



The breadth of imaging findings of groove pancreatitis

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ABSTRACT

The pathogenesis of groove pancreatitis involves progressive cystic degeneration of hamartomatous pancreas rests which lie within the duodenal wall. Hamartomatous pancreatic rests can occur in other locations, but when located within the pancreaticoduodenal groove can lead to a particular clinical presentation following the development of fibrotic and inflammatory tissue. Although this is not a disease of the pancreas itself, the pancreatic duct and biliary system is frequently secondarily involved in this regional process. Identification of this entity and its varied appearances as a distinct pathology is essential given the unique management issues of groove pancreatitis.

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1. Introduction

Groove pancreatitis is an unusual cause of chronic abdominal pain which was first described in 1970 [1]. The imaging appearances and clinical features of this benign hamartomatous condition often overlap with pancreatic adenocarcinoma [2,4]. The prototypical patient is a 50-year-old male with a history of chronic relapsing abdominal pain and weight loss. Chronic alcoholism is the only well-established risk factor [3,4]. Duodenal luminal obstruction has been reported but appears to be a rare presenting symptom [4]. Serum laboratory values usually show only mildly elevated amylase and lipase which help to differentiate from typical acute interstitial or acute necrotic pancreatitis. Serum liver transaminases (aspartate transaminase and alanine transaminase) are also often mildly elevated. Tumor markers including CA19-9 are usually negative. Jaundice and hyperbilirubinemia are less common but can occur [3], mimicking ductal carcinoma. Fortunately, this is a treatable disease. The range of proposed therapies varies widely and includes the endoscopic stenting of the papilla, supportive therapy, Whipple procedure, and pancreas-sparing duodenectomy [3,5–9].

Since the first publication of groove pancreatitis in 1970, the radiological description has been fairly well typified [4,10–12]. However, beyond the typical findings, there has been little information published on the end-stage or atypical characteristics of groove pancreatitis. The spectrum of findings is wide, and the atypical characteristics can vary greatly from the typical form of the disease. Anecdotally, an understanding of the spectrum of the end-stage and atypical imaging features seems to be important as several of the cases diagnosed by

computed tomography (CT) and magnetic resonance imaging (MRI) from our quaternary referral center have been complicated by such features [5]. It is essential for the radiologist to have an understanding of the varied radiographic appearances of this disease in order to differentiate it from other pathologies which often have some overlapping imaging characteristics including, but not limited to, pancreatic adenocarcinoma. This is especially important considering that the prognoses and therapies for those mimicking conditions may vary significantly from groove pancreatitis.

2. Gross pathology and histology

Groove pancreatitis is described histopathologically as chronic inflammation and scarring in the anatomical space between the medial wall of the duodenum and the head of the pancreas, which is termed the “groove” [4,13]. Hamartomatous rests of pancreas within the medial duodenal wall undergo cystic degeneration from chronic episodes of stress, which are presumed to be related to alcohol-induced ischemia [14]. Microscopic pathologic findings include, fibrosis, cysts, Brunner gland hyperplasia, and smooth muscle hyperplasia [5,8,14–16]. Gross ductal abnormalities are not uncommon with groove pancreatitis [17]. Pancreatic duct and common bile duct stenoses occur due to strictures, proteinaceous plugs, and abnormally viscous ductal fluid. The most frequent duct involved is the accessory duct of Santorini at the minor papilla [4,13,15]. Occasionally, there are findings of chronic calcific pancreatitis [4,15,19]. The features of chronic calcific pancreatitis correspond to the severity of ductal abnormalities, with chronic stenosis leading to upstream stasis and eventual intraductal stone formation [10].

There are two established typical gross morphologic forms of this disease: the pure form and the segmental form [11,13,15]. In the “pure” form, the abnormalities are confined to the pancreaticoduodenal

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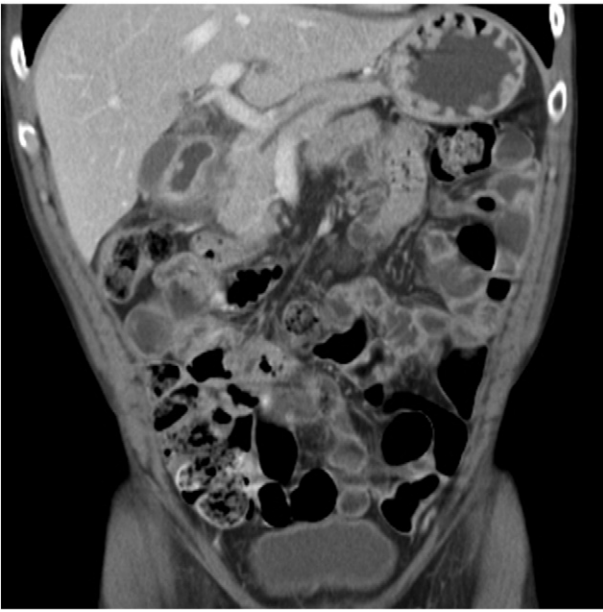


Fig. 1. Coronal contrast-enhanced CT demonstrates typical groove pancreatitis (GP) with a sheet-like mass in the groove and adjacent duodenal thickening. This is an example of the “pure form” with the abnormalities largely confined to the pancreaticoduodenal groove.

groove, and the head of the pancreas proper is spared. In the “segmental” form, the inflammation and scarring extend to directly involve the head of the pancreas proper which frequently leads to intrapancreatic abnormalities including cysts and fibrotic masses [18].

