

# Accuracy of Magnetic Resonance Cholangiopancreatography (MRCP) in Obstructive Biliopathy.

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## Abstract

**Background:** Obstructive biliopathy (OBP) is a commonly encountered clinical condition. With the advent of noninvasive magnetic resonance cholangiopancreatography (MRCP), majority of patients with suspected OBP are nowadays first subjected to MRCP segregating those needing endoscopic retrograde cholangiopancreatography (ERCP) which is invasive but allows therapeutic intervention.

**Aim & Objective:** To evaluate the diagnostic role of MRCP in diagnosing the cause of obstructive biliopathy.

**Material & Method:** A multicentric study involving a total of 100 patients with clinical and biochemical evidence of OBP was conducted. MRCP preceded ERCP in all cases. The findings of both MRCP and ERCP were recorded and results were compared using latter as gold standard.

**Results:** Our study of 100 patients included nearly equal number of males and females in the age range of 20-70 years. The overall accuracy of MRCP in diagnosing intrinsic & extrinsic cause of obstructive jaundice and different causes of intrinsic obstruction was more than 90.0% with high sensitivity & PPV and moderate specificity & NPV.

**Conclusions:** MRCP is a sensitive and reliable imaging tool for ascertaining the cause of obstructive biliopathy and can reliably preclude invasive ERCP.

**Keywords:** Obstructive, Biliopathy, Magnetic Resonance, Endoscopic, Retrograde, Cholangiopancreatography

## Introduction

Magnetic resonance cholangiopancreatography (MRCP) is a radiological technique that demonstrates pancreaticobiliary tract noninvasively similar to that obtained by invasive endoscopic retrograde cholangiopancreatography (ERCP). Inherent fluid-demonstrating capability of MRCP makes it suitable not only as a noninvasive tool but also an ideal method for patients with allergies to iodine-based contrast agents or those with atopy. Multiple studies in recent literature have not only demonstrated high accuracy but also high safety and tolerability of MRCP [1-5].

Biliary obstruction is multifactorial ranging from calculus, stricture, infection & tumour, with choledocholithiasis

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being the most common cause. An accurate diagnosis is imperative for early management, choice of treatment and determining prognosis [1,2]. Though ERCP is the gold standard investigation for pancreaticobiliary tract evaluation providing opportunity for therapeutic procedure yet it is limited by its invasive nature and inherent risk of complications besides radiation-exposure, need for iodinated-contrast agent and sometime need of sedation. Hence in recent era of imaging, ERCP is preferred when therapeutic intervention is contemplated and is usually preceded by MRCP [3]. In addition, MRCP serves as a road-map to ERCP demonstrating anomalies as well as level, degree & cause of obstruction thus helping in reducing associated morbidity & mortality. Hence, the goal of this study was to determine the diagnostic role of MRCP in patients with OBP using ERCP as gold standard.

## Material and Methods

Hundred patients with obstructive biliopathy who had both MRCP & ERCP, irrespective of the centre of

evaluation and age or sex were included in our study. Suboptimal scans were excluded from our study. MRCP preceded ERCP while latter was performed within a week of MRCP.

MRCP was performed on a 1.5 TMR scanner using a 3D-heavy-T2W image sequence with axial, coronal and sagittal MIP reconstructions following overnight fasting of 8-12 hours. The findings of MRCP were recorded as intrinsic or extrinsic obstruction and if intrinsic, the cause was also recorded. The radiologist recording the MRCP findings was blinded to ERCP findings.

The sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and accuracy of MRCP for diagnosis of the cause and aetiology of obstructive biliopathy was calculated.

## Observations

Out of total 100 patients in our study, 65 were females and rest males. Their mean age was 54 years (range 20-70 years).

Among hundred patients, MRCP detected 87 patients with intrinsic obstruction & 13 with extrinsic obstruction while in ERCP, 80 patients were confirmed as having intrinsic, 13 as extrinsic and 7 patients as having no obstruction. This is shown in Table 1. Seven cases where MRCP falsely diagnosed obstruction revealed dilatation of biliary tract without obvious obstructive lesion on ERCP. This may possibly be due to spasm/edema at sphincter of Oddi or residual obstruction secondary to passage of calculus.

