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Groove pancreatitis, a challenging entity

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Learning objectives

Groove pancreatitis (GP) is an uncommon form of chronic pancreatitis.

The imaging diagnosis remains difficult and most patients undergo surgical procedures to discard periampullary malignancy.

We review typical imaging features of GP on MRI, US and CT, in order to better recognize this entity.

Background

Groove pancreatitis involves the anatomic plane between the pancreatic head and duodenum. Duodenal and biliary obstruction symptoms overlap with those of pancreatic cancer, frequently leading to misdiagnosis.

Two forms of GP have been described: the “segmental” form, which involves the pancreatic head with development of scar tissue within the groove, and the “pure” form, which affects the groove only, sparing the pancreatic head.

Pathologic analysis reveals scar tissue in the pancreaticoduodenal groove, with sparing of the pancreatic parenchyma in the pure form and with variable involvement of the pancreatic head in the segmental form.

The pathogenesis of groove pancreatitis is still unclear. Several factors such as peptic ulcer disease, gastric resection, true duodenal wall cysts, pancreatic heterotopia, and disturbance of flow in the main pancreatic duct (MPD), are related to the development of groove pancreatitis

Paraduodenal pancreatitis is a term that has been proposed as a global category which includes GP, cystic dystrophy of the duodenal wall and paraduodenal wall cysts, because these entities have several features in common.

For case selection, we reviewed our hospital’s data base, and 15 patients were retrieved with diagnosis of GP or PP, hospitalized from January 2008 to December 2012.

Findings and procedure details

In our presentation, the segmental form of GP was prevalent, against the pure form.

Key findings of GP on Ultrasounds (US), Computer tomography (CT), Magnetic Resonance and Cholangio Magnetic Resonance are described below:

Sonographically, thick and prominent hyperechoic duodenal folds, while muscular layer appeared normal, cysts in duodenal wall and hypoechoic groove, are the main finding. Other findings can be a thin bandlike hypoechoic area in the plane between the pancreatic head and duodenum, and a hyperechoic or heterogeneous area in the dorsocranial part of the pancreatic head. Diagnosis of PP can't be made only by US studies.

CT images show soft tissue within the pancreaticoduodenal groove, with or without delayed enhancement and small cystic lesions along the medial duodenal wall.

MR imaging features, are essential for final diagnosis.

Mass-like appearance

The most characteristic finding on MRI is a sheetlike mass between the head of pancreas and the C-loop of duodenum. The mass is hypointense to pancreatic parenchyma on T1-weighted images and can be hypo-, iso-, or slightly hyperintense on T2-weighted images. This variation in the T2 signal can be attributed to the time of onset of the disease because subacute disease shows brighter T2 images due to edema, and chronic disease has a lower signal due to fibrosis. Contrast-enhanced dynamic images show a delayed and progressive inhomogeneous enhancement that reflects the fibrous nature of the tissue. Most pancreatic adenocarcinomas are relatively hypovascular and may present a scirrhous character resulting from the presence of dense fibrotic tissue in the mass. Thus, contrast enhancement patterns can be similar in both conditions. Nevertheless, cancer usually has a more round and discrete appearance.

Inflammatory Changes in Pancreatic Parenchyma

Hypointensity of the pancreatic head or the entire gland on T1-weighted images is observed, usually associated with parenchymal atrophy and ductal dilatation. This finding reflects the chronic aspect of inflammatory disease, leading to progressive loss of glandular cells, protein, and lipidic contents of the gland, which are replaced by fibrous tissue. Some patients may present with enlargement of the pancreatic head. In the pure form of groove pancreatitis, the pancreas itself is spared and shows the usual bright T1 signal intensity.

Cysts

Cystic lesions are well shown in the groove or duodenal wall, especially on T2-weighted images. MR cholangiopancreatography (MRCP) also depicts the relationship between the ductal system and the cystic changes.

Duodenal Wall Thickening and Duodenal Stenosis

MRCP and cross-sectional images can show duodenal morphology and correlate it with the tissue in the groove. Duodenal evaluation is important in differentiating groove pancreatitis from pancreatic cancer because marked inflammatory duodenal parietal thickening is not a common feature associated with tumors in the pancreatic head.

Common Bile Duct Tapering

Some degree of stenosis is virtually always found. This tapering is characteristically regular in contrast to the abrupt and “shouldered” aspect of stenosis in pancreatic cancers. Sometimes the stenosis leads to a mild retrograde biliary dilatation.

