SMALL PANCREATIC ADENOCARCINOMAS PRESENTING AS ACUTE PANCREATITIS: A WOLF IN SHEEP'S CLOTHING

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LEARNING OBJECTIVES

- Pancreatic adenocarcinoma may unusually present as acute relapsing pancreatitis.

- Our objective is to describe the radiological features that should prompt further investigation in patients with relapsing acute pancreatitis to rule out underlying small pancreatic adenocarcinoma as the etiology of the pancreatitis.

BACKGROUND

- The prognosis of pancreatic adenocarcinoma (PAC) is poor because surgical management is the only potential curative treatment.

  However, only 15-20% of PAC are diagnosed at surgical resectable state, and this rate decreases to less than 5% in tumors affecting the body and tale, because clinical symptoms are unspecific and the tumor does not give symptoms until it is huge and unresectable, making a considerable delay in the diagnosis.

- The most common presentation of PAC produces a silent atrophy and dilatation of the main pancreatic duct (MPD) upstream of the tumor and jaundice when located in the head.

- The combination of PAC associated and acute pancreatitis is unusual and is not the typical clinical presentation.

  Only 1-3% of PAC manifest as acute pancreatitis as the first symptom. In cases of acute pancreatitis where no initial etiology is found, 5% proved to be caused by a tumor in the follow up, this justifying increased monitoring for patients where etiological cause of acute pancreatitis is not clear.

- In these particular unusual cases the tumor is symptomatic early in the process , therefore it could be diagnosed in a potentially surgical resection stage.

- However, simultaneously , the presence of inflammatory changes related to the acute pancreatitis may mask the underlying neoplastic lesion, turning the radiological diagnosis of the tumor into a challenge for the radiologist.

IMAGING FINDINGS

- Typical radiological appearance of PAC is well known:

  Hypovascular mass compared to normal parenchyma on contrast enhanced CT, with poorly defined contours and which may or may not deform the contours of the gland .

  The secondary signs suggesting the presence of PAC are dilatation of the pancreatic and/or bile duct upstream of the tumor.

- However, 5-14% of PAC have been reported to be isoattenuating on dynamic contrast enhanced CT.

  This appearance is more prevalent in tumors smaller than 20 mm.

  In these cases, Dilatation of the main pancreatic duct is an essential indirect sign for the diagnosis of small isodense PAC, and this finding is the clue for the diagnosis. **(Fig . 1-3, 5, 7-10)**

- Segmental obstruction or interruption of the pancreatic duct is unusual in mild not necrotic ordinary acute pancreatitis.

  In a patient with acute pancreatitis, the presence of segmental upstream ductal dilatation with no evident radiological cause on CT (and in absence of other causes of pancreatic duct dilatation), should lead to considering an underlying carcinoma.

  In these cases other imaging modalities such as MR/MRCP and endoscopic ultrasound (USE) +/- Fine needle aspiration (FNA) should be performed to rule out pancreatic carcinoma.

- The diagnosis may be challenging due to the inflammatory changes of acute pancreatitis, which may mask the identification of the tumor **(Fig. 5, 7-9).**

IMAGING FINDINGS

- Radiological images to illustrate imaging findings are provided from of our series of five cases of pathological proved PAC that presented clinically as acute pancreatitis.
- Patient data are summarized in table 1. Three patients presented as mild relapsing pancreatitis and two as severe acute pancreatitis. All patients presented segmental dilatation of MPD.
  Contrast-enhanced CT and USE was performed in all cases, and three cases had also MR/MRCP.

Patient	Age/ gender	Clinica	Tumor location	Time first Imaging to ADK Dx*	Pathology confirmation	Imaging studies
1	78/ M	Relapsing acute mild pancreatitis	Body	four months	Surgery, distal pancreatectomy	CT, MR/MRCP, USE
2	60/ M	severe pancreatitis	Neck	Two months	USE + FNA	CT, MR/MRCP, USE
3	49/ M	Severe pancreatitis	Tail	Four months	USE + FNA	CT, USE
4	54/ M	Elevated pancreatic enzimes and abdominal pain	Body	Three months	USE + FNA	CT, MR/MRCP, USE
5	53/ W	Mild pancreatitis	body	Nine months	USE + FNA	CT, USE

Table 1. Patient data. *Dx: Diagnosis, CT: Contrast enhanced CT, USE: Endoscopic Ultrasound, FNA: Fine needle aspiration.

