



EVALUATION OF PANCREATOBILIARY PATHOLOGIES USING MAGNETIC RESONANCE CHOLANGIOPANCREATOGRAPHY

Radio-Diagnosis

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ABSTRACT

Introduction: Pancreato-biliary diseases are commonly observed in the population that can have adverse outcome if not diagnosed or managed correctly and in time. It is divided into intraductal and extraductal obstruction. Biliary strictures, choledocholithiasis, malignant strictures as well as conditions such as primary sclerosing cholangitis constitute the most significant reasons of intraductal obstruction. Extraductal reasons for obstruction consist of compression of biliary channels by neoplasms, cystic duct stones and pancreatitis. Benign as well as malignant biliary obstructions are not easy to distinguish with only imaging clinical correlation is also important. **Methodology:** A total of 70 patients were enrolled in the study. MRI was done with 3 Tesla GE machine using body coil. T2-weighted and diffusion-weighted sequences were routinely obtained. Examination was performed after the patient has fasted for minimum 4 hours to promote gall bladder filling. **Result And Discussion:** Males were slightly more in proportion than females (52.86% vs 47.14%) in study. The commonest clinical feature noted in the study was abdominal pain (55.71%), followed by jaundice (17.14%) and epigastric pain in 10% cases. The common findings noted were calculus cholecystitis (21.43%), cholelithiasis (18.57%), choledocholithiasis (17.14%), IHBR dilatation (15.71%) and benign stricture in (14.29%). Acute and chronic pancreatitis was noted in 8 cases each (11.43% each). Pseudocyst of pancreas and hepatic cysts or abscess was also noted in 10% and 7.14% cases respectively. Overall, 11% of the cases had neoplastic or malignant finding on MRCP assessment. **Conclusion:** MRCP was found to be 93 % accurate in identifying the pancreaticobiliary disorders with its underlying cause in present study. The present study shows that MRCP is excellent modality of choice for the detecting of pancreaticobiliary pathologies in the symptomatic patients. Thereby helping in quick diagnosis, treatment planning and better prognosis.

KEYWORDS

MRCP, 3T MRI, Pancreatico-biliary obstruction, cholecystitis, choledocholithiasis, Periapillary carcinoma.

INTRODUCTION

Pancreato-biliary diseases are commonly observed in the population that can have adverse outcome if not diagnosed or managed correctly and in time. Pancreatico-biliary obstruction, it is the most common finding noted. It is divided into intraductal and extraductal obstruction. Biliary strictures, choledocholithiasis, malignant strictures as well as conditions such as primary sclerosing cholangitis constitute the most significant reasons of intraductal obstruction. Extraductal reasons for obstruction consist of compression of biliary channels by neoplasms, cystic duct stones and pancreatitis. Benign as well as malignant biliary obstructions are not easy to distinguish with only imaging clinical correlation is also important. choledocholithiasis is the most common cause of benign obstruction. Other reasons are post-cholecystectomy stricture, inflammation, formation of stricture as a consequence of pancreatitis, and not to neglect an idiopathic cause. Other reasons of benign obstruction include primary sclerosing cholangitis, choledochal cyst, and Mirizzi's syndrome.^{1,2} The commonest reason leading to malignant obstruction is cholangiocarcinoma. Other causes associated with malignant obstruction include carcinoma head of pancreas, carcinoma gall bladder, lymph nodes as well as metastasis.^{3,4} MRCP is an abdominal magnetic resonance (MR) imaging method that allows non-invasive visualization of the pancreatico-biliary tree and requires no contrast administration. Though ERCP has been the backbone for diagnosing pancreaticobiliary diseases, complications like pancreatitis, hemorrhage, cholangitis, and duodenal perforation have restricted its usage as a standard diagnostic modality.⁵ MRCP is also used to determine postoperative complications. MRI is significantly superior to computed tomography (CT) in both identifying and ruling out or excluding malignancies.

