

## CASE REPORT

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# Groove Pancreatitis: A Case Report and Review of Literature

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### ABSTRACT

**Context** Groove pancreatitis is a rare type of segmental pancreatitis characterized by fibrous scars of the anatomic space between the dorsocranial part of the head of the pancreas, the duodenum, and the common bile duct.

**Case report** A 40-year-old man, with a past history of chronic alcohol consumption presented with epigastric pain radiating to the back and intermittent vomiting and a weight loss of 9 kg. A CT of the abdomen revealed swelling of the pancreatic head, a hypodense mass and duodenal wall thickening with luminal narrowing. Peripancreatic fluid and dense strands were also seen. Upper gastrointestinal endoscopy revealed an edematous, shiny, reddish raised mucosa having a polypoid appearance with narrowing of the second portion of the duodenum. Histological examination of the duodenal biopsy specimens showed preservation of the crypt-villus ratio, and the submucosa showed Brunner gland hyperplasia. These findings appeared consistent with the diagnosis of groove pancreatitis. Presently, the patient is on conservative medical management with analgesics, proton pump inhibitors and a pancreatic enzyme supplement.

**Conclusions** Groove pancreatitis often masquerades as pancreatic head carcinoma. This condition should be kept in mind when making the differential diagnosis between

pancreatic masses and duodenal stenosis. In all cases of focal pancreatitis involving the head or uncinate process of the pancreas with involvement of the adjacent duodenum, the possibility of groove pancreatitis should be considered.

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### INTRODUCTION

In 1982, Stolte *et al.* coined the term “groove pancreatitis” and described it as a special form of segmental pancreatitis characterized by fibrous scars of the anatomic space between the dorsocranial part of the head of the pancreas, the duodenum and the common bile duct [1]. Becker and Mischke classified groove pancreatitis into a pure form and a segmental form [2]. The prevalence of groove pancreatitis is difficult to assess. In three surgical series, this diagnosis was present in 2.7%, 19.5%, and 24.4% of duodeno-pancreatectomy specimens obtained from patients with chronic pancreatitis [1, 2, 3]. Groove pancreatitis is often diagnosed in 40- to 50-year-old alcoholic men [1, 2]. The patients usually present with postprandial abdominal pain and, subsequently, impaired motility, stenosis of the duodenum and postprandial vomiting often leading to significant weight loss. Blood tests often show a slight elevation of serum pancreatic enzymes and occasionally of serum hepatic enzymes [4]. Tumor markers, carcino-embryonic antigen and carbohydrate antigen

19-9, are rarely elevated [3]. The distinction between groove pancreatitis and pancreatic



**Figure 1.** CT of the abdomen. **a.** In the pre-contrast phase, the CT revealed swelling of the pancreatic head, a hypodense mass (black arrow), and duodenal wall thickening with luminal narrowing (white arrow). **b.** In the veno-portal phase, the CT revealed swelling of the pancreatic head, a hypodense mass (black arrow), and duodenal wall thickening with luminal narrowing (white arrow). **c.** In the arterial phase, the CT revealed swelling of the pancreatic head, a hypodense mass (black arrow), and duodenal wall thickening with luminal narrowing (white arrow). Peripancreatic fluid and dense strands are also seen in all three phases.

head adenocarcinoma is often difficult on imaging [3, 5, 6, 7]. Groove pancreatitis can be treated by conservative medical measures, but surgery is often required because of the severity of the clinical symptoms and in order to rule out malignancy. The surgical treatment of choice is a pancreaticoduodenectomy using the Whipple procedure or a pylorus-preserving pancreaticoduodenectomy. In this article, we present the case of a patient with groove pancreatitis.

### CASE REPORT

A 40-year-old man, with a past history of chronic alcohol consumption, 80 grams of alcohol per day for the past 15 years, presented with epigastric pain radiating to the back, intermittent vomiting and a weight loss of 9 kg. There had been recurrent admissions due to abdominal pain over the past six years for which he was evaluated at various hospitals. His serum amylase ranged from 118 to 657 U/L (reference range: 0-220 U/L). Transcutaneous ultrasound of the abdomen showed diffuse thickening of the second and third parts of the duodenum with fine inflammatory strands extending to the adjacent mesentery, and the head and uncinate process of the pancreas with a narrowing of the duodenal lumen. A CT of the abdomen, pre-contrast phase (Figure 1a) veno-portal phase (Figure 1b) and arterial phase (Figure 1c) revealed swelling of the pancreatic head, a hypodense mass (black arrowhead), and duodenal wall thickening with luminal narrowing (white arrow). Peripancreatic fluid and dense strands were also seen. The biliary system was normal. Upper gastrointestinal endoscopy (Figure 2) revealed an edematous, shiny, reddish raised mucosa having a polypoid appearance with narrowing of the second portion of the duodenum. Multiple duodenal mucosal biopsies were taken. Histological examination of the biopsy specimens obtained from the duodenal mucosa showed preservation of the crypt-villus ratio, and the submucosa showed Brunner gland hyperplasia. Lamina propria showed mild mixed cell infiltrate. There was no evidence of lymphoma or malignancy.

