ORIGINAL ARTICLE

Diagnostic Accuracy of Magnetic Resonance Cholangio-pancreatography (MRCP) in Diagnosing Cholidocholithiasis taking Operative Findings as Gold Standard

HAFIZA HINA FAROOQ[1], NAIMA MUJAHID[2], ARSHAD FAHEEM[3], SADIA RIAZ[4], KAMRAN NASEEM[5]
[1]*Postgraduate Resident, Radiology Deptt. Bahawal Victoria Hospital, Bahawalpur*
[2]*Senior Registrar, Radiology Deptt. Bahawal Victoria Hospital, Bahawalpur*
[3] *Senior Registrar, Radiology Deptt. Bahawal Victoria Hospital, Bahawalpur*
[4]*Associate Prof. Radiology Deptt. Quaid I Azam Medical College/ BVH, Bahawalpur*
[5]*Assistant Prof. Radiology Deptt. Quaid I Azam Medical College/ BVH, Bahawalpur*
Correspondence to: Dr. Arshad Faheem, Senior Registrar, Radiology Deptt. Bahawal Victoria Hospital, Bahawalpur

ABSTRACT

Aim: To determine the diagnostic accuracy of MRCP in diagnosing choledocholithiasis taking operative findings as gold standard.
Study design: Descriptive, Cross-sectional study.
Settings: Department of Radiology, BVH, Bahawalpur.
Study duration: May 2016 to November 2016
Methodology: A total of 138 patients with obstructive jaundice for >7 days on lab analysis of age 20-60 years of either gender were included. Patients with coagulation disorder and absolute contraindication to MRCP were excluded. After taking informed consent, MRCP was performed in every patient. Surgery was performed. MRCP findings were compared with operative findings.
Results: MRCP supported the diagnosis of choledocholithiasis in 76 (55.1%) patients. Operative findings confirmed choledocholithiasis in 72 (52.2%) cases. Sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of MRCP in diagnosing choledocholithiasis taking operative findings as gold standard was 90.3%, 83.3%, 85.5%, 88.7% and 86.9% respectively..
Conclusion: Magnetic resonance cholangiopancreatography is the non-invasive modality of choice with high diagnostic accuracy in diagnosing choledocholithiasis.
Keywords: Choledocholithiasis, magnetic resonance cholangiopancreatography, sensitivity.

INTRODUCTION

Choledocholithiasis is defined as the presence of at least one gallstone in the common bile duct[1]. It is most commonly seen in the symptomatic cholelithiasis and acute biliary pancreatitis (ABP)[2]. The starting investigation in suspected choledocholithiasis included LFTs e.g., alanine aminotransferase, aspartate aminotransferase, alkaline phosphatase, and total bilirubin) and a abdominal ultrasound (US) of the right upper quadrant. Fractionation of bilirubin can be considered in which isolated indirect hyperbilirubinemia (e.g. Gilbert syndrome) may be present[3]. Its reported incidence is 26.2% by Al-Quorain AA et al[4].

Stones usually pass from the common bile duct (CBD) into the duodenum, but sometimes stones are large enough and cannot pass into the CBD thus causing obstruction. An important factor for this obstruction is diverticulum in the duodenum. This obstruction causes jaundice, raised alkaline phosphatase and increase in conjugated bilirubin in the blood samples. This obstruction may cause acute pancreatitis and ascending cholangitis also.[5] Murphy's sign is usually negative on physical examination in choledocholithiasis, and this helps to differenciate from acute cholecystitis. Yellow discoloration of skin and eyes is an important physical sign in obstruction of biliary tracts. Jaundice and clay-colored stool may raise the chances of choledocholithiasis[6]

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METHODOLOGY

One hundred and thirty eight cases has been calculated with 95% confidence level, 10% desired precision, sensitivity of 87% and specificity 80% of MRCP in diagnosing cholidocholithiasis and taking expected percentage of choledocholithiasis as 26.2%. All patients with obstructive jaundice for >7 days on lab analysis and on abdominal USG (dilated CBD and intrahepatic biliary channels >10 mm), patients of age 20-60 years and both genders were included. Patients with jaundice and proved to be hepatocellular on lab analysis, Patients with any coagulation disorder and Patients with absolute contraindication to MRCP i.e. cardiac pacemaker, claustrophobia and degenerative or ankylotic conditions or senile dementia were excluded.

After permission from local ethical committee, total number of 138 patients who were admitted in other departments of BVH, Bahawalpur and referred by clinician to the radiology department fulfilling the criteria was selected. After taking informed consent, MRCP was performed in every patient. All results of MRCP were interpreted by a consultant radiologist and were looked for choledocholithiasis. Surgeries were performed. Collected data was analyzed by SPSS 20. Age, duration of disease and size of stone were presented as mean and standard deviation. Frequency and percentage were calculated for qualitative variables

RESULT

The detail of results is given in tables 1, 2, 3, 4

Table 1: Age distribution.

Age (yrs)	N=	%age
20-40	43	31.16
41-60	95	68.84
Total	138	100.0

Mean ±SD = 43.91±8.58 yrs

Table 2: Duration of disease.

Duration of disease (months)	N=	%age
≤6	63	45.65
>6	75	54.35
Total	138	100.0

Mean ±SD = 7.40±2.36 months.

