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Original Research Article

Role of Computerized Tomography (CT) in Evaluation of Groove Pancreatitis

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Abstract

Background: Groove pancreatitis is a rare form of chronic pancreatitis that becomes problematic when it suppresses the head of the pancreas or compresses the main pancreatic duct and causes stenosis. Then it becomes a challenge to the radiologist for proper diagnosis or remarks.

Method: 32 patients with Groove pancreatitis (GP) were studied with CE motion 64 multislice CR scanner. With non-ionic IV contrast, 12 patients were additionally examined by MRI, including MRCP, using a 1.5 T closed MRI scanner.

Results: 24 (75%) were hyperdense in CT, 8 (66.6%) in MRI, 20 (62.5%) had duodenal wall thickening in CT, 12 (100%) in MRI, 20 (62.5%) had CBD dilatation and distal tapering, 8 (66.6%) in MRI, 16 (50%) and 6 (50%) had pancreatic head enlargement, 16 (50%), 8 (66.6%) had pancreatic duct dilatation, 12 (37.5%) in CT, 6 (50%) in MRI had delayed enhancement, and 12 (37.5%) in CT and 8 (66.6%) in MRI had duodenal cysts.

Conclusion: The differential diagnosis of the pancreatic groove (PG) should be considered along with co-morbidities of the patient it will avoid the surgical intervention.

Keywords: Groove pancrititis, Chronic Pancreatitis, CT, MRI, common bile duct.

Introduction

Groove pancreatitis (GP) is an underrecognized form of chronic pancreatitis (CP) that involves the space between the pancreatic head, the duodenum, and the common bile duct (CBD). It was observed by Becker in 1973, and he named it Rinnen pancreatitis (a German word), meaning groove pancreatitis [1]. The grooves were two types: 1. one groove having fibro-inflammatory changes affects exclusively the duodenal pancreatic groove (the space between the pancreas head, the duodenum, and the common bile duct (CBD)); 2. The segment extending medially from the pancreatic duodenal groove into the pancreatic head. These two groove were reported 8.9% and 15.5% respectively. In the pure form, the scarring tissue affects the dorso-cranial portion of the pancreatic head involving the main pancreatic duct (MPD) with chronic pancreatitis in addition to the groove [2].

In some patients, GP may show mild, irregular, and progressive narrowing of the pancreatic duct, which becomes prominent or significant in radiological view [3]. The same untrained radiologist may encounter a diagnosis and mistake carcinoma coexisting with it or its presence [4]. Hence an attempt to study if the GP is a chronic inflammatory groove or fibrosis, which causes stenosis in the pancreatic duct or head of the pancreas.

Material and Method

32 (thirty-two) adult patients who regularly visited Mediciti Institute of Medical Sciences hospital in Ghanpur, Medchal (Mandal), Telangana – 501401 were studied.

Inclusion Criteria: The patients above 18 years. Patients having symptoms of pancreatitis with confirmation reports. Patients who gave their consent in writing for the study were selected.

Exclusion Criteria: Patients with the final diagnosis of pancreatic groove carcinoma, ampullary cancer, or pancreatic head cancer. The patients who refused to give their consent in writing were excluded from the study.

Method: Every patient was subjected to an Emotion 4 multi-slice CT scanner; non-ionic IV

contrast was injected with a dose of 1.5 ml/kg (maximum = 150 ml) with an average rate of 4 ml/s using an automatic pump injector and standard protocol with pancreatic phase timing fixed at 45 s, portal phase at 70 s, and delayed phase after 5 minutes from the start of contrast injection, respectively. 12 (twelve) of these patients were additionally examined using MRI, including MRCP, using a 1.5 T closed MRI scanner (Siemens Magnetom Essenza). Non-ionic IV contrast was injected with a dose of 1.5 ml/kg (maximum = 150 ml) with an average rate of 4 ml/s using an automatic pump injector. The pancreatic phase timing was fixed at 45 s, the portal phase at 7 s, and the delayed phase after 5 min from the start of contrast injection, respectively, and examination was done using Siemens Emotions. 6 and 12 (twelve) of these patients were additionally examined by MRI, including MRCP, using a 1.5T closed MRI imager. The pulse sequences used were transverse T2FSE with and without fat saturation, T1 chemical shift sequences (in/opposed phase), dynamic pre- and post-gadolinium volumetric interpolated breath-hold examination (VIBE) sequences, and MRCP sequences. MRCP examinations were obtained with a single-shot heavy T2W FSE sequence, HASTE (Siemens), by using respiratory gating and fat saturation.

