



EVALUATION OF OBSTRUCTIVE JAUNDICE USING MAGNETIC RESONANCE CHOLANGIOPANCREATOGRAPHY (MRCP)

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ABSTRACT

Background: Obstructive jaundice is one of the most frequent and grave form of hepatobiliary disease. It can pose problems in diagnosis and management, particularly intrahepatic cholestasis.

Aim: To evaluate the diagnostic accuracy of Magnetic Resonance Cholangiopancreatography (MRCP) in studying the cause of obstructive jaundice, diagnosing and differentiating benign from malignant lesions and to compare it with USG findings along with histopathological and surgical correlation.

Material and Method: This is a prospective study conducted at Ribat university hospital over a period starting from April 2015 to April 2016. 80 patients who were referred from department of surgery and medicine with strong clinical suspicion of biliary obstruction and altered LFT were enrolled in the study. Initial Ultrasonography (USG) evaluation was followed by MRCP, Histopathological diagnosis, surgical findings (as applicable) were considered as reference.

Result: On ultrasound 49/80 patients were diagnosed with the actual cause of obstructive jaundice. On the other hand 57/80 patients were diagnosed with actual cause of obstructive jaundice on MRCP. Majority of cases of biliary obstruction were due to Choledocholithiasis (31%) followed by strictures (12%), then cholangiocarcinoma (18%) then GB mass (6%), then choledochal cyst (3%), and pancreatic pathology (6%).

Conclusion: Ultrasound is a good screening method but it is less accurate for diagnosing the distal CBD obstruction. MRCP on the other hand has the high sensitivity for diagnosing the cause and extent of biliary obstruction and hence should be the modality of choice for all the patients presenting with obstructive jaundice.

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INTRODUCTION

Obstructive jaundice is one of the most frequent and grave form of hepatobiliary disease. It can pose problems in diagnosis and management, particularly intrahepatic cholestasis. Any blockage in the hepatobiliary system pathway leads to lack of passage of bile into the intestine. Passage of this bile into the circulation leads to symptoms like jaundice and pruritis (Nadkarni *et al.*, 1981). Laboratory investigations like increased serum bilirubin (>3mg/dl) and altered liver function tests help in diagnosis of the type of pathology but they cannot delineate the site of block and the exact cause of the blockage (Vivek *et al.*, 2015). Early and accurate diagnosis is very important in obstructive jaundice so that its outcomes should be controlled as early as possible.

Despite the technical advances, the operative modes of management of obstructive jaundice were associated with very high morbidity and mortality (Singh *et al.*, 2014). Yet, during the last decade significant advances have been made in our

understanding with regard to the pathogenesis, diagnosis, staging and the efficacy of management of obstructive jaundice.

Endoscopic Retrograde Cholangiopancreatography (ERCP) was the standard established procedure for evaluation of patients with obstructive jaundice. However, being an invasive procedure, it has an inherent complication rate of 3–9 % and mortality rate of 0.2–0.5 %. Due to significant advances in cross-sectional imaging, in particular the advent of magnetic resonance cholangiopancreatography (MRCP), ERCP currently has an almost exclusively therapeutic role (Szary and Al-Kawas, 2013).

Magnetic resonance Cholangiopancreatography (MRCP) is the newest modality for biliary and pancreatic duct imaging. MRCP uses MR imaging to visualize fluid in the biliary and pancreatic ducts as high signal intensity on heavily T2 weighted (T2W) sequences Half Fourier Single Shot Turbo Spin Echo (HASTE). The long T2 value of fluid allows ducts

to be imaged in their basal state without distension by exogenous contrast. It can demonstrate the entire anatomy of the biliary tract and so it helps to delineate biliary tract in proximal and in distal obstruction (Coakley and Schwartz, 1999). This study was undertaken prospectively to assess the cause and extent of biliary obstruction and to compare the diagnostic accuracy of MRCP versus Ultrasonography.

