

Importance of MRCP in evaluation of pancreatobiliary diseases

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Abstract

Background: To determine importance of MRCP in screening and diagnosis of pancreatobiliary disease. MRCP was performed in 50 patients attending our gastroenterology OPD using GE 1.5T MRI Findings were confirmed by follow-up surgery, biopsy, histopathology. **Materials and Methods:** The study was conducted in the Department of Radiology, BGS Global Institute of Medical Sciences, Bengaluru, Karnataka. After obtaining the Informed consent from all the study subjects, a total of 50 patients with clinically suspected choledocholithiasis and sonological evidence of pancreatobiliary obstruction were recruited for this study. Age of the study subjects ranged from 20 to ≥ 60 years and both sexes were included in this study suffering from common bile duct and pancreatic pathologies. After the diagnosis of bile duct/pancreatic pathologies by laboratory investigations and USG of abdomen and pelvis, MRCP was done. **Results:** In the present study, a total of 50 patients suffering with various pancreatobiliary pathologies were studied. In this study, 24 (48%) patients were belongs to ≥ 51 years of age group, 15 (30%) were in the 41-50 years of age group, 8 (16%) were in 31-40 years and 3 (6%) were in 20-30 years of age group. In this study, 10 (20%) patients were diagnosed to have Cholangiocarcinoma, 8 (16%) patients with gall bladder carcinoma, 10 (20%) patient with choledochal cyst, 10 (20%) patients presented with stricture, 4 (8%) patients had cholelithiasis, 3 (6%) patients had chronic pancreatitis, 1 (2%) had acute pancreatitis, 1 (2%) had emphysematous cholecystitis and 2 (4%) had IHBRD dilatation due to obstruction by portal lymph node. In one (2%) patient MRCP was normal. **Conclusion:** MRI serves as an accurate and non invasive imaging method for evaluation of pancreatobiliary anatomy and pathology. Combination of MRI and MRCP allows safe surgical management decision. Potentially useful in patients undergoing biliary enteric anastomosis for knowing the level and extent of strictures.

Keywords: MRCP, Pancreatobiliary, Stricture

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INTRODUCTION

Magnetic Resonance Cholangio Pancreatography (MRCP) is a useful technique in the diagnosis of disorders of

pancreatobiliary systems such as Cholelithiasis, Choledocholithiasis, acute cholecystitis, chronic cholecystitis, CBD strictures, acute and chronic pancreatitis, and also pseudocyst of pancreas. It is also useful in the diagnosis of gall bladder carcinoma, cholangitis, cholangiocarcinoma etc.¹ For the evaluation of biliary obstruction, variety of imaging modalities are available including ultrasonography (US), computed tomography (CT) and invasive cholangiography. These techniques are limited with poor visualization of intraductal calculi on ultrasound and CT studies along with the need for invasive procedures like ERCP and PTC.² But, MRCP is a non-invasive imaging technique, which provides good visualization of the biliary system. Ultrasound followed by CT scan are the screening tool that

is useful in evaluating patients presenting with pancreatic biliary diseases.³ However, ultrasonography has been used for many years, it has limitations especially in the evaluation of the distal CBD where bowel gas, debris, fluid in the duodenum and obesity can interfere with the image quality. In addition to this, CT scan also has its own limitations, especially in biliary stones and biliary strictures. Therefore, limitations of US and CT and invasiveness of PTC, IVC and ERCP there is need for an imaging modality which is non invasive and provides high resolution projection images of the biliary and pancreatic duct.² Therefore, the development of higher magnetic field strength and newer pulse sequences, the MRCP technique uses heavily T2-weighted imaging, which produces high signal from bile and other static fluids by virtue of their long T2 time, while suppressing background signal. Fast scanning techniques, particularly half-Fourier fast spin-echo techniques, are continuing to improve image resolution and allow scans within short breath-holds, reducing the effects of respiratory movement.³ A few studies demonstrated that MRCP is able to accurately identify common bile duct stones with sensitivity of 81-100 %. Biliary strictures can also be visualized with sufficient anatomic detail to determine the level of obstruction and in some instances, differentiate benign from malignant causes.^{2,4} In addition, MRCP lacks the major complication rate of approximately 3% associated with ERCP such as sepsis, bleeding, bile leak and death. MRCP demonstrates more than just the biliary and pancreatic ducts. Its disadvantages include lack of visualization of the peripheral intrahepatic ducts and inability to provide endobiliary therapy.⁴ Therefore, the present study is aimed to detect various pancreaticobiliary pathologies and to evaluate role of MRCP in various pancreaticobiliary pathologies.