The duration of the study was from April 2024 to May 2025.

Statistical Analysis: Various clinical manifestations and a summary of different CT and MR. Findings were classified with percentage. The statistical analysis was carried out using SPSS software. The ratio of male and female was 2:1.

Observation and Results

Table 1: Clinical manifestations of patients with groove pancreatitis

- 22 (62.8%) Epigastric pain, 18 (51.4%) obstructive juindice (lelvated indirect Bilirubin), 18 (51.4%) mild elevation of amylase, 13 (37.1%) vomiting, 13 (37.1%) weight loss mild elevation of lipase, 9 (25.7%) diarrhea.

Table 2: Summary of different CT and MRI findings –

- 24 (75%) hypodense in CT, 8 (66.6%) in MRI
- 20 (62.5%) CT, 12 (100%) Duodenal wall thickening.
- 20 (62.5%) CT, 8 (66.6%) MRI, CBD dialatation and distal tapering
- 16 (50%), 6 (50%) pancreatic head enlargement
- 16 (50%) CT, 8 (66.6%) pancreatic duct dialatation
- 12 (37.5%) CT, 6 (50%) MRI delayed enhancement
- 12 (37.5%) CT, 8 (66.6%) Duodenal cyst.

Table 1: Clinical Manifestations of patients with groove pancreatitis (No. of patients: 32)

Clinical Manifestation	No. of patients	Percentage (%)
Epigastric pain referred to the back	22	62.8
Obstructive Juindice (elevated indirect Bilirubin)	18	51.4
Mild elevation of amylase	18	51.4
Vomiting	13	37.1
Weight loss	13	37.1
Mild elevation of lipase	13	37.1
Diarrhea	9	25.7

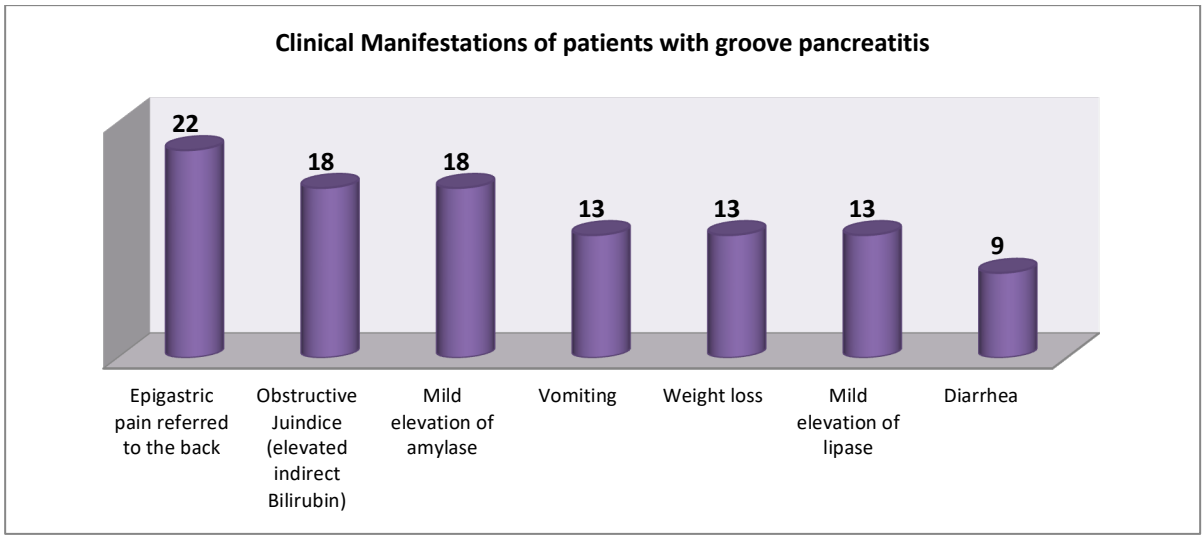

Figure 1: Clinical Manifestations of patients with groove pancreatitis

Table 2: Summary of different CT and MRI findings (No. of patients: 32)

