



STUDY OF PANCREATIC DUCT IN PANCREATITIS USING MRCP

Surgery

Pratik Sharan

Junior Resident, Department of Surgery, RIMS, Ranchi. PIN 834009, Jharkhand, India.

Saurav Kumar Singh

Junior Resident, Department of Surgery, RIMS, Ranchi. PIN 834009, Jharkhand, India.

Dr. Mrityunjay Mundu*

Associate Professor, Department of Surgery, RIMS, Ranchi. PIN 834009, Jharkhand, India. *Corresponding Author

ABSTRACT

AIM: To study the pancreatic duct in pancreatitis using MRCP**METHODS:** A prospective type of study was done comparing the clinical severity of the disease with the findings of MRCP, in the patients presenting with acute severe upper abdominal pain along threefold rise in the level of serum lipase and amylase, at Emergency department at RIMS, Ranchi.**RESULT:** In about 68 out of 100 cases, it was seen that there was normal MPD both in diameter and course. In 19 cases, there was significant (>5 mm) dilatation of MPD. In 5 cases out of 100, there was disruption of MPD was seen. Also, in 8 cases, strictures/stenosis was seen in MPD. MRCP have diagnosed all the changes of MPD in all the cases including dilatation, disruption and stenosis. Also, in this study, the Sensitivity of MRCP in diagnosing Ductal dilatation is found 95%, and Specificity 100%. The PPV and NPV in MRCP is found to be 100% and 98.55% respectively.**CONCLUSION:** MRCP have a very effective diagnostic accuracy in detecting the ductal changes, even better than CECT.

KEYWORDS

Pancreatitis; MRCP; Main pancreatic duct

1. INTRODUCTION

"Acute Pancreatitis" is defined as the acute inflammation of the pancreatic gland and the surrounding tissues and is thought to result from the premature activation of pancreatic digestive enzyme¹; and Clinically it is defined as an acute condition presenting with upper abdominal pain, a threefold rise in serum lipase and amylase, and presence of characteristic imaging findings on contrast enhanced CT Scan.

"Chronic Pancreatitis" is defined as a progressive inflammatory disease in which there is irreversible destruction of the parenchyma and is characterized by severe pain along with both exocrinal as well as endocrinal insufficiency. It is one of the important causes of the patients coming to emergency with Acute abdomen; and its global incidence varies from 5-50 cases per 1 lac²; and In India, its prevalence is about 7.9 per 1 lac. Prevalence in men in India is 8.6 per lac whilst for women it is 8.0 per lac; Overall incidence in India still is increasing. The gender distribution is somewhat more in men than that of women^{3,4}. In about 5-10% cases of pancreatitis there may be severe necrosis with SIRS and subsequently MOFS; those patients are said to have "Acute Necrotizing Pancreatitis". The overall mortality in Mild Pancreatitis is around 1%; and in cases of Necrotizing Pancreatitis it is about 20-50%⁵.

Most common cause of death being Multiorgan failure. Mortality in pancreatitis has a bimodal distribution, in the first week (early phase) is due to Systemic inflammatory cascade; and after 2 weeks (delayed phase) it is due to septic complications. About 70-80% cases of pancreatitis, it is either due to Gall stones (Acute) or Alcohol (Chronic). Gall stone is the most common cause of "Acute pancreatitis". About 3-8% patients of symptomatic gallstone disease will develop acute Pancreatitis, more frequently seen in the older females.

Larena et al⁶ indicated that in patients of Acute pancreatitis, the pancreatic duct is occasionally not visualized on MRCP because of the compression of the duct by adjacent inflammation and edema. Leyendecker et al⁷ and Pascual et al⁸ observed that the pancreatic duct in patients with acute pancreatitis is of normal diameter on MRCP. However, Larena et al. stated that in severe cases of pancreatitis, MRCP may provide information on the status of the pancreatic duct (MPD), including information on the presence of ductal distension, disruption or leakage or the presence of an intraductal lesion that might predispose the patient to pseudocyst formation.

