

Assessment of usefulness of MRCP in Pancreato-Biliary Abnormalities in Pediatric Patients

Ganesh K¹, Judy Mary Kurian², Praveen K³

¹Professor; Department of Radiodiagnosis, A.J Institute of Medical Sciences, Mangalore, Karnataka, ²Associate Professor; Department of Radiodiagnosis, Travancore Medical College, Kollam, Kerala ³Professor; A.J Institute of Medical Sciences, Mangalore, Karnataka, India

Corresponding author: Dr. Judy Mary Kurian, Associate Professor, Department of Radiodiagnosis, Travancore Medical College, Kollam - 691020, Kerala, India

DOI: <http://dx.doi.org/10.21276/ijcmsr.2021.6.3.2>

How to cite this article: Ganesh K, Judy Mary Kurian, Praveen K. Assessment of usefulness of MRCP in pancreato-biliary abnormalities in pediatric patients. *International Journal of Contemporary Medicine Surgery and Radiology*. 2021;6(3):C5-C8.

ABSTRACT

Introduction: MRCP has emerged as a potent non-invasive alternative approach to evaluate the pancreato-biliary system. The present study was conducted to assess the usefulness of Magnetic Resonance Cholangiopancreatography in Pancreatobiliary Abnormalities in Pediatric Patients.

Material and methods: The present study was conducted among pediatric patients for assessment of pediatric gastrointestinal and hepatobiliary disease. The records of 50 pediatric patients below 13 years undergoing MRCP for suspected pancreaticobiliary system abnormalities were assessed. Demographic data, medical history was taken. All imaging study findings were recorded. MRCP examinations were performed. The data were entered and stored in a Microsoft Excel database and analysis was done.

Results: In the present study total 50 records of pediatric patients below 13 years undergoing MRCP for suspected pancreaticobiliary system abnormalities were assessed. Maximum patients were of Choledochal cyst (42%), followed by Biliary atresia (26%).

Conclusion: The present study concluded that MRCP can assess pancreaticobiliary system abnormalities non-invasively. Maximum patients were of Choledochal cyst, followed by Biliary atresia.

Keywords: MRCP, Pancreatobiliary System Abnormalities, Choledochal Cyst, Biliary Atresia

INTRODUCTION

Evaluation of suspected biliary obstruction has traditionally involved a variety of imaging modalities including Ultrasonography (US), Computed Tomography (CT), and invasive cholangiography that includes Endoscopic Retrograde Cholangio-Pancreatography (ERCP) and Percutaneous Transhepatic Cholangiography (PTC). Currently the non-invasive diagnosis of bile duct obstruction mainly relies on US and CT; however the accuracy of these techniques is limited because of low sensitivity for the diagnosis of stones in common bile duct.¹ Magnetic resonance (MR) cholangiopancreatography can be an effective, noninvasive imaging tool for the evaluation of pancreaticobiliary disease in children.²⁻⁶ Magnetic resonance cholangiopancreatography (MRCP) is an innovative technique for evaluating the biliary tree and pancreatic duct, initially used in adults in the early 1990s.^{7,8} It is considered to be a reliable diagnostic tool to evaluate primary sclerosing cholangitis, Caroli disease, choledochal cyst, and other forms of biliary pathology.^{9,10} The advantages of MRCP are that it is noninvasive, requires no contrast material, is without ionizing radiation, and can be performed on an outpatient basis. The

safety is deemed comparable with that of US.¹¹ MRCP is therefore increasingly replacing ERCP or percutaneous cholangiogram in assessing many pancreaticobiliary diseases.^{12,13} Pediatric MR cholangiopancreatography is limited by small-caliber ducts, poor signal, and patient motion, which creates artifacts. Nonetheless, it is possible to visualize ducts as small as 1 mm in diameter, thanks to improvements in coil technology, increased speed of acquisition, refinements in respiratory compensation techniques that reduce motion artifacts, and newer sequences.^{14,15} The present study was conducted to assess the usefulness of Magnetic Resonance Cholangiopancreatography in Pancreatobiliary Abnormalities in Pediatric Patients.