IMAGING FINDINGS

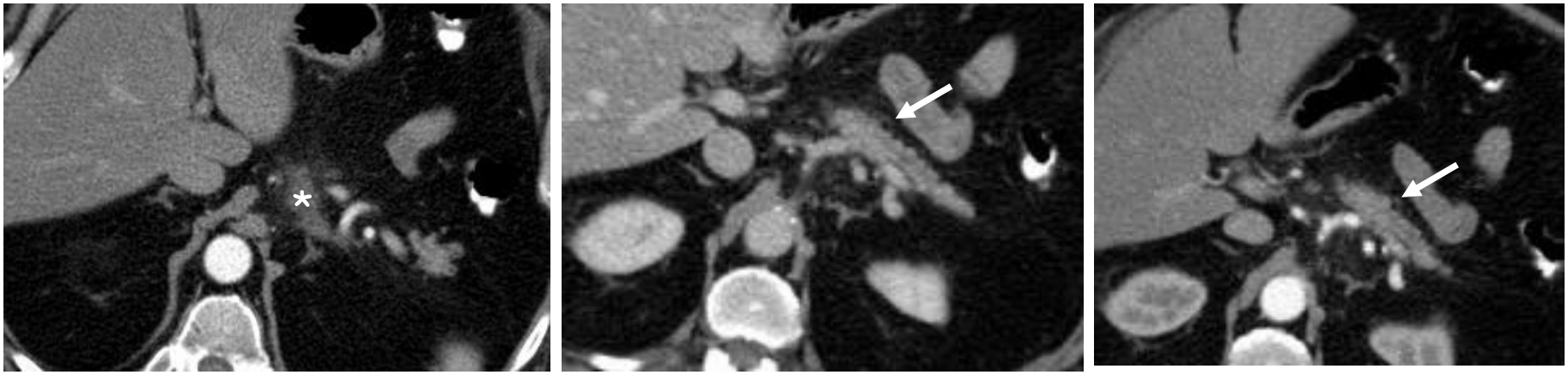


Fig. 1. Patient 1. Contrast enhanced CT. Focal inflammatory changes related to mild pancreatitis (*). Segmental ectasia of MPD (arrow) with no evident mass on first CT.