MATERIALS AND METHODS

The study was conducted in the Department of Radiology, BGS Global Institute of Medical Sciences, Bengaluru, Karnataka. After obtaining the Informed consent from all

the study subjects, a total of 50 patients with clinically suspected choledocholithiasis and sonological evidence of pancreatobiliary obstruction were recruited for this study. Age of the study subjects ranged from 20 to ≥ 60 years and both sexes were included in this study suffering from common bile duct and pancreatic pathologies. However, patients with congenital abnormalities, metallic implants, cardiac pacemaker, cochlear implant were excluded from the study. All the patients underwent MRCP (HASTE coronal and axial, T1 weighted axial, MRCP using heavily T2 weighted sequences) in Siemens 1.5 Tesla Magnetom Avanto. After the diagnosis of bile duct/pancreatic pathologies by laboratory investigations and USG of abdomen and pelvis, MRCP was done. Furthermore, based on MRCP findings the patients were subjected to either endoscopic/surgical procedure and/or medical treatment.

Machine: GE Signa HDxT Twinspeed 1.5 T MRI (USA).

Coil: Body coil.

FOV: 20x30 cm.

Matrix: 256 x 256, 352x352.

RESULTS

In the present study, a total of 50 patients suffering with various pancreaticobiliary pathologies were studied to evaluate role of MRCP significance in evaluating these disease pathophysiology. In this study, 24 (48%) patients were belongs to ≥ 51 years of age group, 15 (30%) were in the 41-50 years of age group, 8 (16%) were in 31-40 years and 3 (6%) were in 20-30 years of age group (Table 1). In this study, 10 (20%) patients were diagnosed to have Cholangiocarcinoma, 8 (16%) patients with gall bladder carcinoma, 10 (20%) patients with choledhocal cyst, 10 (20%) patients presented with stricture, 4 (8%) patients had cholelithiasis, 3 (6%) patients had chronic pancreatitis, 1 (2%) had acute pancreatitis, 1 (2%) had emphysematous cholecystitis and 2 (4%) had IHBRD dilatation due to obstruction by portal lymph node. In one (2%) patient MRCP was normal (Table 2).

Table 1: Age wise distribution of Pancreaticobiliary diseases

Age (Years)	No. of cases	Percentage (%)
20 - 30	3	6
31-40	8	16
41-50	15	30
≥ 51	24	48

Table 2: Number of cases showing diagnosis of Pancreaticobiliary diseases on MRCP

Diagnosis	No. of cases	Percentage (%)
Cholangiocarcinoma	10	20
Gall bladder carcinoma	8	16
Choledhocal cyst	10	20
Stricture	10	20

Cholelithiasis	4	8
Chronic pancreatitis	3	6
Acute pancreatitis	1	2
Emphysematous cholecystitis	1	2
IHBRD	2	4
Normal MRCP	1	2
Total	50	100%

DISCUSSION

Radiological evolution of suspected cases of hepatobiliary and pancreatic pathologies commonly involved the investigations like Ultrasound, CT and endoscopic retrograde pancreaticography. However, these were having certain limitations and less specificity to detect and characterize the stricture, stones. Therefore, MRCP an application of MR imaging is now used for noninvasive cholangiopancreaticography. It provides good visualization of biliary tree. ¹ Abdominal USG is the technique of choice for initial examination of the bile ducts, particularly in patients with jaundice. MRCP is a noninvasive and non-operator dependent technique that has a cost effective and is important in the evaluation of pancreaticobiliary diseases. ⁵ In addition, for the postoperative complications evaluation, MRCP had high sensitivity for the depiction of strictures of anastomotic sites. Stones are easily recognized on MRCP images as low-signal-intensity structures surrounded by high-signal-intensity bile. The evaluation of basic source images was required to confirm the presence of calculi. In this study, 10 (20%) patients were diagnosed to have Cholangiocarcinoma, 10 (20%) patient with choledhocal cyst, 10 (20%) patients presented with stricture, 8 (16%) patients with gall bladder carcinoma, 4 (8%) patients had cholelithiasis, 3 (6%) patients had chronic pancreatitis, 1 (2%) had acute pancreatitis, 1 (2%) had emphysematous cholecystitis and 2 (4%) had IHBRD dilatation due to obstruction by portal lymph node. In one (2%) patient MRCP was normal. In a study conducted by Shadan *et al.* reported total choledocholithiasis (isolated + combined) in 20% patients. ⁶ In another study by Maculay *et al.* reported total choledocholithiasis in 14.2% patients. Our study matches with that of the Maculay *et al.* in the choledocholithiasis percentage. ⁷ In this study, the strictures were detected in 20% of the cases who underwent MRCP for suspected pancreaticobiliary. In a study conducted by Bhatt *et al.* reported that benign and malignant strictures in 4% and 9% cases respectively. Another study conducted by Hurter *et al.* reported benign and malignant strictures in 9.6% and 5.7% cases respectively. ^{8,9} It was observed that 20% cases of choledochal cyst were there in our study. Cholangitis, Cholelithiasis, Choledocholithiasis, biliary abscesses, liver cirrhosis are all potential complications of choledochal cysts. ¹⁰ In our study, pancreatitis was seen in 4 (8%)

