrum of therapeutic options for patients with pancreaticobiliary diseases makes it necessary for the radiologist to precisely assess the etiology, location, level and extent of the disease.¹

Evaluation of suspected malignant pancreaticobiliary diseases has traditionally involved a variety of imaging modalities including Ultrasonography (USG), Computed Tomography (CT) and invasive cholangiography. Magnetic Resonance Cholangiopancreatography (MRCP) is a newer non-invasive imaging technique that provides excellent visualization of the hepatobiliary system.^{2,3}

Material and methods

This is a prospective study performed over a period of 2 years. Patients with clinical and laboratory features suggestive of malignant pancreaticobiliary pathology who are referred to the Department of Radiodiagnosis from surgery or medicine or

paediatrics department. For prospective data, each of the patient included in the study was interviewed to elicit the clinical history. 13 patients of all age groups and both sexes, suspected of malignant biliary and pancreatic pathology on the basis of history, clinical examination and laboratory investigations were selected. Informed and written consent of all cases was taken explaining the procedure. All the patients were instructed to fast overnight prior to the examination. Patients were examined first by USG followed by MRCP, and findings were correlated with ERCP/ biopsy report/ per operative or histopathological correlation or put on regular follow up.

Results

13 patients with malignant diseases were evaluated. Most of the patients with malignant pancreaticobiliary diseases were more common in the older age group. The most common malignant pathology seen was gall bladder carcinoma followed by periampullary carcinoma and cholangiocarcinoma. Gallbladder carcinoma and periampullary carcinoma were more predominant in females whereas Cholangiocarcinoma was predominant among males in this study. There were 2 cases of Carcinoma head

of pancreas. The least common malignant pathology was a single case of HCC. For malignant diseases, the sensitivity of USG was 76.92%, while specificity was 100.0%. The positive predictive value was 100.0%, while negative predictive value was 95.59%. The accuracy of USG in diagnosing malignant pathologies was 96.15%. The sensitivity of MRCP was 92.31%, while specificity was 100.0%. The positive predictive value was 100%, while negative predictive value was 98.48%. The accuracy of MRCP in diagnosing malignant pathologies was 98.72% (Table 01). The sensitivity and diagnostic accuracy of MRCP was higher than USG for periampullary carcinoma and cholangiocarcinoma whereas it was similar in cases of CA GB and CHOP.

Discussion

Most common symptom with which the patients presented was pain in abdomen, followed by nausea and jaundice. Almost all patients presented with combination of symptoms. Our results are comparable to studies by other researchers who also reported pain in abdomen as the most common symptom.^{4,5}

Malignant causes were found to be more common in females than in males. In our study, CA GB was the most common malignant cause with female preponderance. Most of the patients with benign pancreaticobiliary diseases in our study were in younger age group while malignant pancreaticobiliary diseases were seen in older age group. The higher incidence of malignant pancreaticobiliary diseases in patients of older age group has also been reported by other workers.^{6,7}

13 malignant pancreaticobiliary diseases were evaluated in our study with carcinoma gall bladder being the most common neoplasm followed by cholangiocarcinoma and periampullary carcinoma. Out of these, 12 were correctly diagnosed on MRCP whereas USG diagnosed 10 correctly. USG and MRCP missed one case of periampullary carcinoma which was finally diagnosed on histopathological examination.

From our study, it can be inferred that MRCP is better than USG for the evaluation of malignant pancreaticobiliary pathologies.

