

ORIGINAL ARTICLE

Comparative Study of MRCP and ERCP in Extra Hepatic Biliary Obstruction

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ABSTRACT

Background and Aims :

The objective of this study is to hold comparison between Endoscopic Retrograde Cholangio pancreatography and Magnetic resonance cholangio pancreatography in diagnosis of patients with obstructive jaundice in Indian population and to determine the accuracy to find the cause and level or site of obstruction by both modalities.

Methods :

It is a prospective and descriptive study conducted in department of Gastroenterology, Mahatma Gandhi Hospital from March 2018 to March 2019. A total number of 80 patients with clinical diagnosis of obstructive jaundice of all age groups and either sex were included in this study. MRCP was done in all the patients and its results were compiled and compared with the ERCP findings. The sensitivity, specificity were calculated. Statistical significance was set at $p < 0.05$, with 95% confidence intervals.

Results :

80 patients were included in our study, results showed female predominance (60%) over males (40%), MRCP diagnosed stone in 46 (57.5%) patients while ERCP diagnosed CBD stone in 48 (60%) patients. MRCP showed stricture in 30 (37.5%) patients in which 24 (80%) patients had malignant stricture while 6 (20%) patients had benign stricture. Carcinoma gall bladder was the most common etiology of malignant stricture. Among malignant strictures 19 (79.16%) had below hilar block, 4 (16.66%) had hilar block and 1 case had complex anatomy

of block. ERCP found stricture in 27 (33.7%) patients, 19 (70.3%) patients had malignant stricture while 8 (29.6%) patients had benign stricture. 14 (73.7%) had below hilar block, 4 (21.05%) had hilar block and 1 case had complex anatomy of block.

Conclusion :

Diagnostic accuracy of MRCP and ERCP are comparable in evaluation of etiology, site and extent in extra hepatic biliary obstruction cases. MRCP can be used as noninvasive alternative to ERCP however ERCP has therapeutic value.

Key words :

Cholelithiasis, Choledocholithiasis, ERCP, MRCP, EHBO, Stricture of CBD

INTRODUCTION

Obstructive jaundice is defined as due to a block in the pathway between the site of conjugation of bile in the liver cells and entry of bile into the duodenum through the ampulla. The block may be intrahepatic (at biochemical cellular or canalicular level) or extrahepatic in bile ducts (Extrahepatic biliary obstruction /EHBO)¹. Symptoms of obstructive jaundice include jaundice with or without pain, dark urine, pruritus, pale stools, weight loss, anorexia. Timely investigation and management of obstructive jaundice can avoid complications. A vast array of invasive and non invasive diagnostic tests are available to diagnose and establish the etiology of obstruction. It includes Ultrasonography, CT scan, MRCP and ERCP. The role of imaging is crucial for detection of site, extent and cause of obstruction. In case of malignant obstruction, characterization and staging of tumour is crucial to decide optimal management.

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Endoscopic retrograde cholangiopancreatography (ERCP) is a technique that combines the use of fiber optic endoscopy and fluoroscopy for both diagnostic and therapeutic purpose². Although ERCP is considered gold standard, it is an invasive procedure that includes cannulation of the common bile or pancreatic duct, sedation, use of ionizing radiation along with an expert team of trained and experienced gastroenterologists and nursing staff. ERCP is also associated with significant complications like hemorrhage, sepsis, pancreatitis and bile leak, as well as a documented mortality of upto 1%².

Introduced by Wallner and co workers in 1991 Magnetic resonance cholangio pancreatography (MRCP) is a non invasive imaging method that relies on heavily T2 weighted imaging with fat suppression. It allows multiplanar view of entire biliary tree in a coronal scan much like the view afforded by conventional cholangiography. MRCP is noninvasive, uses no ionizing radiation, requires no anesthesia, less operator dependent, better demonstrating ducts proximal to an obstruction or tight stenosis and when combined with conventional T1- and T2-weighted sequences, allows anatomic imaging of extra ductal diseases and surrounding parenchyma but it has no therapeutic value³.

OBJECTIVE

To compare MRCP and ERCP in evaluation of etiology, site and extent in extrahepatic biliary obstruction cases.

MATERIALS AND METHOD

It is a prospective, descriptive study done in Mahatma Gandhi Medical College, Jaipur Rajasthan, India, from March 2018 - March 2019. 80 Patients of all age groups and either sex with EHBO were included in study. The diagnosis of EHBO was based on clinical presentation (jaundice, pain, pruritus, fever) and investigations which included CBC/LFT/RFT, PT/INR & imaging (Ultrasonography (USG) or Contrast enhanced computerized tomography [CECT]). Patient with EHBO underwent MRCP. Imaging was done on GE 1.5 tessa MRI machine. MRCP sequences used were axial and coronal T2W TSE, Fat suppressed T2W SPAIR, Fat suppressed T2W FRFSE, thick slab MRCP, heavily T2W high resolution 3D.