MATERIAL AND METHODS

The present study was conducted among pediatric patients for assessment of pediatric gastrointestinal and hepatobiliary disease. Before the commencement of the study ethical approval was taken from the Ethical Committee of the institute and written consent was taken from the patient after explaining the study. The records of 50 pediatric patients below 13 years undergoing MRCP for suspected pancreaticobiliary system abnormalities were assessed.

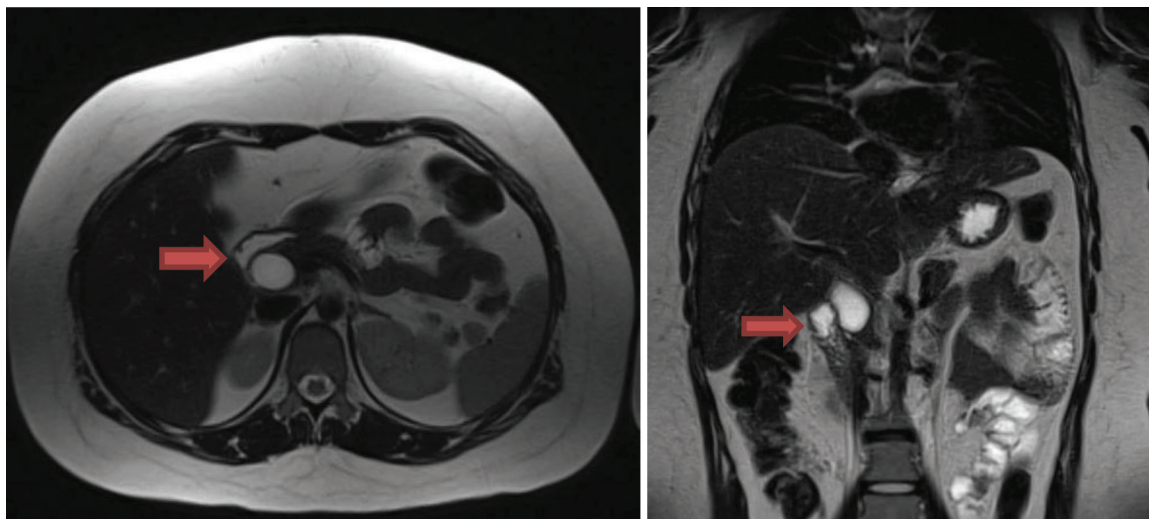


Figure-1: Showing T2 weighted axial and coronal images of a 17 yr old showing dilatation of extrahepatic bile duct – suggestive of a type Ib Choledochal cyst

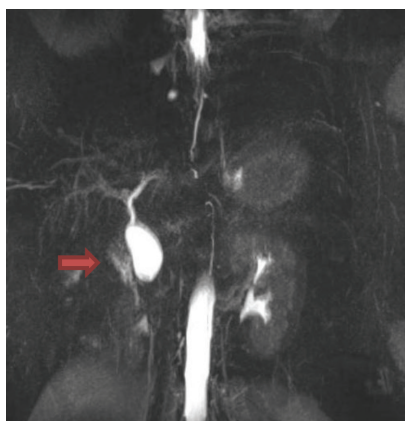


Figure-2: Showing heavily weighted T2 coronal section of the same 17 yr old showing dilatation of extrahepatic bile duct – suggestive of a type Ib Choledochal cyst