AIM AND OBJECTIVES

Aim of the study, To evaluate the role of MRCP in diagnosing pancreato-biliary diseases and the underlying cause

Objectives:

- To evaluate spectrum of findings in the cases of pancreato-biliary pathologies on MRCP
- To differentiate between benign and malignant causes of biliary obstruction with the help of MRCP.

METHODOLOGY

A total of 70 patients were enrolled in the study. MRI was done with 3 Tesla GE machine in our institute using body coil. T2-weighted and diffusion-weighted sequences were routinely obtained. Examination was performed after the patient has fasted for minimum 4 hours to promote gall bladder filling. A brief medical history was taken and any MRI contraindications were evaluated and patients consent was obtained. MRCP protocol was taken and scan images analysed.

RESULTS

A total of 70 patients were enrolled in the study. The mean age was noted to be 43.77 ± 20.19 years, with age range of 4 years to 80 years included in study. Males were slightly more in proportion than females (52.86% vs 47.14%).

The commonest clinical feature noted in the study was abdominal pain (55.71%), followed by jaundice (17.14%) and epigastric pain in 10% cases. Other details of clinical features given below in table 1.0

Table 1.0

Clinical features	Number of patients	% patients
Abdominal pain	39	55.71%
Jaundice	12	17.14%
Epigastric pain	7	10.00%
Traumatic pain	3	4.29%
Vomiting	2	2.86%
Weight loss	2	2.86%
Anorexia	1	1.43%
Fever	1	1.43%
Gastritis	1	1.43%
Hypogastric pain	1	1.43%
Swelling	1	1.43%

On MRCP, the common findings noted were calculus cholecystitis (21.43%), cholelithiasis (18.57%), choledocholithiasis (17.14%) and benign stricture in 14.29%. Acute and chronic pancreatitis was noted in 8 cases each (11.43% each).

The malignant findings of MRCP assessment included malignant CBD stricture (4.29%), periampullary carcinoma, neoplastic GB, cholangiocarcinoma, adrenal adenoma, IPMN neoplasm and pancreatic head carcinoma (one case each).

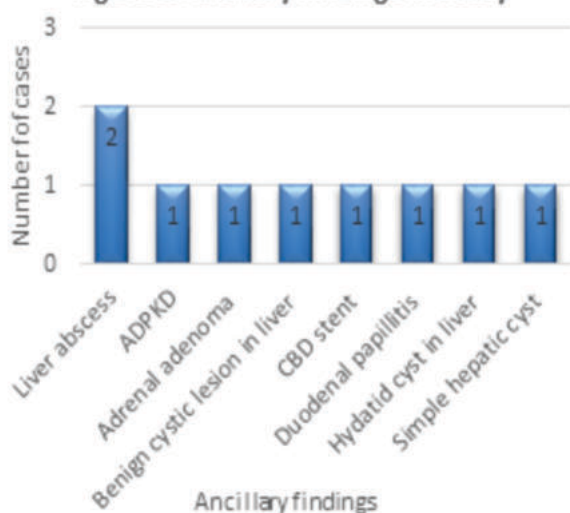
Complete details of the MRCP findings have been listed below in table 1.1.

9 of the 70 cases in study (12.86%) also presented with ancillary findings in study. Of these, commonest was liver abscess seen in two cases. Other such findings were ADPKD, adrenal adenoma, benign cystic lesion in liver, CBD stent, duodenal papillitis, hydatid cyst in liver and simple hepatic cyst listed in chart given below figure 1.0