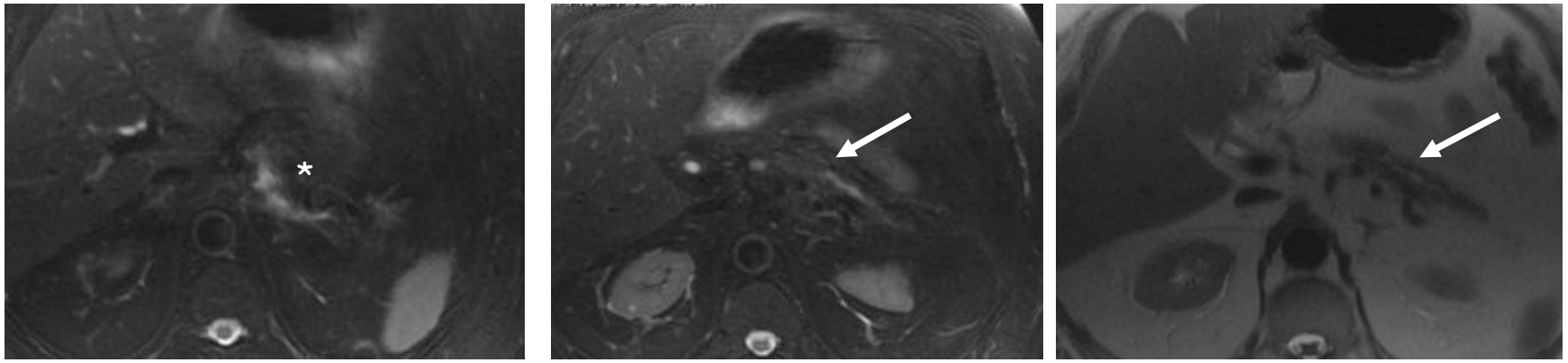


Fig.2. Patient 1. MR axial fat-sat T2, T2* at same time of first CT. Note signs of mild pancreatitis (*) and segmental dilatation of MPD with no evident mass at the MPD stenosis point (arrow). Follow up was recommended.