Results of MRCP were reviewed by an experienced radiologist blinded to the ERCP results but having only clinical information related to the symptoms of patients. MRCP findings were subsequently confirmed by ERCP

findings, ERCP guided tissue diagnosis, surgical findings and histopathological findings wherever available. ERCP was done by Pentax scope and general electric fluoroscopy with patients under propofol sedation in prone or left lateral position by an experienced gastroenterologist.

The diagnosis of Benign biliary stricture (BBS)⁴ was made by the combination of history review, serum markers, imaging studies, and ERCP brush cytology reports. On MRCP^{5,6} benign biliary stricture is characterized by regular, symmetric, and short segment narrowing, whereas malignant strictures usually present with irregular, asymmetric, long-segment narrowing associated with mass lesion. Those strictures in which basic work up, including transabdominal imaging and endoscopic retrograde cholangiopancreatography (ERCP) with conventional brush cytology, is non-diagnostic for its etiology are classified 'indeterminate stricture'⁷, while stricture with mass lesion along with elevated serum CA 19-9 and carcinoembryonic antigen (CEA) and positive brush cytology and tissue biopsy and characteristic imaging findings is classified as malignant stricture⁸. Findings of the above mentioned investigations were compiled and compared to draw the following results. Fisher's 2x2 exact tests were used to compare groups. Statistical significance was set at p<0.05, with 95% confidence intervals.

RESULTS

80 patients were included for final analysis. Among the total cases, 32 (40%) were male and 48 (60 %) were female. Mean age in males was 58 years and in females was 42 years. (Table 1)

Table 1: Age and gender distribution

Gender	Frequency	Percentage	Age (mean) in years
Male	32	40%	58
Female	48	60%	42

The etiology of EHBO in MRCP was CBD stone in 46 (57.5%), Stricture in 30 (37.5%), others (bile leak, hydatid cyst, SOD) in 4 (5%) case. Among cases with strictures 24 (80%) have malignant stricture findings while 6 (20%) have either benign or indeterminate findings. Causes of benign stricture includes Chronic pancreatitis (2), Choledocal cyst (1), Mirrizi syndrome (1), Post surgical stricture (1). Those with malignant

stricture, 19 (79.16%) have below hilar block, 4 (16.66%) have hilar block, 1 (4.16%) case have complex anatomy of block. Causes of malignant stricture include findings suggestive of CA GB in 17 (70.8%) cases, carcinoma head of pancreas in 4 (16.6%) cases, cholangiocarcinoma in 2 (8.3%) cases and periampullary carcinoma in 1 (4.16%) case. (Table 2)

Table 2: Etiology of EHBO Cases in MRCP

	Stones 46 (57.5%)	Strictures 30 (37.5%)		Others 4 (5%)	Total Cases 80
		Malignant 24 (80%) Ca GB =17(70.8%) CaHOP=4(16.6%) Cholangio Ca=2 (8.3%) Periampullary Ca=1 (4.16%)	Others (Benign/Indeterminate) 6 (20%)		
Benign causes of stricture			Chronic pancreatitis: 2 Choledocal cyst : 1 Mirrizi syndrome: 1 Post surgical stricture: 1		
Malignant block level		Below hilum: 19 (79.16%) Hilum : 4 (16.66%) Complex : 1 (4.16%)			

The etiology of EHBO in ERCP were found to be CBD stone in 48 (60%), Stricture in 23 (33.7%), others (bile leak, hydaid cyst, SOD) in 5 (6.25%) cases. 19 (70.3%) have malignant stricture while 8 (29.6%) have either benign or indeterminate stricture. Those with malignant stricture, 14 (73.7%) have below hilar block, 4 (21.05%) have hilar block, 1 (5.26%) case have complex anatomy of block. (Table 3)

Table 3: Etiology of EHBO Cases in ERCP

	Stones 48 (60%)	Strictures 27 (33.7%)		Others 5(6.25%)	Total Cases 80
		Malignant 19 (70.3%)	Others (Benign/Indeterminate) 8(29.6%)		
Malignant block level		Below hilum: 14 (73.7%) Hilum : 4(21.05%) Complex : 1 (5.26%)			
Benign causes of stricture			Choledocal cyst : 1 Mirrizi syndrome: 2 Others: 5		

While comparing results of both techniques MRCP correctly diagnosed 46 of the 48 patients with ERCP-proven bile duct calculi. There were 2 false negative results in MRCP. The sensitivity of MRCP in detecting stones was 86-99% and specificity was 90-100%, overall accuracy was 97.5%. Strictures were diagnosed by MRCP in 30 patients while ERCP diagnosed stricture in 27 cases.