Table 1.1

Table : MRCP findings of enrolled patients		
MRCP Findings	Number of cases	% cases
Calculus cholecystitis	15	21.43%
Cholelithiasis	13	18.57%
Choledocholithiasis	12	17.14%
IHBR dilatation	11	15.71%
Benign stricture of CBD	10	14.29%
Acute pancreatitis	8	11.43%
Chronic pancreatitis	8	11.43%
Pseudocyst of pancreas	7	10.00%
Hepatic cyst or abscess	5	7.14%
Atrophic pancreas with MPD calculus	4	5.71%
CBD Stent	3	4.29%
Cholangitis	3	4.29%
MPD stricture	3	4.29%
Choledochal cyst	3	4.29%
Malignant stricture of CBD	2	2.86%
Pneumobilia	2	2.86%
Pancreatic divisum	2	2.86%
Hydatid cyst in liver	2	2.86%
Mirizzi syndrome	2	2.86%
Periampullary Carcinoma	1	1.43%
Acalculus cholecystitis	1	1.43%
Neoplastic GB	1	1.43%
GB perforation	1	1.43%
Biliary cystadenoma	1	1.43%
Biliary leak	1	1.43%
ADPKD	1	1.43%
Cholangiocarcinoma	1	1.43%
Adrenal adenoma	1	1.43%
Pancreatic neoplasm	1	1.43%
GB polyp	1	1.43%
Pancreatic injury	1	1.43%
IPMN neoplasm	1	1.43%
Pancreatic head carcinoma	1	1.43%
Pancreatic transection	1	1.43%

Figure 1: Ancillary findings in study



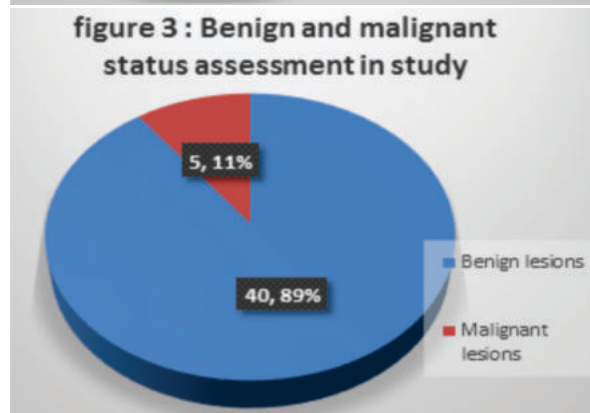
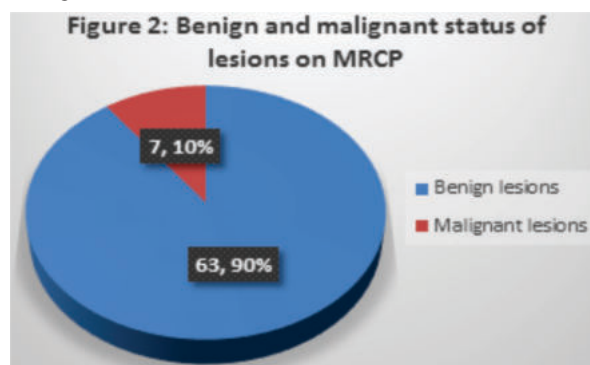
Overall, 10% of the cases had some kind of neoplastic or malignant finding on MRCP assessment. (figure 2).

45 of the 70 patients followed up. Of the 45 cases, 5 cases were noted to have malignancy while 40 others were found to have benign lesions and these patients managed conservatively. (Figure 3)

comparing the diagnoses by MRCP with gold standard 42 of the 45 diagnoses were matching, giving an accuracy of 93.3%.

One patient was diagnosed with acute pancreatitis on MRCP, however on histopathology the diagnoses was confirmed to be necrotizing pancreatitis. Another patient was diagnosed with GB polyp and necrotizing pancreatitis on MRCP. On post-operative histopathology, the actual diagnoses was noted to be a GB neoplasm.

One of the patients who was diagnosed with calculus cholecystitis was noted to have neoplastic lesion on post-operative histopathology finding.



DISCUSSION

A total of 70 patients were enrolled in the study. The mean age was noted to be 43.77 ± 20.19 years with Males predominance noted in study (M:F, 52.86% vs 47.14%) similar as compared to study conducted by Sonawane et al.,⁶ and Nandan kumar et al.,⁷

The commonest clinical feature noted in the study was abdominal pain (55.71%), followed by jaundice (17.14%) and epigastric pain in 10% cases. The study by Khan et al.,⁸ 16 (53%) had the complaints of the obstructive jaundice, 12 (40%) had pain abdomen, and a small 5 (16%) had cholangitis. In the study by Nirhale et al.,⁹ commonest presenting complaint was pain in abdomen (98.33%), yellowish discoloration of urine (8.33%), and lump in abdomen in one case. Icterus was noted in 21.7% cases. Obstructive jaundice was found in 23.3% cases And study by Sonawane et al.,⁶ clinical symptoms of the patients were studied which revealed pain in abdomen in 95% of the patients followed by jaundice in 47.5%.