Table 3: Size of stone.

Size of stone (mm)	N=	%age
≤5 mm	31	22.46
>5 mm	107	77.54
Total	138	100.0

Mean ±SD = 7.57±2.65 mm.

Table 4: Diagnostic accuracy of MRCP taking operative findings as gold standard

MRCP	Operative findings		Total
	Positive	Negative	
Positive	65 (TP)	11 (FP)	76
Negative	07 (FN)	55 (TN)	62
Total	72	66	138

Sensitivity: 90.3%, Specificity: 83.3%
Positive Predictive Value (PPV): 85.5%
Negative Predictive Value (NPV): 88.7%
Diagnostic Accuracy: 86.9%

DISCUSSION

In this study, the diagnosis by MRCP has 76 (55.1%) patients. Operative findings confirmed choledocholithiasis in 72 (52.17%) cases. In MRCP positive patients, 65 were true positive and 11 were false positive. Among 62 MRCP negative patients, 07 were false negative whereas 55 were True Negative. Sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of MRCP in diagnosing choledocholithiasis taking operative findings as gold standard was 90.3%, 83.3%, 85.5%, 88.7% and 86.9% respectively.

Verma et al.[9] in their study showed the sensitivity and specificity of 85.3% and 88.4% on USG, 84.6% and 94.2% on CT imaging, 92.3% and 86% on MRCP to detect the benign cause of obstruction. Ferrari FS et al[10] demonstrated similar findings for benign cases in their study. The diagnostic accuracy, sensitivity and specificity of USG was 78.6%, 16.7% 97.3%, of CT it was 92.6%, 92.3%.92.9% and of MRCP was 93.1%, 90%, 94% respectively.

Griffin N et al[8] showed the sensitivity in diagnosing choledocholithiasis by MRCP as 84%, specificity 96%. Varghese JC et al[7] in his study showed the efficacy of MRCP for diagnosing choledocholithiasis and found the sensitivity and specificity as 91% and 98% respectively. Sperlongano P et al[11] in his study has shown that MRCP has a diagnostic accuracy comparable to that of ERCP. He has found the sensitivity and specificity of MRCP as 100% and 100% respectively in diagnosing choledocholithiasis.

CONCLUSION

MRCP is the non-invasive modality of choice with high diagnostic accuracy in diagnosing choledocholithiasis, and has not only dramatically improved our ability of diagnosing choledocholithiasis pre-operatively but also helps the surgeons for proper decision making.

REFERENCES

1. Maple JT, Menachem TB, Anderson MA et al. The role of endoscopy in the evaluation of suspected choledocholithiasis. Gastrointest Endoscop. 2010;71(1):1-9.
2. Bilgin M, Toprak H, Burgazli M et al. Diagnostic value of dynamic contrast-enhanced magnetic resonance imaging in the evaluation of the biliary obstruction. Scientific World J. 2012;2012:1-9.
3. Shapiro T, Melzer E, Binder Y et al. Selective utilization of pre-operative endoscopic ultrasound to exclude choledocholithiasis prior to laparoscopic cholecystectomy: a retrospective study. Hepatogastroenterol. 2013;60(123):34-6.
4. Al-Quorain AA, Ismail MH, Al-Mulhim AA et al. Prospective comparative study of mrcp and ercp in biliary and pancreatic duct abnormalities. Sci J King Faisal Uni. 2010;11(1):193-201.
5. Glasgow RE, Mulvihill SJ. Treatment of gallstone disease. In: Feldman M, Friedman LS, Brandt LJ, eds. Sleisenger & Fordtran's Gastrointestinal and Liver Disease. 9th ed. Philadelphia, Pa: Saunders Elsevier; 2010: chap. 66.
6. Gurusamy K, Sahay SJ, Burroughs AK, Davidson BR. Systematic review and meta-analysis of intraoperative versus preoperative endoscopic sphincterotomy in patients with gallbladder and suspected common bile duct stones. Br J Surg. 2011;98(7):908-16.
7. Varghese JC, Farrell MA, Courtney G. A prospective comparison of magnetic resonance cholangiopancreatography with endoscopic retrograde cholangiopancreatography in the evaluation of patients with suspected biliary tract disease. Clin Radiol. 1999;54:513-20.
8. Griffin N, Wastle ML, Dunn WK et al. Magnetic resonance cholangiopancreatography versus endoscopic cholangiopancreatography in the diagnosis of choledocholithiasis. Eur J Gasteroenterol. 2003;15(7):809-13.
9. Verma SR, Sahai SB, Gupta PK et al. Obstructive Jaundice-Aetiological Spectrum, Clinical, Biochemical And Radiological Evaluation At A Tertiary Care Teaching Hospital. The Internet Journal of Tropical Medicine. 2011;7(2)
10. Francesco SF, Federica F, Laura T et al. A comparative study in 131 patients with suspected biliary obstruction. Med Sci Monit. 2005;11(3):8–18.
11. Sperlongano P, Pisaniello D, Del Viscovo L et al. Efficacy of magnetic resonance cholangiopancreatography in detecting common bile duct lithiasis: our experience. Chir Ital. 2005;57(5):635-40.