This study aimed to study main pancreatic duct in patients of pancreatitis using MRCP and find out the findings of the pancreatic

duct system including its dilatation and strictures and assessing the cause; in patients with pancreatitis.

2. MATERIALS AND METHODS

The study was a prospective type of study comparing the clinical severity of the disease with the findings of MRCP, in the patients presenting with acute severe upper abdominal pain along threefold rise in the level of serum lipase and amylase, at Emergency department at RIMS, Ranchi. All patients were diagnosed either as acute, chronic or acute on chronic pancreatitis. Male and female patients of age 18-70 years were included. After a complete thorough clinical history and physical examination, measurement of Serum Lipase and Amylase and other routine blood investigation were performed in all cases.

Abdominal ultrasonography was performed as the initial investigation in all the cases. Contrast Enhanced CT Scan was performed in all the cases for confirming the diagnosis in all the cases. Magnetic Resonance Cholangiopancreatography (MRCP) was performed in all the cases to assess the cause and compare the severity of the disease with its findings.

3. RESULT

Table 1. showing age incidence of pancreatitis among all patients (n=100) studied

AGE GROUP	GALLSTONE	ALCOHOL	OTHERS	TOTAL
18-20 years	03	00	03	06
20-29 years	08	04	01	13
30-39 years	08	06	00	14
40-49 years	10	16	02	28
50-59 years	08	17	01	26
60-69 years	04	08	01	13
Total	41	51	08	100

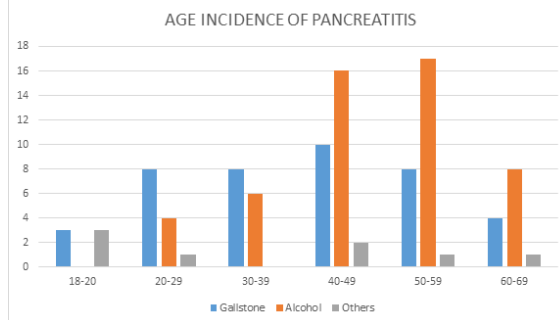
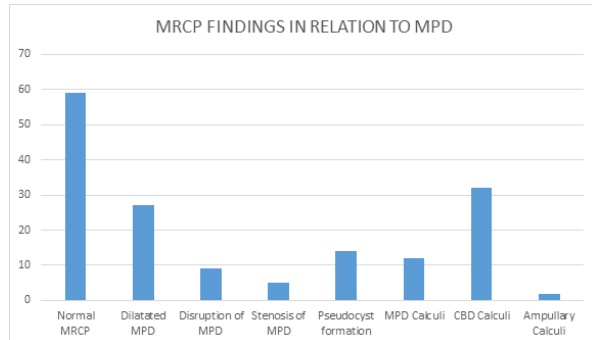
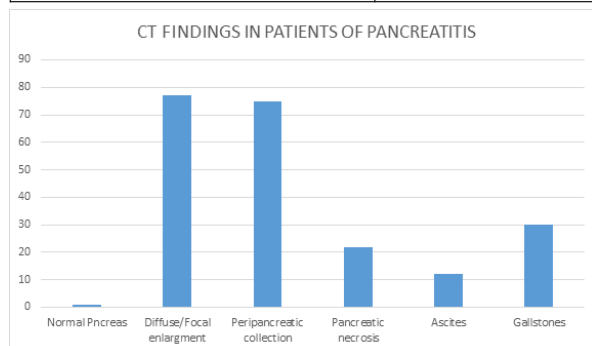
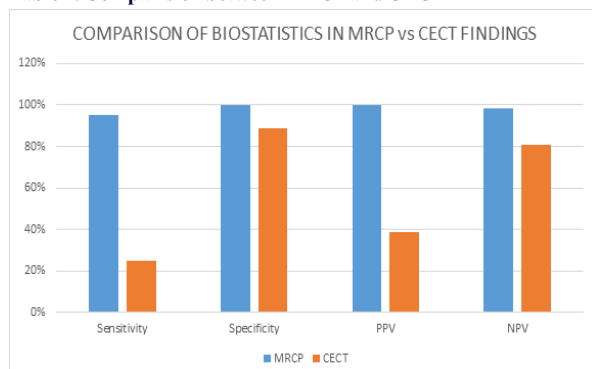