Pancreatic Duct Morphology

The main pancreatic duct usually shows a mild, regular, and progressive pattern of narrowing in the head of the gland, especially in the segmental form of the disease. Higher degrees of dilation of the Wirsung duct and secondary duct ectasia are seen in some patients, a fact that can be explained by the inclusion of cases when both groove pancreatitis and diffuse chronic inflammatory disease were present. tissue in the groove.

Widening of Space Between Distal Pancreatic and Common Bile Ducts and Duodenal Lumen on MRCP

This sign, not commonly seen in cases of pancreatic cancer, was observed in most of our patients with groove pancreatitis. We consider it to be caused by a combination of two factors: the presence of a space-occupying lesion in the pancreaticoduodenal groove and marked duodenal wall thickening.

Banana-Shaped Gallbladder

Because groove pancreatitis is not usually associated with a significant degree of biliary dilatation, the gallbladder tends to be normally distended. A curious fact is the high

prevalence of a banana-shaped gallbladder on MRCP, a sign commonly encountered in cases of chronic pancreatitis.

Conclusion

GP is a rare form of chronic pancreatitis with a course frequently aggressive and serious differential diagnosis.

The goal of this exposition was to disclose the main imaging findings of GP, in order to suggest the correct diagnosis and treatment of this entity.

Images:

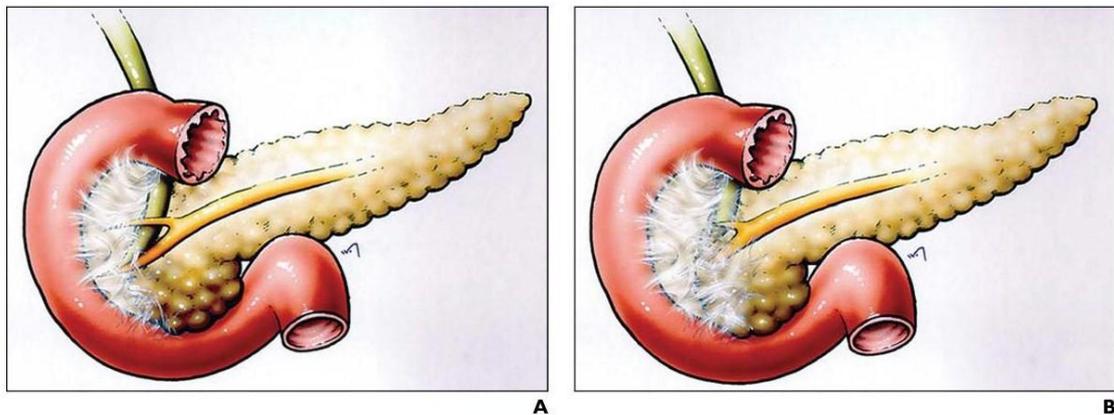


Fig. 1: Schematic drawings of groove pancreatitis A- Depicts fibrotic tissue in pancreaticoduodenal groove (PURE FORM) B- Depicts fibrotic tissue involving also pancreatic head (SEGMENTAL FORM)