3. Radiological findings

The imaging findings of typical groove pancreatitis have been relatively well established. The typical morphology includes a “sheet-like mass” of nonenhancing fibrotic tissue within the groove, medial duodenal wall thickening and cystic degeneration, and possibly mild common biliary ductal dilation (Figs. 1 and 2) [4]. There are several other less typical morphologies of groove pancreatitis which are not altogether uncommon. These atypical forms have a wide range of imaging features which can vary greatly from the typified form.

The morphologic spectrum of the fibrotic mass can vary greatly from the typical “sheet like” form (Fig. 3). The mass can be large, solid, cystic,

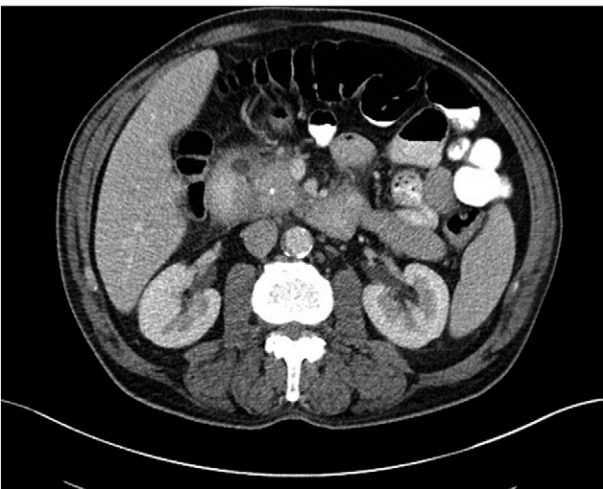


Fig. 2. Axial contrast-enhanced CT (CECT) demonstrates another typical case of GP. This is an example of the “segmental form” with the round fibrotic mass centered in the pancreaticoduodenal groove but involving the head of the pancreas.

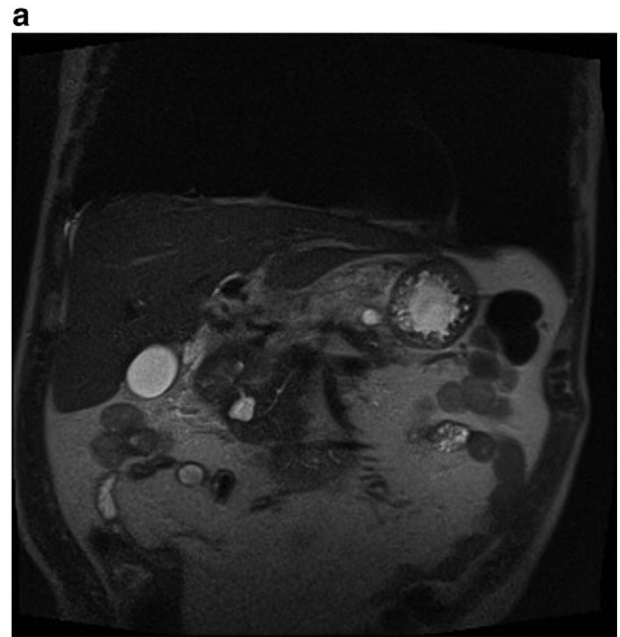


Fig. 3. Coronal HASTE T2W images demonstrate the wide spectrum of morphologies of the groove mass ranging from (a) a small cystic lesion to (b) a large cystic and solid mass.

multicystic, heterogeneous, or complex [4]. Often, with these atypical morphologies of the fibrotic mass, the major diagnostic dilemma is differentiating a benign hamartomatous fibrotic mass from a carcinomatous scirrhous mass. When assessing the mass, it is the absence of certain features which is important in order to discriminate from carcinoma including vascular encasement, distant metastases, lymphadenopathy, and direct invasion of neighboring organs (other than for the duodenum or the pancreas).

Cystic degeneration within the medial duodenal wall is a somewhat specific imaging characteristic for groove pancreatitis. Typical findings are small discrete cysts and associated focal medial duodenal wall thickening. The cysts are within the thickened wall are more often seen with MRI. Atypical cystic degeneration can vary greatly in appearance and can include multiple, large, complex multicystic masses (Fig. 4).

Ductal abnormalities are common imaging findings with groove pancreatitis. The typical findings are gradually tapered narrowings and mild

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