ERCP was done to delineate the pancreatic duct and the common bile duct. The common bile duct could not be cannulated. Cannulation of the pancreatic duct revealed that the main pancreatic duct was normal. Endoscopic ultrasonography (EUS) at 7.5 MHz revealed a mass with mixed consistency which was situated between head of the the pancreas and the duodenum. The tumor marker serum carbohydrate antigen 19-9 was 0.516 U/mL (reference range: 0-37 U/mL). These findings appeared consistent with the diagnosis of groove pancreatitis. Since the patient was having repeated abdominal pain despite medical therapy, he was operated on. A laparotomy was done which revealed a thickened omentum, bulky pancreas and the duodenum adherent to the adjacent tissues. The operative diagnosis was chronic pancreatitis with an inflammatory mass. The patient had an uneventful recovery. He is on conservative medical management with analgesics, proton pump inhibitors and a pancreatic enzyme supplement. He has mild intermittent abdominal pain at irregular intervals. He has not consumed alcohol for the past year and is being regularly followed up at our pancreas clinic.

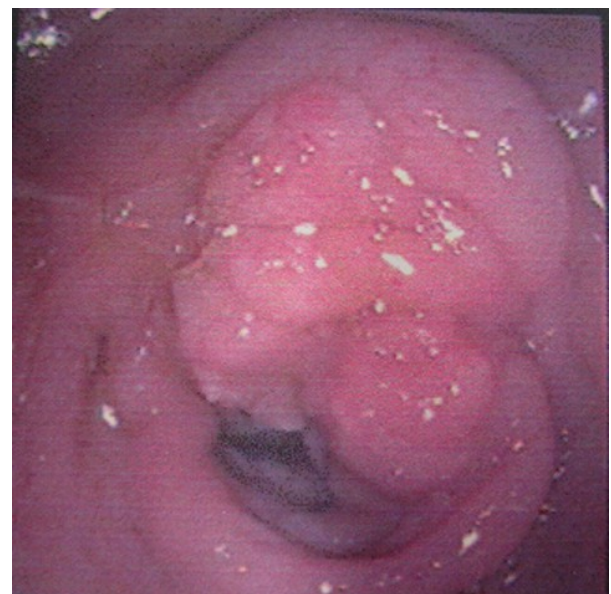
## DISCUSSION

In 1982, Stolte *et al.* coined the term “groove pancreatitis” and described it as a special form of segmental pancreatitis characterized by fibrous scars of the anatomic space between the dorsocranial part of the head of the pancreas, the duodenum and the common bile duct. They reported the largest series of patients and reviewed in detail the histopathological features of 30 patients with groove pancreatitis in a series of 123 patients undergoing pancreaticoduodenectomy for chronic pancreatitis [1]. In the 1970s, this entity had been described by Becker *et al.* as “segmentäre pankreatitis” or “Rinnenpankreatitis” in the German literature [2, 8]. This disease is rare and its low detection can partly be attributed to lack of familiarity. Adsay and Zamboni published a review in which they tried to unify the concept of “groove pancreatitis”, “cystic

dystrophy of heterotopic pancreas“, and “paraduodenal wall cyst” [9]. While heterotopic pancreas is only occasionally found in groove pancreatitis, the presence of this feature is an inherent precondition for cystic dystrophy of the duodenal wall in the heterotopic pancreas as described by Potet and Duclert [10], Fléjou *et al.* [11] and Vullierme *et al.* [12]. This condition is characterized by the presence of cysts surrounded by inflammation and fibrosis in the duodenal wall, intermingled with pancreatic ducts and lobules.

Becker and Mischke classified groove pancreatitis into a pure form and a segmental form [2]. Groove pancreatitis in the pure form involves the groove only, with preservation of the pancreatic parenchyma and the main pancreatic ducts. The segmental form of groove pancreatitis involves both the groove and the head of the pancreas with stenosis of the pancreatic duct causing upstream dilatation. The prevalence of groove pancreatitis is difficult to assess. In three surgical series, this diagnosis was present in 2.7%, 19.5% and 24.4% of duodeno-pancreatectomy specimens obtained from patients with chronic pancreatitis [1, 2, 3].

Groove pancreatitis is often diagnosed in 40-



**Figure 2.** Upper gastrointestinal endoscopy showing an edematous, shiny, reddish raised mucosa having a polypoid appearance with a narrowing of the second portion of the duodenum.

to 50-year-old alcoholic men [1, 2]. The patients usually present with postprandial abdominal pain and, subsequently, impaired motility, stenosis of the duodenum and postprandial vomiting often leading to significant weight loss. Jaundice is unusual, and the duration of the clinical symptoms ranges from a few weeks to more than one year.