References: Blasbalg R et al. (2007) MRI Features of Groove Pancreatitis

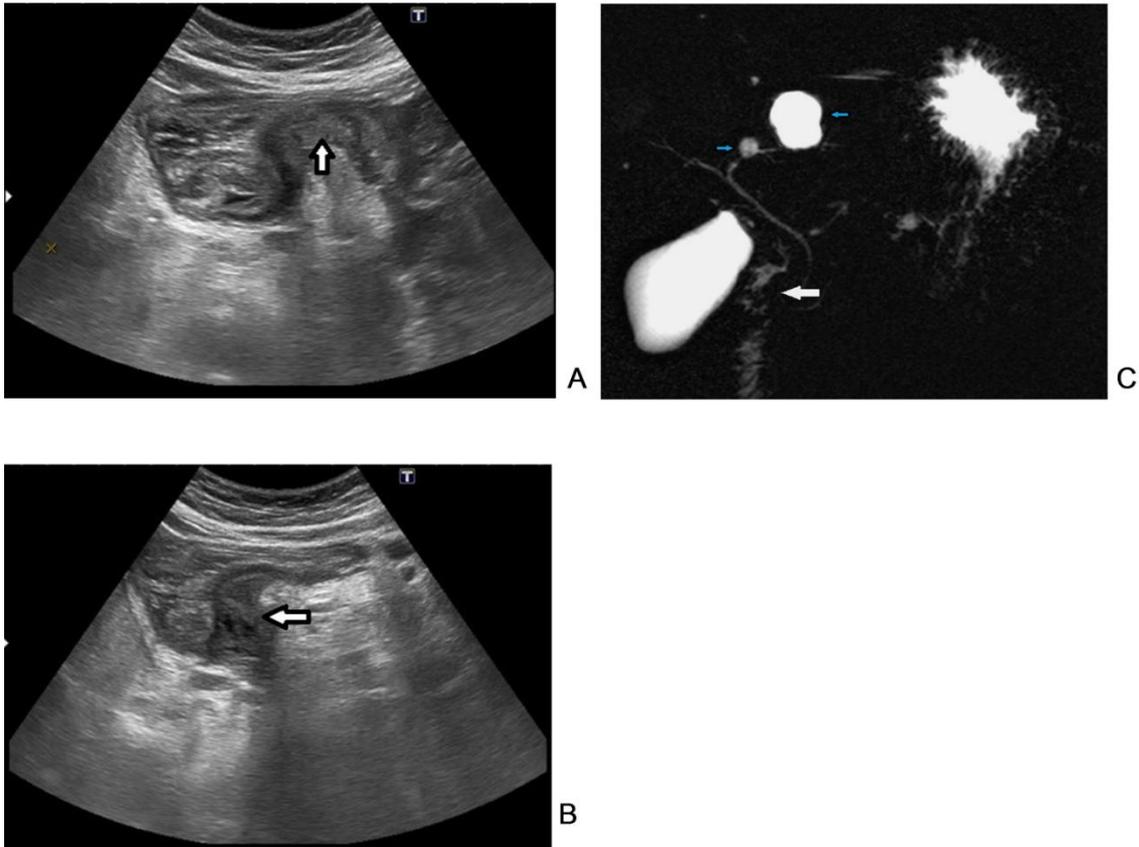


Fig. 2: A 56-year-old patient with epigastric cramping pain, associated with delayed vomiting A, B- Echography findings: Mural thickening of the duodenal second portion adjacent to the pancreatic head, with alteration of the surrounding fat as probable signs of groove pancreatitis (white arrows) C- Cholangio- MR findings: Widening of the space between duodenal and common biliary duct because of de duodenal mural thickening (white arrow). Hepatic cysts (blue arrows).

References: - Valencia/ES

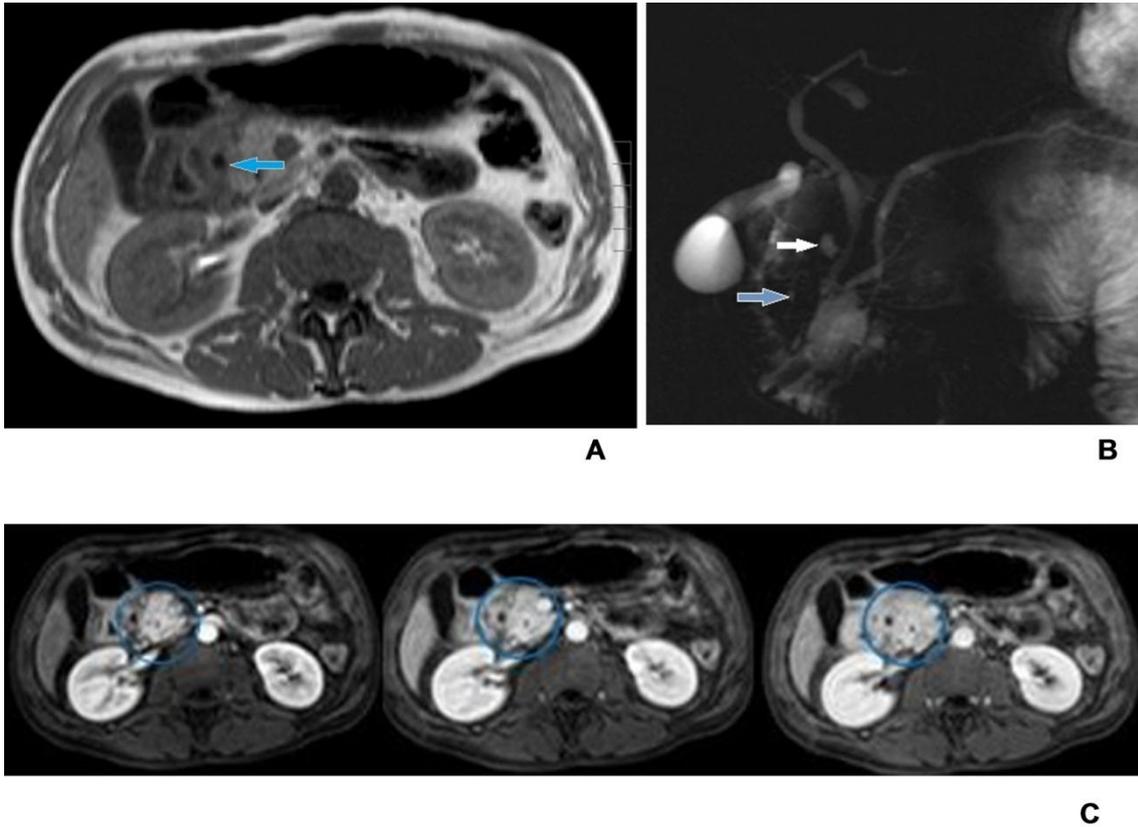
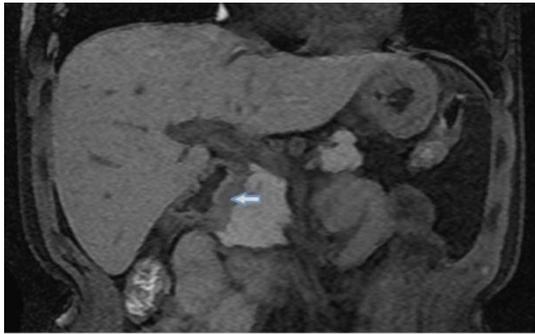
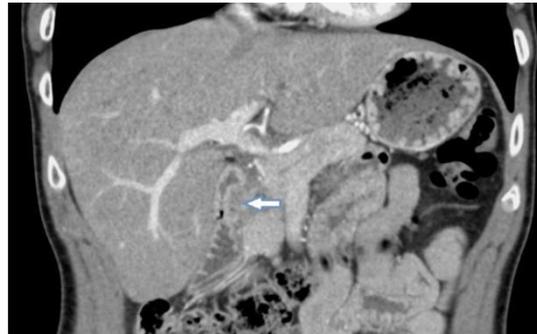