There were 3 false- positive in MRCP. The sensitivity and specificity of MRCP in detection of stricture was 87.2-100% and 85-99% respectively and accuracy was about 96% among strictures MRCP diagnosed below hilar block in 19 patients, while ERCP showed 14 below hilar block. Hilar and complex blocks were found in 4 and 1 case respectively in both MRCP and ERCP. (Table 4)

Table 4: Comparison of ERCP vs MRCP

Pathology			MRCP (n =80)	ERCP (n =80)	Significance
Choledocholithiasis	Total		46	48	P value=0.001
Strictures	Total		30	27	P value=0.039
	Malignant	Below hilum	19	14	P- value=0.04
		Hilar	4	4	
		Complex	1	1	
Others (Benign/indeterminate)		6	8	P- value <0.05	
Others			4	5	P-value<0.05

DISCUSSION

While evaluating a patient with obstructive jaundice, the main aim of radiological investigations is to confirm the presence of bile duct obstruction and to accurately define its site and cause. In cases of malignant obstruction, delineation of extent of disease and assessment of tumor respectability are important to plan the appropriate treatment. The main aim of our study was to compare the accuracy and results of relatively non-invasive MRCP vs. much invasive ERCP as a diagnostic tool for bile duct abnormalities.

Our study showed female predominance (60%) similar to the study done by Gamersddin et al.⁹ in which female were more frequently affected with extra hepatic biliary obstruction than males (58% vs 42%), in our study affected mean age was 42 in females and 58 years in male, this agrees with the study of 51 patients by Al-Quorainetal¹⁰, in which the affected mean age was 50 years in female and 53 years in male.

MRCP was able to demonstrate the presence of obstruction in all cases in present study. These findings were similar to studies by Yeh et al¹¹ where MRCP was able to diagnose obstruction in 100% of cases. Another study by Bheema Shankar et al¹² also showed that MRCP was able to diagnose the presence, level and aetiology of biliary obstruction in all patients.

In our study sensitivity of MRCP in detecting stones was 86-99% and specificity was 90-100%, overall

accuracy was 97.5% in detection of CBD stone. Similar result were obtained from the Study by Soto et al¹³, where sensitivity of MRCP in detection of CBD stone was 90-100% and specificity of 92-100%. The sensitivity and specificity of MRCP in detection of stricture was 87.2-100% and 85-99% respectively and accuracy was about 96%. In another study by Hekimoglu K et al¹⁴ overall sensitivity and specificity of MRCP was 85-97% and 75 - 98% respectively. Strictures of the common bile ducts or pancreatic duct can be easily diagnosed by MRCP. MRCP is less sensitive in differentiating benign from malignant stricture since finer imaging details like mural irregularity, ductal asymmetry, abrupt / gradual tapering, double duct sign used as criteria are not always reliable¹².

Our study showed CBD Stones followed by malignancy as the most common cause of extra hepatic biliary obstruction in contrast to other studies from AIIMS Delhi and Rajasthan. A large prospective study of 429 patients from AIIMS Delhi,¹⁵ showed that malignant obstruction was more common than benign (75.3% vs. 24.7%). Carcinoma of the gallbladder (CA GB) and common bile duct (CBD) stone were the most common causes in the malignant and benign categories respectively. Another study of 502 patients from Rajasthan¹⁶ found malignant etiology in 318 (63.3%) cases and benign etiology in 184 (36.6%) cases. Carcinoma of gall bladder was commonest in the malignant, and common bile duct (CBD) stone in the

benign group. In our study, CBD Stones were found to be most common cause followed by malignancy stricture. Similar to the results of previous studies, carcinoma GB and CBD stone were most common malignant and benign etiology of EHBO in our study. In all these studies clinical profile of patients presented as EHBO including all IPD and OPD patients were taken into account while our study is an analysis of laboratory data so benign causes like CBD stones has higher representation.

Our results are consistent with results of other studies¹⁷. Our results from this prospective study present the potential of using MRCP and ERCP in our University Hospital. The results of the study confirm the sensitivity of both procedures in diagnosing biliary and pancreatic disorders

CONCLUSIONS

MRCP has got the potential to replace diagnostic ERCP in a wide range of bile duct abnormalities (tumor, stricture and occlusion), thereby avoiding possible unnecessary ERCP procedure and its complications.

Although ERCP is still employed in the diagnosis of biliary abnormalities present data shows that MRCP is an accurate investigation compared with diagnostic ERCP but on the other hand ERCP is still needed for therapeutic purpose.

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