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Utility Of Magnetic Resonance Cholangiopancreatography (MRCP) In Evaluation Of Obstructive Jaundice.

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ABSTRACT

Obstructive jaundice is a clinical condition characterized by yellow discoloration of the skin and mucous membranes due to the buildup of bilirubin in the blood, caused by an obstruction in the bile ducts. The research article discusses the utility of magnetic resonance cholangiopancreatography (MRCP) in the evaluation of obstructive jaundice, a clinical condition characterized by yellow discoloration of the skin and mucous membranes due to the obstruction of the bile ducts. The article describes MRCP as a non-invasive imaging technique that uses magnetic resonance imaging (MRI) to visualize the biliary system and pancreatic ducts. The study was conducted on 50 patients with clinical suspicion of obstructive jaundice, and the diagnosis was confirmed with histopathological examination and the clinical course of the disease. The results of the study showed that MRCP had high sensitivity and specificity in identifying the site and cause of the obstruction, and it was an accurate diagnostic tool for all causes of obstructive jaundice. The article also discusses the advantages of MRCP over other imaging modalities and concludes that MRCP has become an important tool in the evaluation of obstructive jaundice.

Keywords: Obstructive jaundice , cholangiopancreatography

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INTRODUCTION

Obstructive jaundice is a clinical condition characterized by yellow discoloration of the skin and mucous membranes due to the buildup of bilirubin in the blood, caused by an obstruction in the bile ducts. The diagnosis and management of obstructive jaundice require a thorough evaluation of the biliary system to determine the location and cause of the obstruction [1]. Magnetic resonance cholangiopancreatography (MRCP) is a non-invasive imaging technique that uses magnetic resonance imaging (MRI) to visualize the biliary system and pancreatic ducts. It has emerged as a valuable tool in the evaluation of obstructive jaundice due to its high sensitivity and specificity in identifying the site and cause of the obstruction, without the need for invasive procedures [2].

USG is the primary modality in suspected biliary obstruction due to its many advantages like its ready availability, its cost effectiveness and no requirement of contrast material and lack of ionizing radiation [3] but it has major limitation in the visualization of distal CBD and pancreas, due to obscuration by overlying bowel gas in 30 -50 % of cases and obesity can degrade the image quality and also USG is highly operator dependent. MRCP is a non-invasive technique for work-up of patients with suspected biliary obstruction, which has gained popularity because of its excellent diagnostic capabilities in the evaluation of biliary obstruction [4].

MATERIAL AND METHODS

The present study of MRCP evaluation was conducted on 50 patients with clinical suspicion of obstructive jaundice. The diagnosis of obstructive jaundice was done on characteristic features on different sequences of MRI. The final diagnosis was confirmed with histopathological examination either preoperative or postoperative and with clinical course of disease.

Place of study: Department of Radiodiagnosis in tertiary care center.

Proposed duration of study: 18 months to 2 yr. approximately (September 2020 to November 2022).

Sample size: 50 (total no. of cases).

Sampling method: Random.

Source of cases: Department of surgery from tertiary care institute.

Inclusion criteria

- Patients with suspected biliary obstruction with clinical and laboratory or imaging features suggestive of obstructive jaundice who are referred for MRCP to Department of Radiology.
- Patients willing to enroll in the study after giving the informed consent.

Exclusion criteria

- Patients having history of claustrophobia.
- Patients having cardiac pacemakers and electromagnetic implants.
- Patients not giving the consent for study.
- Hemodynamically and clinically unstable patients.

RESULTS

Majority of the patients were in the age group of 41 – 50 years (32%), while least number of patients were aged 1 – 10 years (2%). The age of study population ranged from 4 to 76 years with a mean of 44.02 ± 15.54 years.

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Table 1: Validity measures of MRCP in diagnosing etiology of obstructive jaundice by considering HPE finding as a gold standard.