Findings	CT Number patients (32)	Percentage (%)	MRI No. of patients (12)	Percentage (%)
Hypodense sheet	24	75	8	66.6
Duodenal wall thickening	20	62.5	12	100
CBD dilatation & distal tapering	20	62.5	8	66.6
Pancreatic head enlargant	16	50	6	50
Pancreatic duct dialatation	16	50	8	66.6
Delayed enhancement	12	37.5	6	50
Duodenal cyst	12	37.5	8	66.6

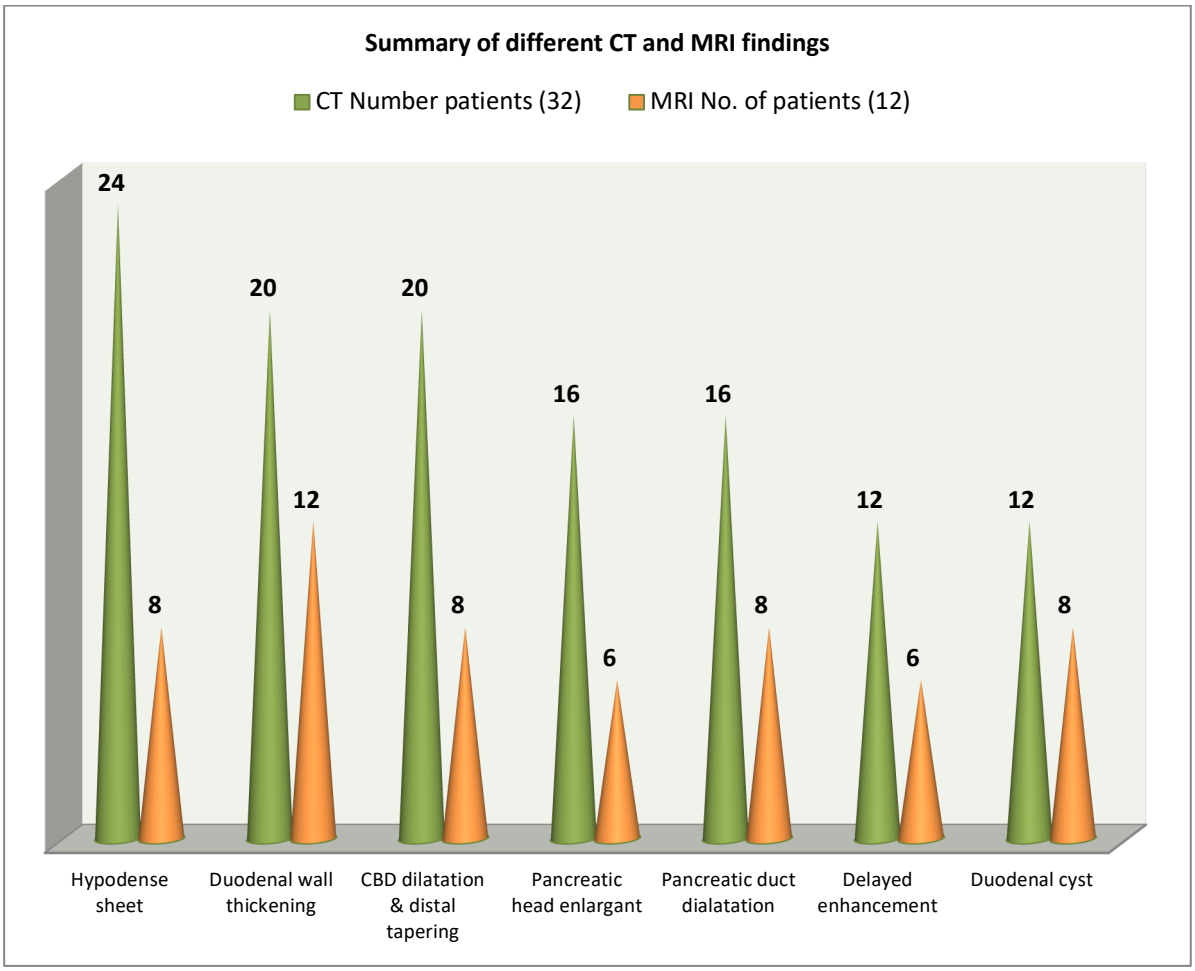

Figure 2: Summary of different CT and MRI findings

Discussion

The role of CT in the evaluation of groove pancreatitis. The clinical manifestations were 22 (62.8%) epigastric pain referred to the back, 18 (51.14%) obstructive jaundice (elevated indirect bilirubin), 18 (51.4%) mild elevation of amylase, 13 (37.1%) vomiting, 13 (37.1%) weight loss, 13 (37.1%) mild elevation of lipase, and 9 (25.7%) diarrhea (Table 1).

The findings of CT and MRI were 24 (75%) CT, 8 (66.6%) hypodense sheets, 20 (62.5%) CT, 12 (100%) MRI, and duodenal wall thickening. 20 (62.5%) CT, 8 (66.6%) MRI, CBD dilatation and distal tapering MRI, 16 (50%) CT, 6 (50%) MRI pancreatic head enlargement, 16 (50%) CT, 8 (66.6%) pancreatic duct dilatation, 12 (37.5%) CT, 6 (50%) MRI delayed enhancement, 12 (37.5%) CT, 8 (66.6%) MRI duodenal cyst (Table 2). These findings are more or less in agreement with previous studies [5,6,7].

The pancreatic duodenal groove is a theoretic space between the pancreatic head and the duodenal wall. A number of small arteries, veins, and lymphatics pass through this space [8].

The important artery is the pancreatic co-duodenal artery (PDA); moreover, important anatomical structures involved in the groove are the CBD, main and accessory pancreatic ducts, major