As per the study by Kurian et al. (2015) the sensitivity and specificity of ultrasonography in

detecting malignant lesions were 83.33% and 94.4% with a positive predictive value of 83.33% and negative predictive value of 94.4%. The sensitivity and specificity of MRCP in detecting malignant lesions were 81.25% and 91.66% with a positive predictive value of 81.25% and negative predictive value of 91.66%.⁸

For malignancy, sensitivity of MRCP ranges from 81-94.4% and specificity from 92-100%²⁷. The diagnostic accuracy of USG and MRCP in our study are almost similar to those reported by Bhat et al (2005) and Kurian et al (2015).^{8,9}

There were 5 cases of carcinoma gall bladder in our study, all of which were females and were correctly diagnosed on both USG and MRCP. In our study, sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of USG as well as MRCP were 100%. These results are comparable to recent studies in the literature.^{8,9}

There were 3 cases of cholangiocarcinoma in our study out of which 2 were male and one was female. Our results for USG in detection of cholangiocarcinoma are higher than the study of Machan L et al (sensitivity 50%) and lower than study by Hann E et al (1995) and Robledo R et al (1996) who detected 87% and 96% correct cases respectively.¹⁰⁻¹²

Diagnostic accuracy of USG and MRCP reported by Kurian et al (2015) and Bhatt et al (2005) is 83% and 100% respectively.^{8,9} Gajbhiye et al (2011) reported the sensitivity and specificity of MRCP to be 100% similar to our study.¹³

Out of 3 cases of periampullary carcinoma, out of which 2 were female and one was male, 1 was correctly diagnosed by USG with sensitivity, specificity and diagnostic accuracy of 33.3%, 100% and 97.4% respectively while MRCP detected 2 cases with sensitivity, specificity and diagnostic accuracy of 66.6%, 100% and 98.7%. Our USG results for specificity and diagnostic accuracy are similar to that reported by Amandeep et al (2014)⁷ (sensitivity 57.14%, specificity 100% and diagnostic accuracy 94%). Sensitivity for MRI/MRCP is low as compared 100% in their study, however, specificity and diagnostic accuracy (100 % each) is almost similar to their results.

Diagnostic accuracy of USG and MRCP reported by Kurian et al (2015) and Bhatt et al (2005) is 50% and 50%. Gajbhiye et al (2011) reported the sensitivity and specificity of MRCP to be 50 % and 100% respectively.^{8,9}

In our study there were 2 cases of carcinoma head of pancreas, one of which was male and the other was female. Both of them were correctly diagnosed by both USG and MRI/MRCP with sensitivity, specificity and diagnostic accuracy of 100% each. Upadhyaya V et al (2006)¹⁴ reported sensitivity of 77.78% and 88.89% by USG and MRCP respectively for pancreatic head carcinoma.

Conclusion

MRCP and USG, both are excellent noninvasive, non radiating modalities for the evaluation of malignant pancreaticobiliary diseases. USG, due to its easy availability and cost effectiveness, remains the first line of modality for malignant pancreaticobiliary diseases. MRCP provides valuable information of diagnostic, therapeutic, prognostic significance and helps in optimum surgical management of the patient.

As compared to USG, MRCP is more sensitive in detecting malignant pathologies. MRCP is a superior diagnostic modality as compared to USG for diagnosing and evaluating the various malignant pancreaticobiliary diseases. MRCP can be considered almost as a new gold standard for the investigation of malignant CBD and pancreatic ductal pathologies and it permits reservation of ERCP to patients with a high probability of therapeutic intervention.

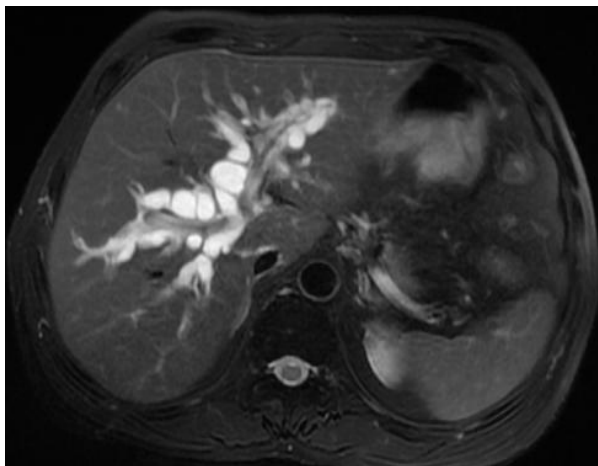
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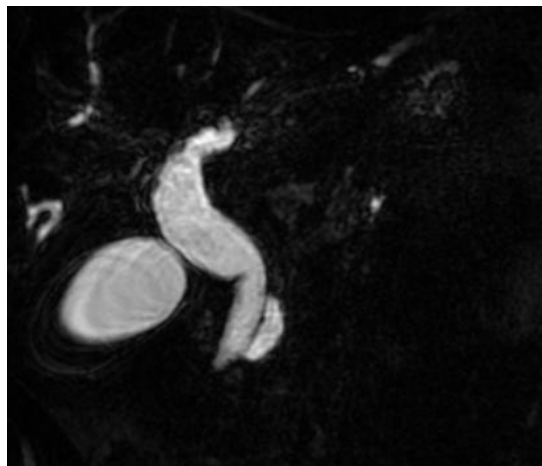
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Case 1: Periampullary carcinoma