On MRCP, the common findings noted were calculus cholecystitis (21.43%) (figure 4), cholelithiasis (18.57%), choledocholithiasis (figure 5) (17.14%), IHBR dilatation (15.71%) and benign stricture in (14.29%). Acute pancreatitis (figure 6) and chronic pancreatitis was noted in 8 cases each (11.43% each). Pseudocyst of pancreas and hepatic cysts or abscess was also noted in 10% and 7.14% cases respectively. 9 of the 70 cases in study (12.86%) also presented with

ancillary findings in study. Of these, commonest was liver abscess seen in two cases. Other such findings were ADPKD, adrenal adenoma, benign cystic lesion in liver, CBD stent, duodenal pappilitis, hydatid cyst in liver (figure 8) and simple hepatic cyst. The malignant findings of MRCP assessment included malignant CBD stricture (4.29%), periampullary carcinoma (figure 7), neoplastic GB, adrenal adenoma, IPMN neoplasm and pancreatic head carcinoma (one case each).

In the study by Khan et al.,⁸ stricture was diagnosed in 32% of the cases, while tumours formed 28% of the total cases from pancreaticobiliary region. The other common lesions noted were cysts, extrinsic causes and calculus (12% each).

In the study by Nirhale et al.,⁹ commonest diagnoses on MRCP were cholelithiasis (40%), followed by choledocholithiasis (16.7%), CBD stricture (11.7%) and chronic pancreatitis (10%). Pancreatic pseudocyst was noted in 6.7% cases.



Figure 4: cholecystitis with distal obstruction.

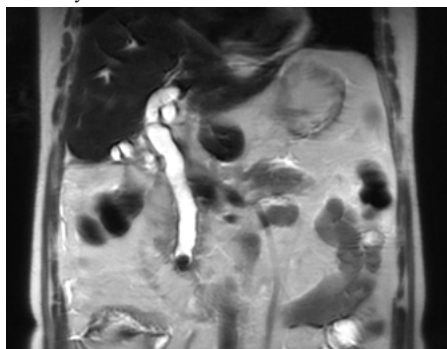


Figure 5: choledocholithiasis with dilatation of proximal CBD

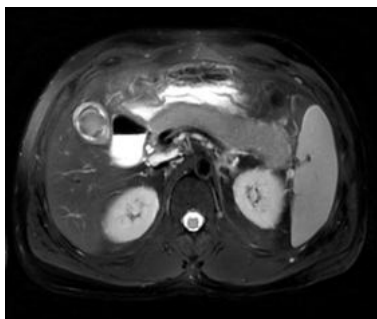


Figure 6: Axial sequences of same patient shows GB polyp with bulky and edematous pancreas with mild peripancreatic fat stranding suggestive of acute edematous pancreatitis

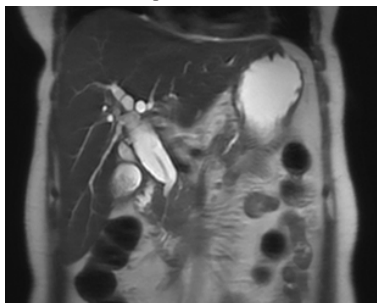


Figure 7: shows well-defined mass lesion in periampullary region

involving proximal MPD and distal CBD and adjacent head of pancreas causing their narrowing CBD, CHD and IHBR. CBD stent is in distal CBD likely suggestive of periampullary carcinoma.

In the study by Sonawane et al.,⁶ 17.5% cases were of acute pancreatitis, 15% each were diagnoses with cholelithiasis, benign stricture and malignant stricture. Choledocholithiasis was noted in 10% cases. Choledochal cysts and periampullary carcinoma were noted in 7.5% cases each.