IMAGING FINDINGS

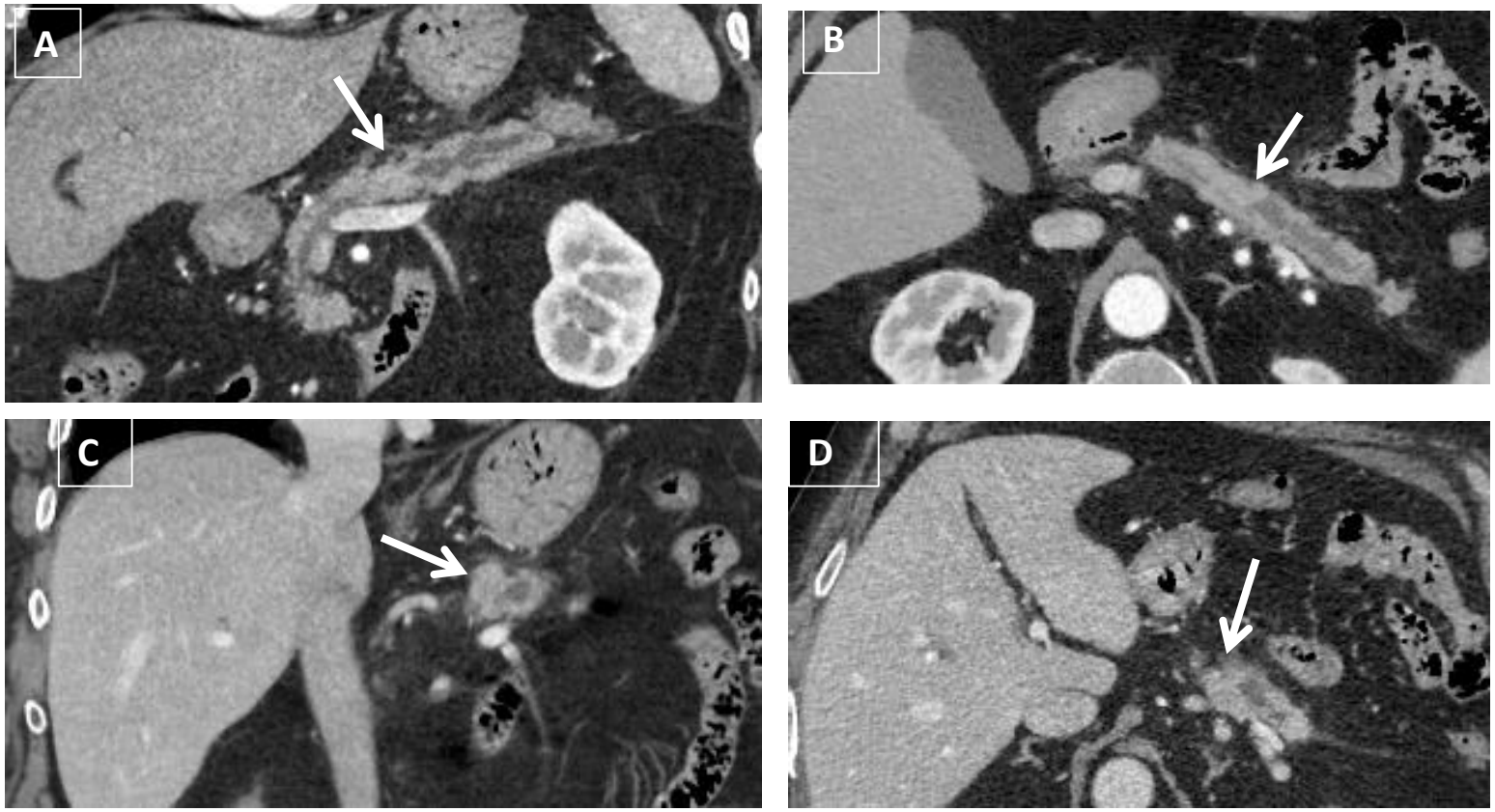


Fig.3. Patient 1. Contrast enhanced CT acquired 5 months later, oblique MPR (A,B), axial and coronal images. Note Increased segmental dilation of MPD compared to the first CT. There is an isodense mass (arrow) at the point of the stenosis. The mass deforms the contour of the gland on the postero-superior side of the body (C-D).