Blood tests often show a slight elevation of serum pancreatic enzymes and occasionally of serum hepatic enzymes [4]. Tumor markers, carcinoembryonic antigens and carbohydrate antigen 19-9, are rarely elevated [3]. Upper gastrointestinal endoscopy often reveals an inflamed and polypoid duodenal mucosa with stenosis of the duodenal lumen [5, 13].

Abdominal ultrasound usually shows a hypoechoic mass, and a CT scan often reveals a hypodense, poorly enhanced mass between the pancreatic head and a thickened duodenal wall [6]. Magnetic resonance (MR) imaging usually presents a hypointense mass on T1-weighted MR images, and iso- or slightly hyperintense on T2-weighted MR images, with delayed contrast enhancement after injection of the contrast material, reflecting its fibrous nature [14]. Arteriographic findings include a hypervascular mass in the groove area or vascular encasement. MR cholangiopancreatography [14], EUS [15] and ERCP demonstrate smooth tubular stenosis of the common bile duct without abnormality of the main pancreatic duct, or rarely, with only slight irregularities. Cysts in the duodenal wall can be shown on T2-weighted MR images, CT scan or EUS. ERCP can demonstrate irregularity and dilatation of the Santorini duct and its branches, sometimes with intraductal stones. Although smooth tubular stenosis of the common bile duct is common in groove pancreatitis, genuine obstructive jaundice is found only rarely. The distinction between groove pancreatitis and pancreatic head adenocarcinoma is often difficult on imaging [3, 5, 6, 7]. Although the diagnosis is difficult, it is crucial to differentiate between groove pancreatitis and groove pancreatic adenocarcinoma, because the appropriate management of the two

conditions differs significantly. ERCP and EUS may be used to differentiate between the above two conditions. Smooth and regular stenosis of the common bile duct is seen in groove pancreatitis while irregular ductal stenosis with obstructive jaundice is seen in pancreatic adenocarcinoma. Obstructive jaundice is rarely found in groove pancreatitis [2]. Gabata *et al.* reported nine cases of histologically proven carcinoma of the head of the pancreas found in the groove area whose imaging findings resembled those of groove pancreatitis [7]. Plate-like masses within the groove region were seen in all cases. They were hypointense on T1-weighted images and slight hyperintense on T2-weighted MR images. On MRCP, stenosis of the intrapancreatic common bile duct was seen in all patients whereas stenosis of the main pancreatic duct was seen in only three cases. There was luminal narrowing of the duodenum in all patients and a duodenal mucosal biopsy demonstrated adenocarcinoma in seven patients. Abdominal arteriography showed serrated encasement of the peripancreatic arteries in seven patients. Suehara *et al.* reported the detection of telomerase activity in the pancreatic juice preceding the emergence of clinical evidence of pancreatic cancer [16]. Telomerase activity in the pancreatic juice may be a sensitive marker for the early diagnosis of pancreatic ductal carcinoma before it is possible to detect tumors by various imaging modalities.

Shudo *et al.* reviewed seventeen cases of groove pancreatitis reported in the Japanese literature [17]. The 17 patients (14 men and 3 women) had a median age of 51 years (range 37-69 years). Sixteen of the 17 patients were symptomatic. All patients but one were alcoholics. Duodenal stenosis was evident in 14 patients. Biliary stenosis, characterized by the smooth tapering of the common bile duct, was observed in six patients. Pre-operatively, almost all patients were diagnosed as having pancreatic head carcinoma.

Groove pancreatitis can be treated by conservative medical measures, but surgery is often required because of the severity of the clinical symptoms and in order to rule out

malignancy. The surgical treatment of choice is a pancreaticoduodenectomy using the Whipple procedure or a pylorus-preserving pancreaticoduodenectomy.

Gross examination of the surgical specimen usually shows an abundant whitish firm mass of the groove area stenosing the terminal common bile duct [1, 2, 3].

On microscopic examination, extensive fibrosis of the duodenal wall with Brunner gland hyperplasia in the submucosa may be observed. The pancreatic biopsy will show evidence of chronic pancreatitis with extensive fibrosis, acinar involution and intimal fibrosis of the pancreatic arterioles. The pancreatic duct is normal, and the Santorini duct is sometimes dilated and can contain protein plugs, calcification and abscesses. Sometimes, there are cysts in the duodenal wall and pseudocysts which can contain protein-rich pancreatic juice [1, 2, 3]. The pathogenesis of groove pancreatitis is still unclear but seems to be caused by a disturbance of the pancreatic outflow in the Santorini duct through the minor papilla [1, 2, 3]. One of the main factors is probably chronic alcohol consumption which increases the viscosity of the pancreatic juice and leads to Brunner gland hyperplasia, causing occlusion or dysfunction of the minor papilla.

## CONCLUSIONS

Groove pancreatitis often masquerades as pancreatic head carcinoma. This condition should be kept in mind when making the differential diagnosis between pancreatic masses and duodenal stenosis. In all cases of focal pancreatitis involving the head or uncinate process of the pancreas with involvement of the adjacent duodenum, the possibility of groove pancreatitis should be considered.

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**Conflict of interest** The authors have no potential conflicts of interest

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