MRCP findings	HPE findings		Total
	Benign	Malignant	
Benign	33	3	36
Malignant	2	12	14
Total	35	15	50

Parameters	Estimates	95% CI
Sensitivity	80.00%	57.19% to 98.2%
Specificity	94.28%	81.34% to 99.30%
Accuracy	90.00%	80.77% to 97.78%

95% CI: 95% Confidence interval

On MRCP, the most common benign pathology was benign stricture (24%). Moreover, the most common malignant pathology was periampullary carcinoma (12%).

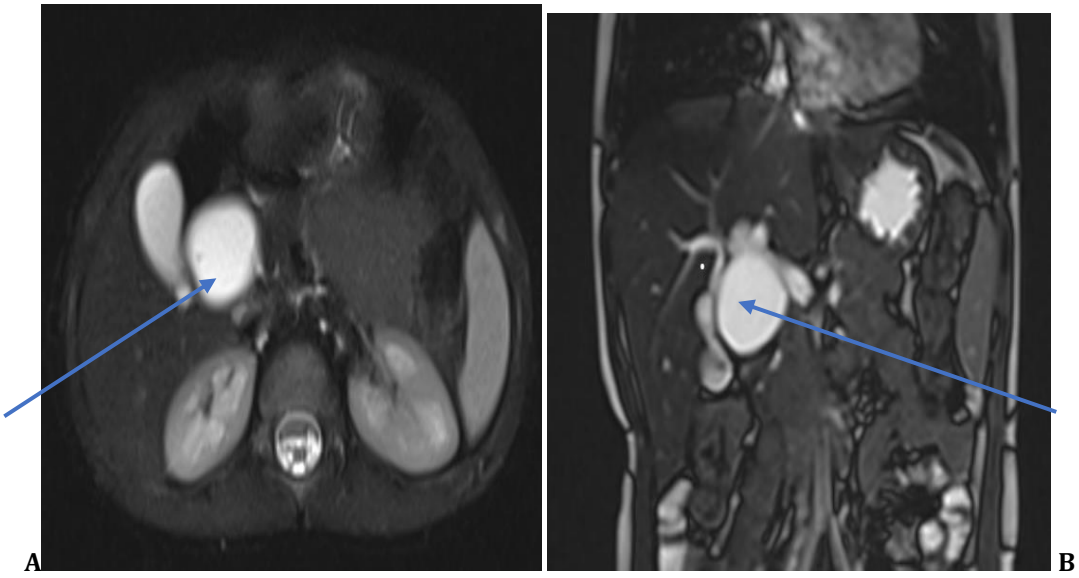
In the present study, out of the 50 cases with obstructive jaundice, 80% of malignant pathology of obstructive jaundice were detected through MRCP considering HPE as gold standard.

MRCP is having 94.28 % specificity to rule out malignant pathology by considering HPE as gold standard.
Accuracy of MRCP in diagnosing all causes of obstructive jaundice is 90% compared to HPE.

Case 1: 4 yr. old child present with abdominal pain in peri-umbilical region with deranged LFT.

(A) T2 axial & (B) T2 trufi shows fusiform dilatation of proximal & mid CBD (C) USG image shows dilated CBD. suggestive of

Type IC choledochal cyst (Todani classification).



A **B**

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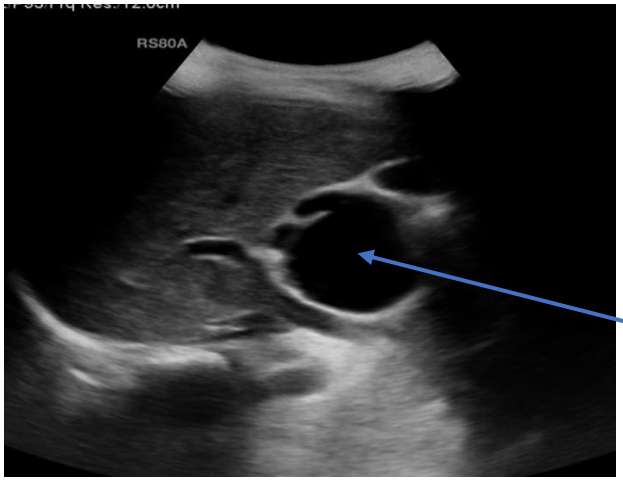
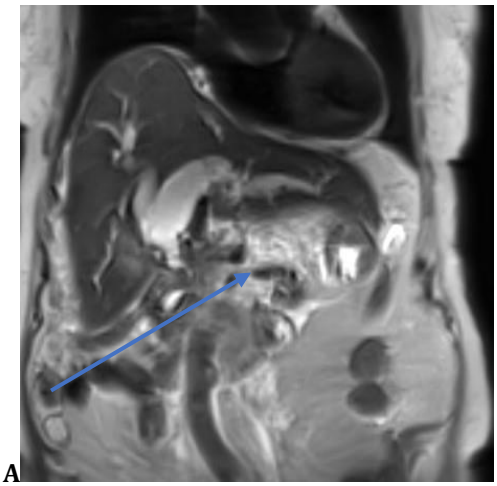