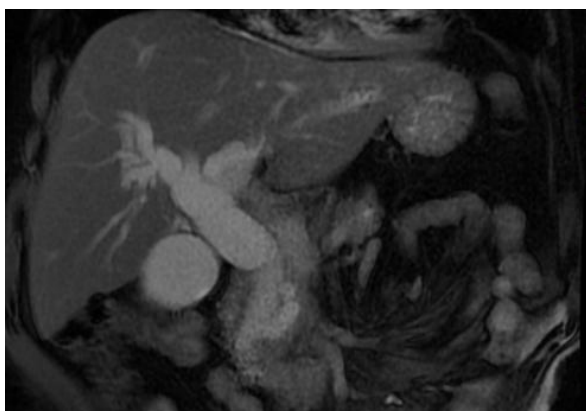
A 55 year female came with the complaints of pain in abdomen, jaundice, vomiting, loss of appetite and weight loss since 3 months.



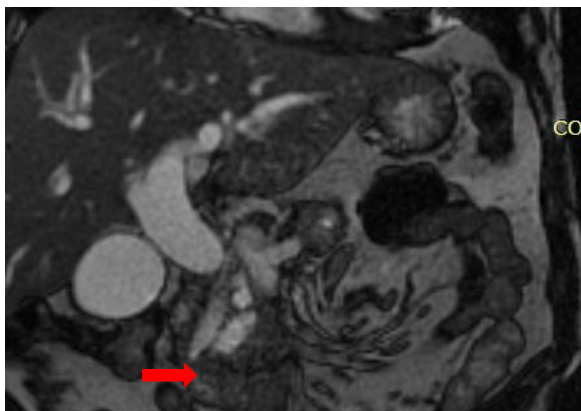
a.



b.



c.