Table 2: Showing MRCP findings of the patients with pancreatitis

FINDINGS	NUMBER OF PATIENTS(n=100)
Normal MRCP (Normal MPD)	68
Dilatation of Main Pancreatic Duct (>5 mm)	19
Disruption of MPD without dilatation	05
Stenosis/ structuring of MPD	08
Pseudocyst formation	14
MPD Calculi	12
CBD Calculi	32
Ampullary Calculi	02

**Table 3: Showing CECT findings of patients with pancreatitis**

FINDINGS	NUMBER OF PATIENTS(n=100)
Normal Pancreas	01
Diffuse/Focal enlargement of the pancreas	77
Peripancreatic collection	75
Pancreatic Necrosis	22
Normal MPD	89
MPD Dilatation	07
MPD Disruption	02
MPD Stenosis/Stricture	02
CBD Calculi	32
MPD Calculi	08
Ascites	12
Gallstones	30(less sensitivity of CT in diagnosis of gallstone)

**Table 4: Comparision between MRCP and CECT****4. DISCUSSION**

In about 68 out of 100 cases, it was seen that there was normal MPD both in diameter and course. In 19 cases, there was significant (>5 mm) dilatation of MPD. In 5 cases out of 100, there was disruption of MPD was seen. Also, in 8 cases, strictures/stenosis was seen in MPD. In 14 out of 100 cases, pseudocyst was seen as a complication. In 12 cases out of 100, MPD calculi was seen. In 32 cases out of 100, CBD calculi. Out of 41 cases of gallstone pancreatitis, there was 32 cases of CBD calculi. In about 2 out of 100 cases, Ampullary calculi is seen.

In 2015, Raju Sharma et al at AIIMS, Delhi, studied the efficacy of MRCP in diagnosing the ductal changes in compare to CECT scan. They found in their studies in the favour of MRCP. In 2006, T. Kamusaiwa et al in their study concluded the importance of MRCP in diagnosing the ductal changes in autoimmune pancreatitis in 70% of their cases. Also, in the study of Soto et al in 1996 and Mall Crages in 1993, they concluded that MRCP has emerged helpful in respect to determine the presence of level and extent of pancreatic obstruction in most of the patients than ERCP. According to study of Munir et al, sensitivity and specificity of MRCP in diagnosing stricture is 92 and 100% cases.

In my study, MRCP have diagnosed all the changes of MPD in all the cases including dilatation, disruption and stenosis. Also, in this study, the Sensitivity of MRCP in diagnosing Ductal dilatation is found 95%, and Specificity 100%.

The PPV and NPV in MRCP is found to be 100% and 98.55% respectively.

Out of 100 patients of the study group; in CECT Scan, 89 cases have normal MPD while only 66 patients have normal MPD on MRCP. 7 cases have MPD dilatation on CECT Scan while 19 cases have MPD dilatation on MRCP. 2 cases have disruption of MPD in CECT Scan while 5 cases have disruption MRCP. 2 patients have stenosis of MPD in CECT Scan while 8 cases have MPD stenosis in MRCP. Overall only 11 patients have changes in MPD on CECT Scan while 34 have changes in MPD on MRCP.

In the study of A. Singh et al in 2014, they showed that diagnostic accuracy of MRCP in diagnosing the level of obstruction of MPD and CBD is more (98%) than CECT Scan (82%) and hence more useful in pancreatitis.