C

Case 2- 76 yr. old female patient present with obstructive jaundice.

(A) & (B) T2 HASTE CORONAL image shows hypointense mass lesion in proximal CBD causing its near complete narrowing (C) MRCP image showing intrahepatic biliary radicles dilatation with narrowing of CBD suggestive of

Type I Cholangiocarcinoma



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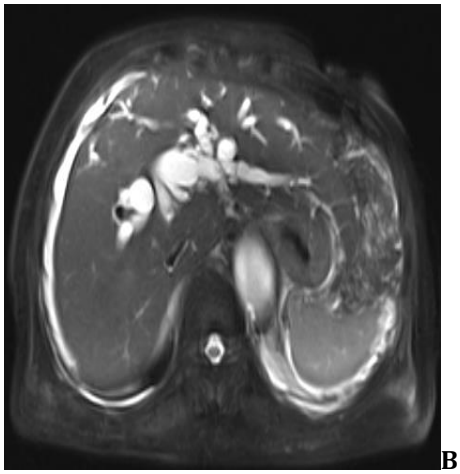

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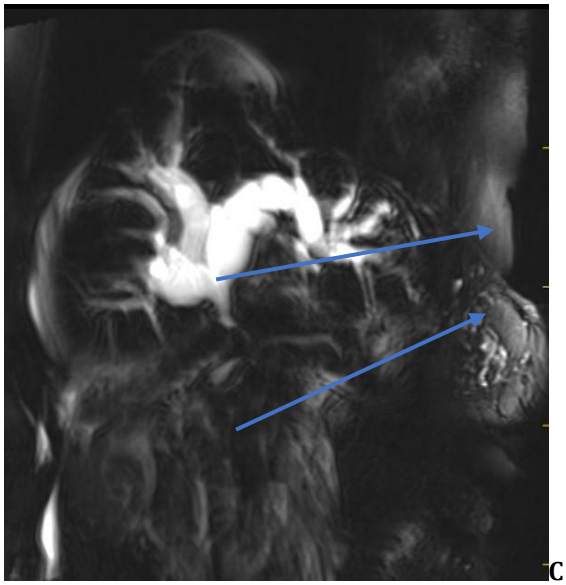

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DISCUSSION

Magnetic resonance cholangiopancreatography (MRCP) is a non-invasive imaging technique that has become an important tool in the evaluation of obstructive jaundice. MRCP provides high-quality images of the biliary system and pancreatic ducts without the need for invasive procedures such as endoscopic retrograde cholangiopancreatography (ERCP) or percutaneous transhepatic cholangiography (PTC) [5].

The utility of MRCP in the evaluation of obstructive jaundice lies in its ability to accurately identify the site and cause of the obstruction. MRCP can detect the presence of gallstones, biliary strictures, tumors, and other causes of biliary obstruction with high sensitivity and specificity. MRCP can also differentiate between intrahepatic and extrahepatic causes of obstruction and identify the level of obstruction within the biliary system [6].

Moreover, MRCP has several advantages over other imaging modalities in the evaluation of obstructive jaundice. Firstly, it is a non-invasive technique that does not require the use of ionizing radiation or contrast media, which can be harmful to some patients. Secondly, it is a fast and efficient imaging modality, which can be performed within a relatively short period of time, typically less than an hour. Thirdly, MRCP can be repeated without any adverse effects, which is especially useful in cases where the cause of the obstruction is unclear or where follow-up imaging is necessary [7].