Demographic data, medical history including prenatal history, abdominal US findings on newborn screening, and any surgery before MRCP and clinical manifestations were taken. All imaging study findings were recorded. The results of surgery and pathology examination were also reviewed. MRCP examinations were all performed with a 1.5-T scanner by using head or phased-array surface coil, depending on the body size of patients. The T2-weighted fast spin-echo and fat-suppressed sequence images were acquired with the following parameters: single-shot fast spin-echo sequence, repetition time/echo time range, 2015e16,000/33.8e541; slice thickness, 6 mm; slice gap, 0; field of view, 35 cm; and matrix, 288*256. The images were acquired by use of breath-hold technique in the older children if possible. In children who could not hold their breath, the MRCP examination was performed with respiratory triggering. The acquisition time for each sequence varied according to the patient’s body volume and breathing rate. The whole MRCP examination time was about 45 minutes in general. Patients fasted at least 6 hours before the examination. Sedation with oral chloral hydrate at a dose of 40 mg/kg of body weight (maximum, 1 g) was used if the child was younger than 6 years or not

able to cooperate during the examination. MRCP images were analyzed by an experienced pediatric radiologist. The MRCP diagnosis of choledochal cyst (fig-1,2) was based on the disproportional dilatation of extrahepatic bile ducts and excluding other cause of dilatation, such as stone, tumor, or inflammation. The MRCP diagnosis of biliary atresia was made on the basis of the nonvisualization of either the common bile duct or the common hepatic duct and demonstration of a small or atresic gall bladder. The data were entered and stored in a Microsoft Excel database and analysis was done.

RESULTS

In the present study total 50 records of pediatric patients below 13 years undergoing MRCP for suspected pancreaticobiliary system abnormalities were assessed. Maximum patients were of Choledochal cyst(42%), followed by Biliary atresia (26%).

Diagnosis	N(%)
Choledochal cyst	21(42%)
Biliary atresia	13(26%)
Hepatitis syndrome in infancy	8(16%)
Common bile duct dilatation	2(4%)
Common bile duct stone	1(2%)
Pancreatic duct stones with pancreatitis	1(2%)
Hepatic cyst	1(2%)
Intrahepatic duct dilatation	1(2%)
Hepatic tumor	2(4%)

Table-1: Diagnoses of children undergoing magnetic resonance cholangiopancreatography

DISCUSSION

Jaundice or hyperbilirubinemia is a common problem in neonates and infants. For the diagnosis of the pancreaticobiliary diseases in childhood, sonography is considered the best screening technique, followed by biliary scintigraphy.¹⁶

MR cholangiopancreatography is useful for noninvasively identifying these structural anomalies and ruling them out as a cause of pancreatitis.¹⁷⁻¹⁹ It can be performed in the acute stage of pancreatitis—unlike ERCP, which is contraindicated in the acute stage. MR cholangiopancreatography is highly sensitive and specific for pancreas divisum.¹⁸ It is difficult to visualize pancreatic ducts and anomalies such as pancreas divisum and (as mentioned earlier) anomalous union of the PBJ in children less than 2 years of age.²⁰

In a study of 26 infants (mean age, 2 months), MR cholangiography was shown to be 82% accurate, 90% sensitive, and 77% specific for depicting extrahepatic biliary atresia.²¹

In the present study total 50 records of pediatric patients below 13 years undergoing MRCP for suspected pancreaticobiliary system abnormalities were assessed. Maximum patients were of Choledochal cyst (42%), followed by Biliary atresia (26%). In a study by Ferrara et al, MR cholangiopancreatography was found to have a specificity and positive predictive value of 100% and an accuracy of 85%. The authors of that study concluded that positive MR cholangiopancreatographic findings in a child with clinical suspicion for PSC are very likely to be correct; hence, ERCP should not be performed in such cases.²²

North American Society for Pediatric Gastroenterology and Nutrition also put out a statement emphasizing that MRCP can provide high-quality noninvasive imaging of biliary and pancreatic ducts in adults and may eliminate the need for diagnostic ERCP in some settings. But the initial reports of MRCP in children are limited, so further study is needed.²³

CONCLUSION

The present study concluded that MRCP can assess pancreaticobiliary system abnormalities non-invasively. Maximum patients were of Choledochal cyst, followed by Biliary atresia.

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Source of Support: Nil; **Conflict of Interest:** None

Submitted: 08-06-2021; **Accepted:** 10-07-2021; **Published online:** 13-08-2021