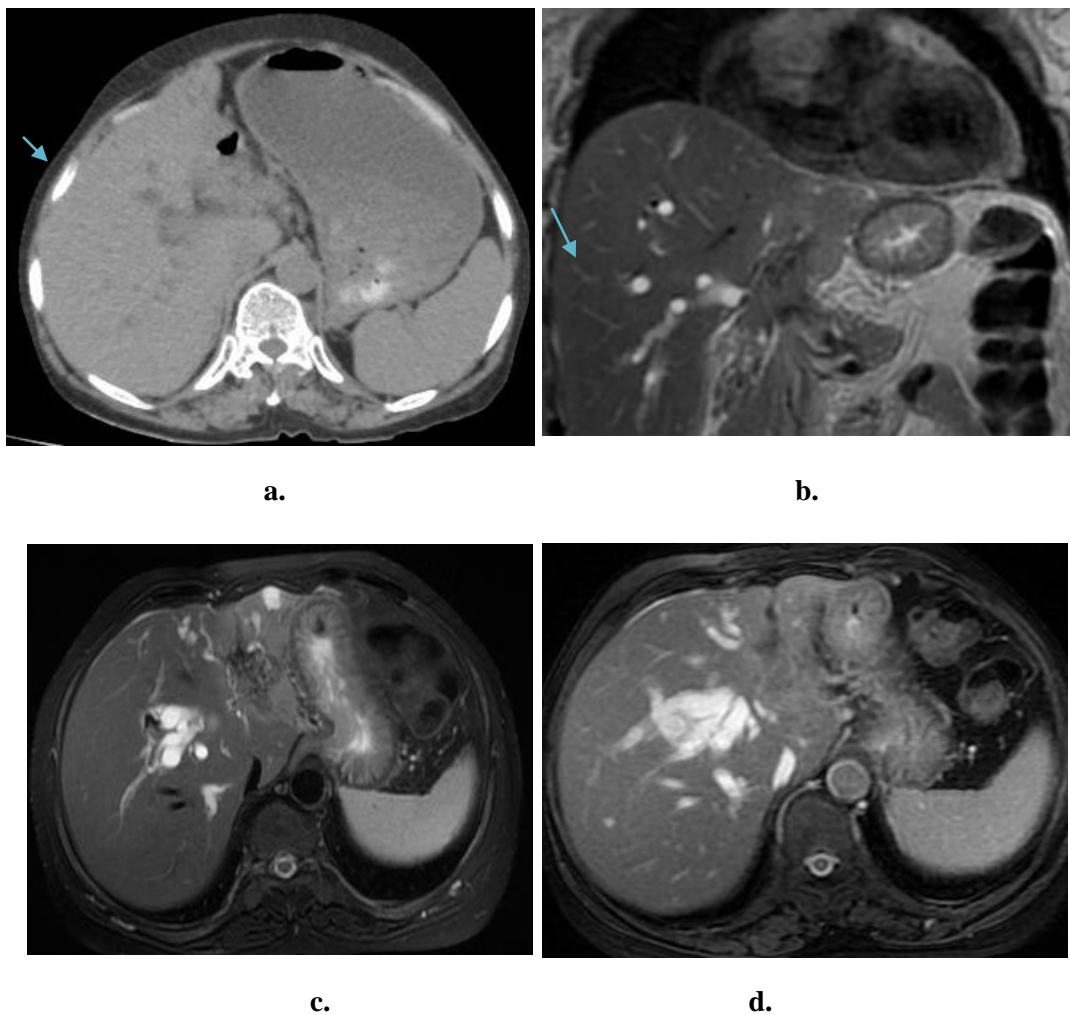


d.

Figure a: Axial T2 FRFSE RTr FS image shows dilated IHBR. Figure b: 3D MRCP RTr ASSET image showing dilated CBD and MPD. Cor 2D FIESTA images (figure c,

Case 2: Klatskin tumour

A 40 year male came with the complaints of pain in abdomen and jaundice, nausea, weight loss, loss of appetite since 4 months.

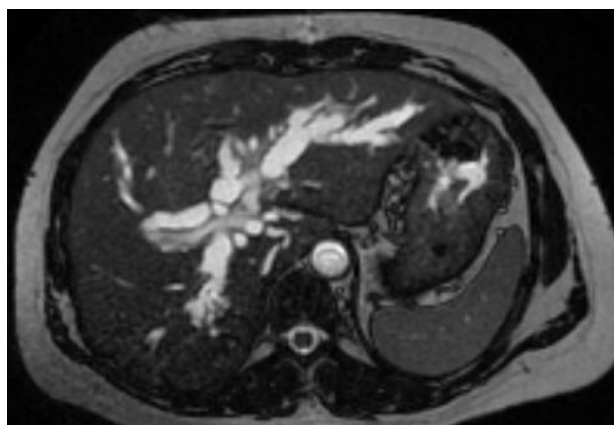


Axial NECT (figure a) and MRCP (figure b) images showing a hilar mass lesion (red arrow).