Fig. 3: 41 year old man admitted for retention vomiting 5-7 times/day with impaired fluid intake. Epimesogastric pain associated that radiates in belt, wich intensity improves after vomiting. A- MRI T1 weighted: Increased of size and signal intensity of the pancreatic head. Cysts on pancreatic groove (blue arrow) and second portion of duodenal wall, which is also thickened. Inflammatory changes in the adjacent fat. B- Cholangio-MR: Duodenal wall cyst (white arrow) and widening of the space between duodenal and common biliary duct because of de duodenal mural thickening (Blue arrow). C- T1 weighted fat-suppressed MRI contrast-enhanced: Progressive enhancement of inflammatory and fibrotic tissue in pancreatic groove (blue circle).

References: - Valencia/ES



A



C



B



D

Fig. 4: 47 year old man who came to the emergency service with epigastric pain radiated into both hypochondria that has worsened over the past 15 days, although. Weight loss of 7 – 8 kg during the last 3 months. A,B - Fat-suppressed contrast-enhanced T1 weighted MRI, and C,D - Contrast enhanced CT: Pancreatic duodenal groove involvement consistent in a replacement with soft tissue of fibrotic nature (white arrows) D- Contrast enhanced CT: Associates a unilocular cystic lesion of 17 mm in pancreatic head correspondent with a pseudocyst.(blue arrow)