**Table 1: Distribution of patients with OBP according to Type of Obstruction**

Type	MRCP	ERCP
<b>Intrinsic</b>	87	80
<b>Extrinsic</b>	13	13
<b>No obstruction</b>	0	7
<b>Total</b>	<b>100</b>	<b>100</b>

Based on Table 1, MRCP has the sensitivity, specificity, PPV, NPV and accuracy of 100%, 74.1%, 92%, 100% and 93.5% respectively for diagnosing the cause of OBP as intrinsic. While all the statistical values were 100% for extrinsic causes of OBP.

**Table 3: Statistical Evaluation of MRCP in Intrinsic Causes of Obstructive Biliopathy**

Cause of Intrinsic Obstruction	Sensitivity % age	Specificity % age	PPV % age	NPV % age	Accuracy % age
<b>Cholelithiasis</b>	100	88.4	90.7	100	94.6
<b>Parasitic infestation</b>	100	97.7	66.7	100	97.8
<b>Benign stricture</b>	100	92.1	72.7	100	93.5
<b>Malignant stricture</b>	68.6	100	100	93.8	94.6

Among the intrinsic causes of OBP, choledocholithiasis predominated where MRCP overrated the diagnosis. Similar results were also noted with for parasitic causes of obstructive biliopathy (4 cases of ascariasis and 2 for hydatidosis). Cases that were falsely diagnosed by MRCP as choledocholithiasis/parasitic infestation were possibly due to tumefactive biliary sludge.

MRCP could detect strictures with 100% accuracy. Though MRCP falsely diagnosed 5 cases as benign strictures as they proved malignant on cytology / tissue diagnosis yet it did not miss any case of malignant stricture. Table 2 shows the above distribution of cases.

**Table 2: Distribution of Cases of Intrinsic Causes of Obstructive Biliopathy**

Cause Of Intrinsic Obstruction	MRCP	ERCP
<b>Cholelithiasis</b>	54	49
<b>Parasitic Infestation</b>	06	04
<b>Benign Stricture</b>	21	16
<b>Malignant Stricture</b>	06	11
<b>No Cause</b>	00	07
<b>Total</b>	<b>87</b>	<b>87</b>

Based on the above observations of our study, the sensitivity, specificity, PPV, NPV and accuracy of MRCP for detection of various intrinsic causes of OBP is as given in Table 3.

Table 3 shows that MRCP is highly sensitive for detection of choledocholithiasis, parasitic infestation & benign strictures of biliary tract with high specificity of detecting malignant stricture and an overall accuracy of more than 90% in detecting all intrinsic causes of OBP.

## Discussion

Obstructive biliopathy is characterised by obstruction to free flow of bile by variety of causes including calculus, stricture & tumor associated with variably raised levels of bilirubin especially direct-type and alkaline phosphatase [6]. MRCP provides excellent anatomic details of the pancreaticobiliary tract with high-contrast resolution without use of ionizing radiation [7]. Recent technological advancement allows three-dimensional (3D) imaging that can display the biliary tract in any plane from any angle.

Our study shows that MRCP is highly sensitive and specific in evaluating the biliary system. Furthermore, it revealed that a negative MRCP is very unlikely to reveal any abnormality on ERCP. Several studies like ours claim that MRCP is highly accurate and provides comparable results to ERCP in the evaluation of biliary duct pathology in general population [8-10].

## Conclusion

Based on our study, we can confidently conclude that MRCP is a sensitive and reliable imaging tool for evaluation of patients with obstructive biliopathy. It can not only differentiate cases with intrinsic obstruction from those with extrinsic causes but can also reliably predict the cause of intrinsic pathology. Negative MRCP practically precludes the invasive ERCP procedure thus avoiding related complications.

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