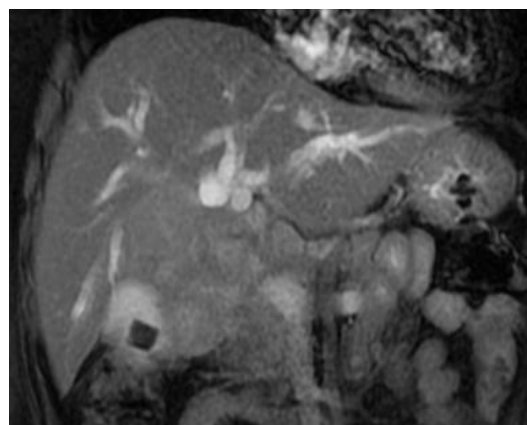
Axial 2D FIESTA images (figure c and d) showing dilatation of IHBR.

Case 3: HCC compressing CBD

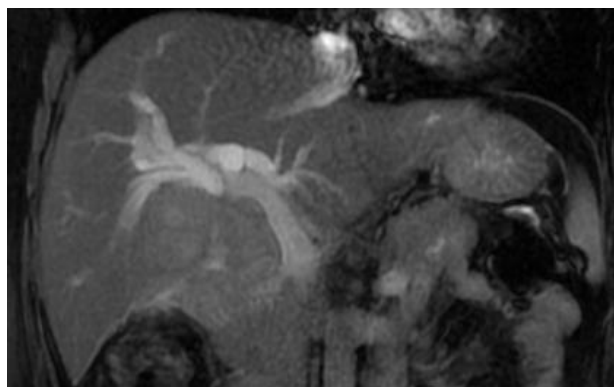
60 year male came with the complaint of pain in abdomen, nausea, weight loss and loss of appetite since 1 year.



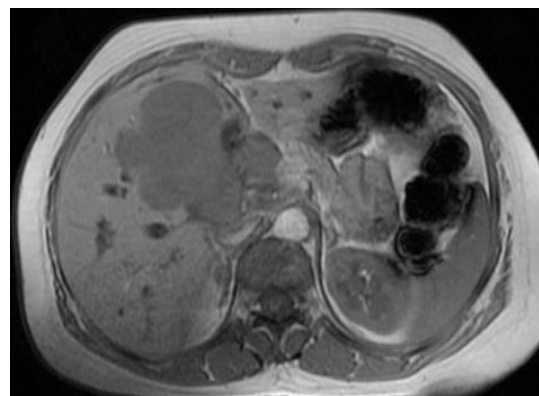
a.



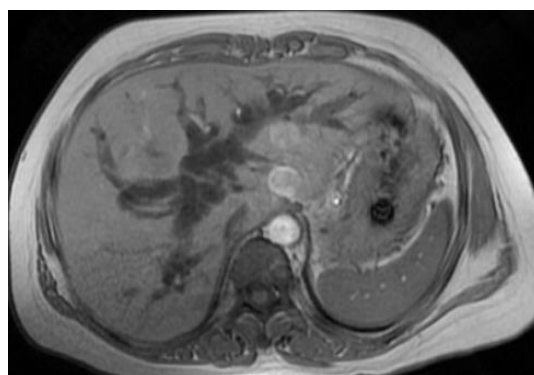
b.



c.



d.



e.

Axial 2D FIESTA FS BH (figure a), Cor 2D FS FIESTA (figure b, c) and Axial T1 FSPGR BH (figure d, e) images showing HCC compressing CHD and CBD and causing proximal IHBR dilatation.

TABLES

Table 01: Diagnostic evaluation of malignant pancreaticobiliary pathologies by USG and MRCP in percentage

Modality	T P	F P	F N	TN	Sensitiv ity	Specific ity	PPV	NPV	Accuracy
USG	10	0	3	65	76.92 (46.19 to 94.96)	100.00 (94.48 to 100)	100.00	95.59 (88.93 to 98.32)	96.15 (89.17 to 99.20)
MRCP/MR I	12	0	1	65	92.31 (63.97 to 99.81)	100.00 (94.48 to 100)	100.00	98.48 (90.82 to 99.77)	98.72 (93.06 to 99.97)