IMAGING FINDINGS

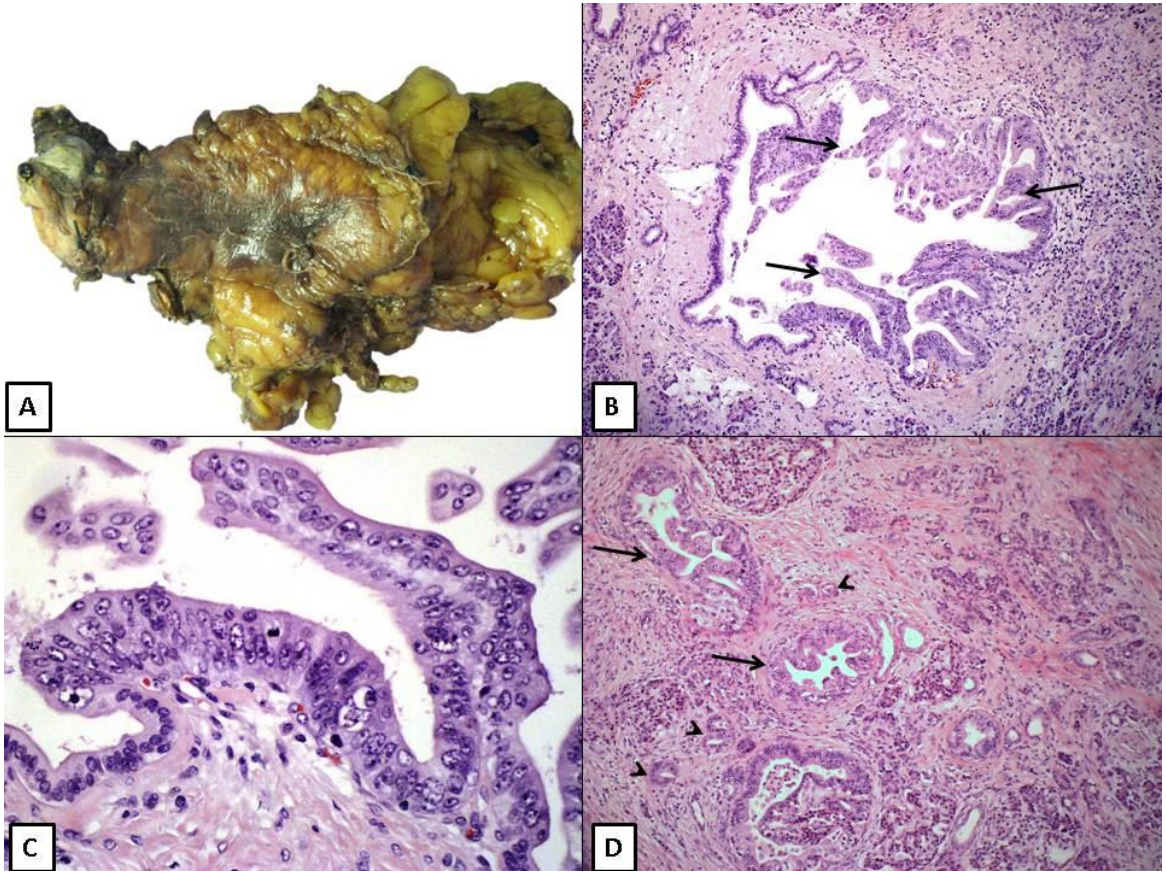


Fig.4. Patient 1. Pathology of the tumor. A) Distal pancreatectomy, that showed a 11 mm nodule obstructing the dilated Wirsung duct . B, C) Pancreatic duct with significant architectural and cytological atypia. The epithelium forms a papillary lesion (arrows), formed by cells with enlarged nuclei, loss of orientation and prominent nucleoli D) Minor adjacent ducts (arrow) with epithelial marked atypia and papillary projections.