However, there are some limitations to the utility of MRCP in the evaluation of obstructive jaundice. MRCP is unable to identify small bile duct stones (<2mm), which may be missed on imaging. Moreover, MRCP may not be able to provide accurate information in cases where there is a poor or incomplete visualization of the biliary system due to patient factors such as obesity or poor cooperation during the procedure. In such cases, other imaging modalities such as ERCP or PTC may be necessary to provide more detailed information about the biliary system [8].

Obstructive jaundice is always challenging to clinician, in terms of confirmation and to find cause. Ever evolving radiology branch with its newer innovation of modalities is tremendously contributing to diagnose and help clinician to manage obstructive jaundice. Obstructive jaundice is defined as a condition occurring due to a block in the pathway between the site of conjugation of bile in the liver cells and the entry of bile into the duodenum through the ampulla. The block may be intrahepatic or extrahepatic in the bile duct. It may be benign or malignant [1].

Benign causes can be due to intraluminal causes e.g., Choledocholithiasis, Haemobilia or parasites. Benign causes originating from the wall include infection or inflammation of the bile ducts e.g., primary Sclerosing Cholangitis, AIDS cholangiopathy, post-surgical stricture and Hepatic artery chemotherapy. Extraluminal causes include acute and chronic pancreatitis, Ampullary Stenosis, lymph node compression or vascular compression e.g., Portal cavernoma or aneurysm. Malignant causes can be intraluminal e.g., Cholangiocarcinoma or Carcinoma of the Gall Bladder. Extraluminal causes include Carcinoma of the head of pancreas, Duodenal or Ampullary Carcinoma, or metastatic disease. Congenital causes include Biliary Atresia, Choledochal Cyst or Caroli's Disease.

The present study of MRCP evaluation was conducted on 50 patients with clinical suspicion of obstructive jaundice. The diagnosis of obstructive jaundice was done on characteristic features on different sequences of MRI. The final diagnosis was confirmed with histopathological examination either preoperative or postoperative and with clinical course of disease.

Among 50 patients, age of patients varied from youngest being 4 year to eldest 76 year, with majority of patients (n=16) lying in the range of 41–50 year age group. It was observed that majority of patients below age 45 year presented with benign pathology while beyond 45 year benign & malignant lesions had equal distribution. We used USG as primary modality of investigation for screening. Incidence of biliary obstruction was found more in female (60 %, n=30) sex in this study which was in contrast to study by to study by Dr. Saket Ballabh et al (2020) where they found biliary obstruction more common in male sex [8].

In present study abdominal pain was most common presenting symptom (100%, n=50), followed by jaundice (96 %, n=48), vomiting (64 %, n=32), pruritus (52%, n=26), weight loss (36%, n=18) and

fever (16%, n=8) in contrast of study by ankur atrri et al where most common symptoms were jaundice (82%) and vomiting (72%), respectively [3]. Some people presented with comorbidities like diabetes mellitus (10%), sickle cell disease (8%) and hypertension (3%) considered high risk patient. In the present series, most of pathologies were found to be predominantly involving the distal CBD (66 %, n=33). This was in contrast to study done by Upadhyaya et al., in which most frequent level of obstruction was found to be intrapancreatic CBD followed by supra-pancreatic CBD and CHD [9].

CONCLUSION

In conclusion, magnetic resonance cholangiopancreatography (MRCP) has emerged as a valuable tool in the evaluation of obstructive jaundice due to its high sensitivity and specificity in identifying the site and cause of the obstruction. MRCP is a non-invasive imaging technique that provides high-quality images of the biliary system and pancreatic ducts without the need for invasive procedures. Although it has some limitations, MRCP is a safe, efficient, and repeatable imaging modality that can provide important diagnostic information for the management of obstructive jaundice. MRCP is most useful non-invasive & essential imaging modality for preoperative evaluation of patient with obstructive jaundice.

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