duodenal papillae, and minor duodenal papillae. This anatomical complexity accounts for many clinical and imaging features of GP and differential diagnosis of this rare entity [9]. The etiology of GP is heterogeneous, implying a series of factors probably playing a role in its development. GP is also observed in alcoholic people, because chronic alcohol intake causes a decrease in bicarbonate secretion, which increases viscosity and consequent stagnation of pancreatic secretion in the pancreatic duct [10]. It follows an increase in pressure inside the Santorini duct with the release of secretion in the groove that promotes the formation of pseudocysts. It is also hypothesized that alcohol predisposes acinar cells to autodigestive injury and necro-inflammation by increasing the synthesis of digestive and lysosomal enzymes, leading to autodigestive cellular damage, acinar injury, and pancreatic necro-inflammation [11].

The differential diagnosis leads to suspicion of pancreatic adenocarcinoma of the head of the pancreas, other pancreatic neoplasms, duodenal carcinoma, ampullary carcinoma, duodenal gastrointestinal stromal tumor (GIST), or duodenal neuroendocrine tumor (NET). Endoscopy-guided FNA biopsy presents a great variability depending on the area sampled.

Summary and Conclusion

Role of CT in evaluation of PG. suggests the diagnosis of groove pancreatitis. Unfortunately the differentiation of GP only on the basis of imaging charecterstics clinical presentation and even the aid of biological markers is very difficult, so that patient often undergo pancreatico duodenectomy (shipps procedure) precisely because can be hard to completely exclude a neoplasm.

However proper knowledge of all types GP radiological features may avoid the surgical interventions.

Limitation of study: Owing to remote location of research centre, small number of patients and lack of latest techniques we have limited finding and results.

This research work was approved by the ethical committee of Mediciti Institute of Medical Sciences, Ghanpur, Medchal, and Telangana-501401.

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