In the study of Morgan et al in 1997, severity of MRI and MRCP is found more (100%) than CECT Scan (98%) in diagnosing the ductal changes and parenchymal changes in pancreatitis.

5. CONCLUSION

In this study alcohol was found as the most important cause of both acute as well chronic pancreatitis ie; in 51% cases. In males, alcohol was most important aetiology ie; in 55.5% cases; where as in female, gallstones are found to be the most important cause in the study ie; in 51.5%.

Contrast Enhanced CT Scan is done in all patients and was found very accurate in detailing of pancreatic necrosis, but its limitation included deranged RFT (in those patients it was done after correcting renal function); and it failed to detect the ductal changes in 21 cases. Hence it failed to accurately identify the MPD dilatation, disruption and stenosis; which was confirmed by MRCP.

MRCP was done in all the cases (have no limitations for deranged RFT) in order to determine its efficacy in diagnosing the MPD changes and was found to detect abnormal changes of MPD in 32 cases in comparison to CECT which had detected changes only in 11 cases. MPD changes includes dilatation(>5mm), disruption and stenosis of MPD. In addition to the ductal changes, detection of both biliary and pancreatic obstruction was better using MRCP than CECT (MRCP have detected calculi in more cases than CECT) ie; in 46 cases.

The "Specificity" of MRCP for the same reason is 100% in comparison to CECT that is 89%. Also, the "Positive Predictive Value (PPV)" in The "Sensitivity" of MRCP in diagnosing ductal changes (specially MPD dilatation) in study population(n=100) is 95% in comparison to CECT that have 25%. MRCP is 100% (CT have 38.8%) and "Negative Predictive Value (NPV)" in MRCP is 98.55% (CT have 80.9%). Hence it is found that MRCP have a very effective diagnostic accuracy in detecting the ductal changes, even better than CECT.

REFERENCES

1. Kim DH, Pickhardt PJ (2007) Radiologic Assessment of Acute and Chronic Pancreatitis. *Surg Clin N Am* 87: 1341–1358.
2. Xiao, A. Y. et al. Global incidence and mortality of pancreatic diseases: a systematic review, meta-analysis, and meta-regression of population-based cohort studies. *Lancet Gastroenterol. Hepatol.* 1, 45–55 (2016).
3. Pezzilli R, Billi P, Morselli-Labate AM: Severity of acute pancreatitis: Relationship with etiology, sex and age. *Hepatogastroenterology* 45:1859–1864, 1998
4. Taylor TV, Rimmer S, Holt S, Jeacock J, Lucas S: Sex differences in gallstone pancreatitis. *Ann Surg* 214:667–670, 1991
5. Lund H, Tonnesen H, Tonnesen MH, Olsen O (2006) Long-term recurrence and death rates after acute pancreatitis. *Scand J Gastroenterol* 41: 234–8.
6. Larena JA, Astigarraga E, Saralegui I, Merino A, Capelastegui A, et al. (1998) Magnetic resonance cholangiopancreatography in the evaluation of pancreatic duct pathology. *Br J Radiol* 71: 1100–4.
7. Leyendecker JR, Elsayes KM, Gratz BJ, Brown JJ (2002) MR cholangio pancreatography: spectrum of pancreatic duct abnormalities. *AJR Am J Roentgenol* 179: 1465–71.
8. Pascual I, Soler J, Peña A, Añón R, Almela P, et al. (2008) Morphological and functional evaluation of the pancreatic duct with secretin-stimulated magnetic resonance cholangiopancreatography in alcoholic pancreatitis patients. *Dig Dis Sci* 53: 3234–41.
9. JA Soto, MABarish, EK Yucel, D Siegenberg, JTFerrucci, R Chuttani. Magnetic resonance cholangiography: Comparison with endoscopic retrograde cholangio pancreatography. *American J Gastroenterology*;1996;110(2):589-597.