patients. Out of which acute pancreatitis was involving 1 (2%) and chronic pancreatitis patients constituted for 3 (6%) patients. Detailed evaluation of pancreas is possible with the MRCP imaging as compared to all other imaging modalities such size, texture, pancreatic duct dilatation, any fluid collections, any calculi in the pancreatic duct, anatomical variations. These findings were supported by Yagmarulu *et al.* ¹¹

CONCLUSION

MRCP is noninvasive, non-ionizing imaging modality for evaluation of the pancreaticobiliary anatomy and pathology. It is much superior in the diagnosis and evaluation of various pathologies as compared to the ultrasound and Computed Tomography. MRCP has highest resolution of the pancreaticobiliary tree. Highest sensitivity of MRCP is for the any fluid collections in the pancreatic region as compared to other imaging modalities. As MRCP is noninvasive, it has similar sensitivity and specificity as compared to the ERCP in Choledocholithiasis and CBD stricture and chronic pancreatitis. So it is a safe presurgical imaging modality.

REFERENCES

1. Suraj Sonawane, Sachin Bagale, Sunil Patil. MRCP – a problem solving diagnostic tool in pancreaticobiliary pathologies. International Journal of Contemporary Medicine Surgery and Radiology. 2018;3(1):138-142.
2. SN Singh, Trilok C Bhatt. Magnetic Resonance Cholangiopancreatography (MRCP) in the Evaluation of Pancreaticobiliary Tract in Gallstone Disease. International Journal of Anatomy, Radiology and Surgery, 2016;5(1):30-34.
3. Shivashankar Kumaresan, Ganga Devi Rajapandian, Kanimozhi Damodarasamy. Role of MRCP in the evaluation of Choledocholithiasis. IOSR Journal of Dental and Medical Sciences. 2016;15(9):51-57.
4. Noha Mohamed Osman, Shaimaa Abdelsattar Mohammad, Reham M. Khalil. Diagnostic benefit of MRCP in hepatopancreaticobiliary diseases in children. The Egyptian Society of Radiology and Nuclear Medicine. 2016;47:291-295.
5. Ward WH, Fluke LM, Hoagland BD, Zarow GJ, Held JM, Ricca RL. The Role of Magnetic Resonance Cholangiopancreatography in the Diagnosis of Choledocholithiasis: Do Benefits Outweigh the Costs?. Am Surg. 2015 Jul;81(7):720-5.
6. Shadan A, Malik GM, Kamill MMA, Umar K, Showkat H, Willayat A, *et al.* Role of MRCP in the evaluation of suspected biliary and pancreatic disease. JK Pract. 2011;16(1–2):19–23.

7. Macaulay SE, Schulte SJ, Sekijima JH, Obregon RG, Simon HE, Rohrmann CA, *et al.* Evaluation of a nonbreath-hold MR cholangiography technique. *Radiology*. 1995; 196(1):227–32.
8. Bhatt C, Shah P, Prajapati H, Modi J. Comparison of diagnostic accuracy between USG and MRCP in biliary and pancreatic pathology. *Indian J Radiol Imaging* 2005;15(2):177–81.
9. Hurter D, Vries C De, Potgieter P, Barry R, Botha F, Joubert G. Accuracy of MRCP compared to ERCP in the diagnosis of bile duct disorders. *SA J Radiol* 2008;12(1):14–22.
10. Guy F, Cognet F, Dransart M, Cercueil J-P, Conciatori L, Krausé D. Caroli's disease: magnetic resonance imaging features. *Eur Radiol*. 2002;12(11):2730–6.
11. Yağmurlu B, Erden A, Erden I. Pancreas divisum: Diagnostic importance of MR cholangiopancreatography. *Tani Girisim Radyol* 2003;9(3):339–44.

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