References: - Valencia/ES

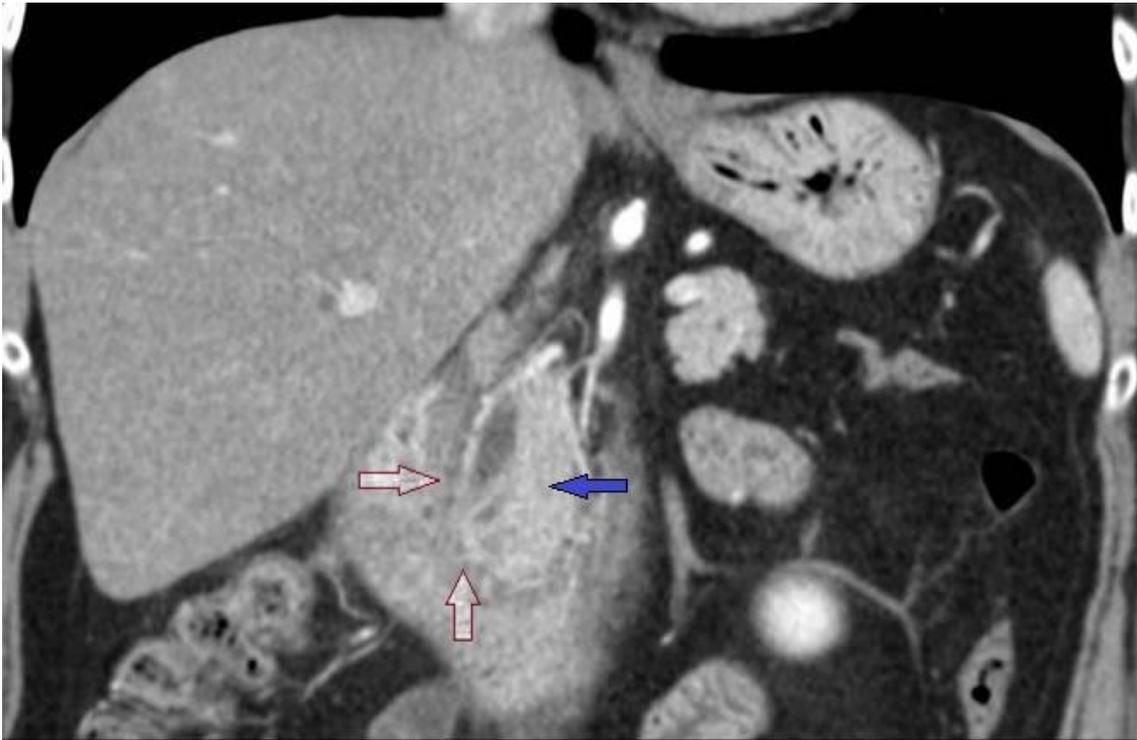


Fig. 5: 56 years old woman with abdominal pain in the right abdomen and the back. TC enhanced findings: Concentric wall thickening of first and second duodenal portion with inflammatory tissue on pancreatic-duodenal groove (white arrows), with enhancement of the ampullary region (blue arrow), associating slight dilatation of the common bile and the main pancreatic duct.

References: - Valencia/ES



Fig. 6: Same 56 years old woman with abdominal pain in the right abdomen and the back. Ecographic findings: Concentric wall thickening is observed on first and second duodenal portion with the presence of an hypoechoic area in ampullary region
References: - Valencia/ES

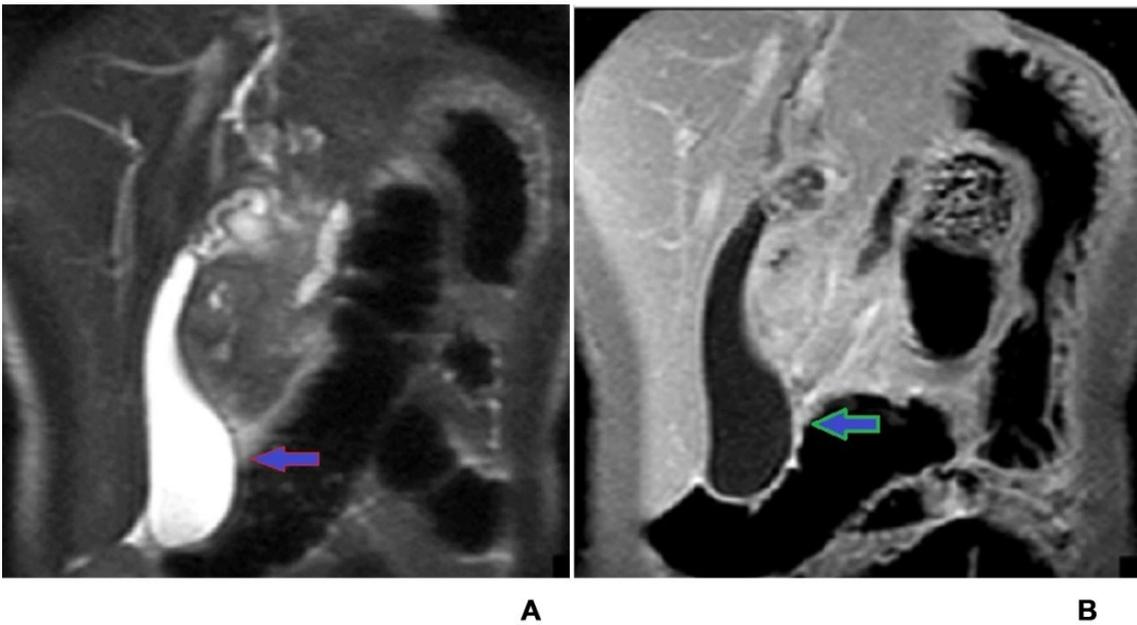


Fig. 7: Coronal single-shot fast spin-echo T2-weighted (A), and coronal fat-suppressed contrast-enhanced spoiled gradient-echo (B), images reveal banana-shaped gallbladder.
References: Blasbalg R et al. (2007) MRI Features of Groove Pancreatitis