Patients and Method

This is a prospective study conducted at Ribat university hospital over a period starting from April 2015 to April 2016. 80 patients who were referred from department of surgery and medicine with strong clinical suspicion of biliary obstruction and altered LFT were enrolled in the study (females 43 and 37 males); their age range 20-80 years. Informed consent was taken from all patients undergoing this study. Initial Ultrasonography (USG) evaluation was followed by MRCP, Transabdominal ultrasonography was done with convex 1 to 5 MHz probe using SEIMENS SONOLINEG60. The patients were then referred to the Radiology Department and, after giving informed consent, the patient underwent MRCP on 1.5 tesla MAGTOM AVANTO machine. The position of the patient was kept supine and 8 channel upper body array coil was used. FOV 34 cm, frequency 256 MHz, phase 128, NEX 2, bandwidth 31.25 and auto frequency of water were used. FRFSE-XL pulse sequence was used and images were obtained in 3D mode. MRCP images were evaluated on the viewing console by senior consultant radiologist blinded to the findings USG. Histopathological diagnosis, surgical findings (as applicable) were considered as reference.

Data was entered and analyzed using SPSS version 15. Accuracy of MRCP for the cause of obstructive jaundice was calculated versus ultrasound findings.

RESULT

Of the 80 patients, 48 (60%) were females and 32 (40%) were males. The age ranged from 20 to 80 years, and the mean age was 47 ± 14 years. On ultrasound 49/80 patients were diagnosed with the actual cause of obstructive jaundice. On the other hand 57/80 patients were diagnosed with actual cause of obstructive jaundice on MRCP.

Table 1 Age Distribution

Age group	Frequency	Percentage
20 – 30	12	15
31 – 41	13	16.25
42 – 52	23	28.75
53 – 63	14	17.5
64 – 74	11	13.75
75-80	7	8.75
Total	80	100%

Table 2 Comparison of Diagnostic Accuracy in Patients with Suspected Biliary Obstruction

No	Cause of obstruction	USG	USG Accuracy	MRCP	MRCP Accuracy	Final Diagnosis
1	Cholelithiasis	20	80%	25	100%	25
2	GB Mass	5	100%	5	100%	5
3	Cholangiocarcinoma	10	66%	15	100%	15
4	Stricture	6	50%	10	83%	12
5	Cyst	3	100%	1	33%	3
6	Pancreatic Pathology	5	100%	1	20%	5
7	Normal	4	40%	8	80%	10

DISCUSSION

In our study 42-52 years (28%) was the most common age group of patients presenting with obstructive jaundice in which males were in majority. All the cases of obstructive jaundice were evaluated on the basis of calculi, cause of obstruction, any mass lesion and the type of CBD narrowing or dilatation by both the modalities USG and MRCP.

Majority of cases of biliary obstruction were due to Cholelithiasis (31%) followed by strictures (12%), then cholangiocarcinoma (18%) then GB mass (6%), then choledochal cyst (3%), and pancreatic pathology (6%).

Calculus disease- On MRCP calculus appeared as a focal round or linear low signals voids partially or completely surrounded by high T2 signal within the duct (Hekimoglu *et al.*, 2008). The accuracy for diagnosing CBD calculus by USG was 80% and accuracy for diagnosing CBD calculus by MRCP was 100%. This result was in line with the previous studies (Munir *et al.*, 2004).

Choledochal cyst is a fusiform dilatation of the biliary tree. It appeared as a fluid filled structure which is in continuity with the bile ducts and is separate from the GB (Schindera *et al.*, 2007). In our study, there were 3 cases of choledochal cyst. The accuracy for diagnosing choledochal cyst by USG and MRCP were 100% and 33% respectively.

Cholangiocarcinoma is a most common cause of malignant stricture (Kim *et al.*, 2007). It is an intrahepatic mass with irregular borders and satellite nodules as hypo on T1W images and hyperintense on T2W images (Center, 2009). In our study, the accuracy for diagnosing cholangiocarcinoma was 66% on USG and on MRCP was 100%. This result was consistent with previous studies (Vivek *et al.*, 2015).

GB mass is a most common lesion of biliary tract. It had hyperintense signal on T2W images and hypointense signal on T1W images. It appeared as a mass which enhanced rapidly and retained contrast (Mendler *et al.*, 1998). In our study there were five cases of GB mass. The accuracy for diagnosing GB mass by USG and MRCP was 100%.

MRCP has proved to be more accurate and sensitive in the diagnosis of cause of CBD obstruction and for the accurate diagnosis and for proper differentiation between benign and malignant lesion.

CONCLUSION

In patients with suspected biliary and pancreatic pathology, USG is a good screening method but it is less accurate for diagnosing the distal CBD obstruction. MRCP on the other hand has the high sensitivity and specificity (approaching 100%) for diagnosing the level, cause and extent of biliary obstruction and hence should be the modality of choice for all the patients presenting with obstructive jaundice.

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