In the study by Ranganath et al.,¹⁰ 20% cases each were diagnosed on MRCP to be cholangiocarcinoma, choledochal cyst, and stricture. 16% cases were gall bladder carcinoma, while 8% were cholelithiasis cases. In the study by Nandan Kumar et al.,⁷ cholelithiasis was the most common cause with 21 (32.3%) cases, choledocholithiasis was the second most common cause with 10 (15.4%) cases, followed by stricture with 9 (13.8%) cases, cholecystitis with 5 (7.7%) cases, periampullary carcinoma with 2 (3.1%) cases, cholangiocarcinoma with 4 (6.2%) cases, choledochal cyst and cholangitic abscess with 4 cases (6.2%) and 1 (1.5%) case respectively.

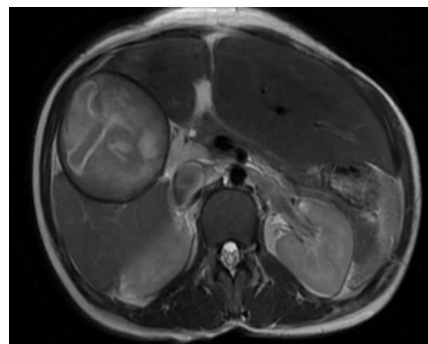


Figure 8 : Hydatid cyst in liver.

Benign and malignant lesions distribution in study Overall, 10% of the cases had some kind of neoplastic or malignant finding on MRCP assessment. In the study by Khan et al.⁸ 28% were malignant lesions while 72% were benign ones. In the study by Sonawane et al.,⁶ total 20% of the enrolled cases were diagnosed with malignant pathology. Most common malignant etiology in present study was malignant CBD stricture (15%) followed by periampullary carcinoma (7.5%). Out of three cases of periampullary carcinoma, one patient's ERCP report turned out to be Periampullary adenoma. The patient was having a nodular swelling the duodenal ampulla. In the study by Ranganath et al.,¹⁰ 36% of the enrolled cases were diagnosed with malignant pathology. Of these, 20% cases were cholangiocarcinoma while 16% cases were of gall bladder carcinoma. In the study by Nandan Kumar et al.,⁷ 6 of the 65 enrolled cases (9.23%) were noted to be malignant lesions on MRCP which was similar to our study.

45 of the 70 patients followed up with confirmed ERCP, Post operative, biopsy or clinical symptoms findings. 5 of the patients with ERCP or biopsy diagnoses were noted to have malignant lesions. The accuracy in the present study was noted to be 93.3% for MRCP.

In the study by Khan et al.,⁸ in 22 of the 25 cases, MRCP diagnosed correctly (88%).

In the study by Georgopoulos et al.¹¹ in patients suspected to have malignancy in the pancreaticobiliary system, MRCP accurately delineated the level of extrahepatic biliary ductal obstruction in 13 (87%) of 15 patients. In the study by Sonawane et al.,⁶ all but one diagnoses in the study (39/40) were accurate by MRCP, with percentage of accuracy noted to be 97.5%. In the study by Ranganath et al.,¹⁰ only of the enrolled 50 cases was diagnosed with MRCP pathology was noted to be normal on gold standard assessment (98% accuracy).

CONCLUSION

MRCP permits the study of anatomy and pathology of biliary tree including pancreatic duct. The differentiation of benign and malignant pancreaticobiliary disorders was also done precisely by MRCP in study.

MRCP was found to be 93 % accurate in identifying the

pancreaticobiliary disorders with its underlying cause in present study. MRCP is the modality of choice for optimal characterization of the causative lesions in most of the cases of pancreaticobiliary pathologies. It also help in determining the modality of treatment either surgical or endoscopy and helps in reducing the invasive intervention done in patients. It is non invasive modality as compared to ERCP.

The present study shows that MRCP is excellent modality of choice for the detecting of pancreaticobiliary pathologies in the symptomatic patients. Thereby helping in quick diagnosis, treatment planning and better prognosis.

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