IMAGING FINDINGS

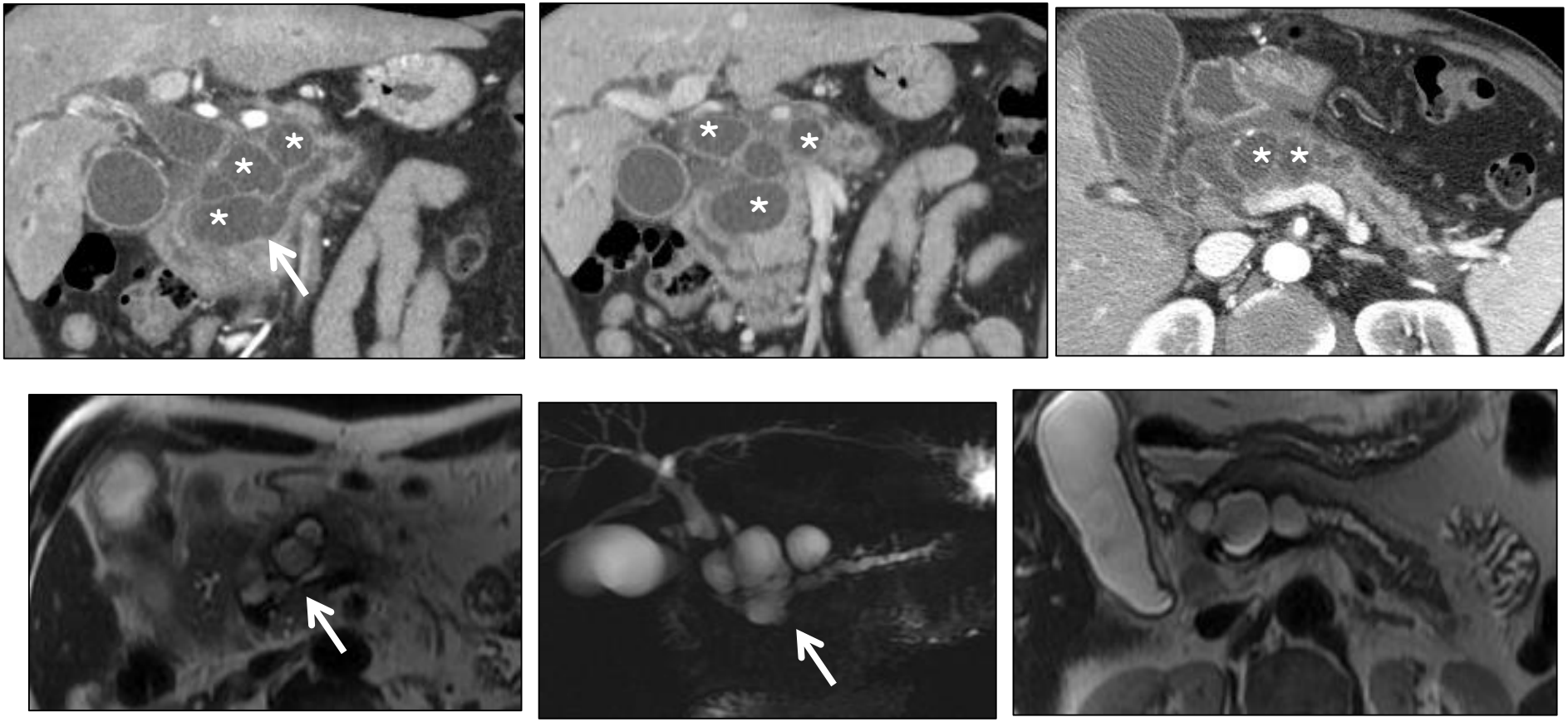


Fig.5. Patient 2. Contrast enhanced CT, MR T2 axial and Colangio-MR images. Multiples cystic lesions (*) on the head and neck of the pancreas and mild dilatation of MPD until the uncinate process (arrow) , where there is an stenosis. There was no clear connection between the cystic lesions and the MPD , there was no clear mass at the point of MPD stenosis. Differential diagnosis was intraductal papillary mucinous tumor versus pancreatic pseudocyst. Endoscopic ultrasound was recommended.

IMAGING FINDINGS

Fig.6. Patient 2. Endoscopic ultrasound (USE) and USE-guided fine needle aspiration (FNA). Cystic lesions turn out to be a pseudocyst on FNA biochemical study. Pancreatic parenchyma of the head was heterogenous but with no evident mas, and cytologic study of FNA revealed pancreatic adenocarcinoma.

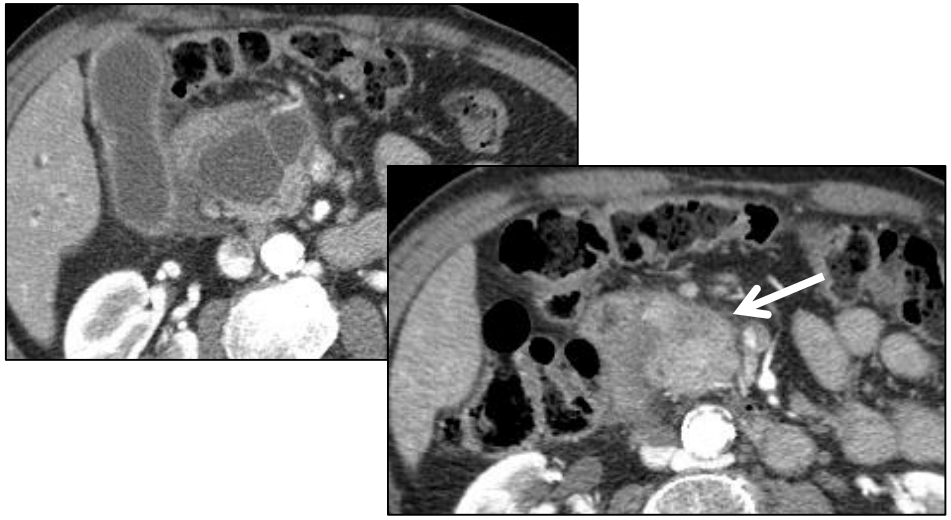


Fig.7. Patient 2. Contrast enhanced CT. Evaluating CT retrospectively, there is a small hypodense lesion at the point of MPD stenosis (arrow), which turn out to be the cause of the stenosis and the consequent pancreatitis. This area was misdiagnosed as parenchyma heterogenicity due to acute pancreatitis.
Inflammatory changes may mask underlying small lesions., and they are very difficult to depict in the inflammatory context.

IMAGING FINDINGS

Patient 2. FIRST CT

Patient 2. SECOND CT

Fig.8. Patient 2. Contrast enhanced CT. On CT acquired two months later (second CT), cystic lesions were smaller (*) but there was an evident pancreatic mass at the point of MPD stenosis, which extends to pancreatoduodenal groove (arrow). Tumor was unresectable due to the presence of millimetric liver metastasis.

IMAGING FINDINGS

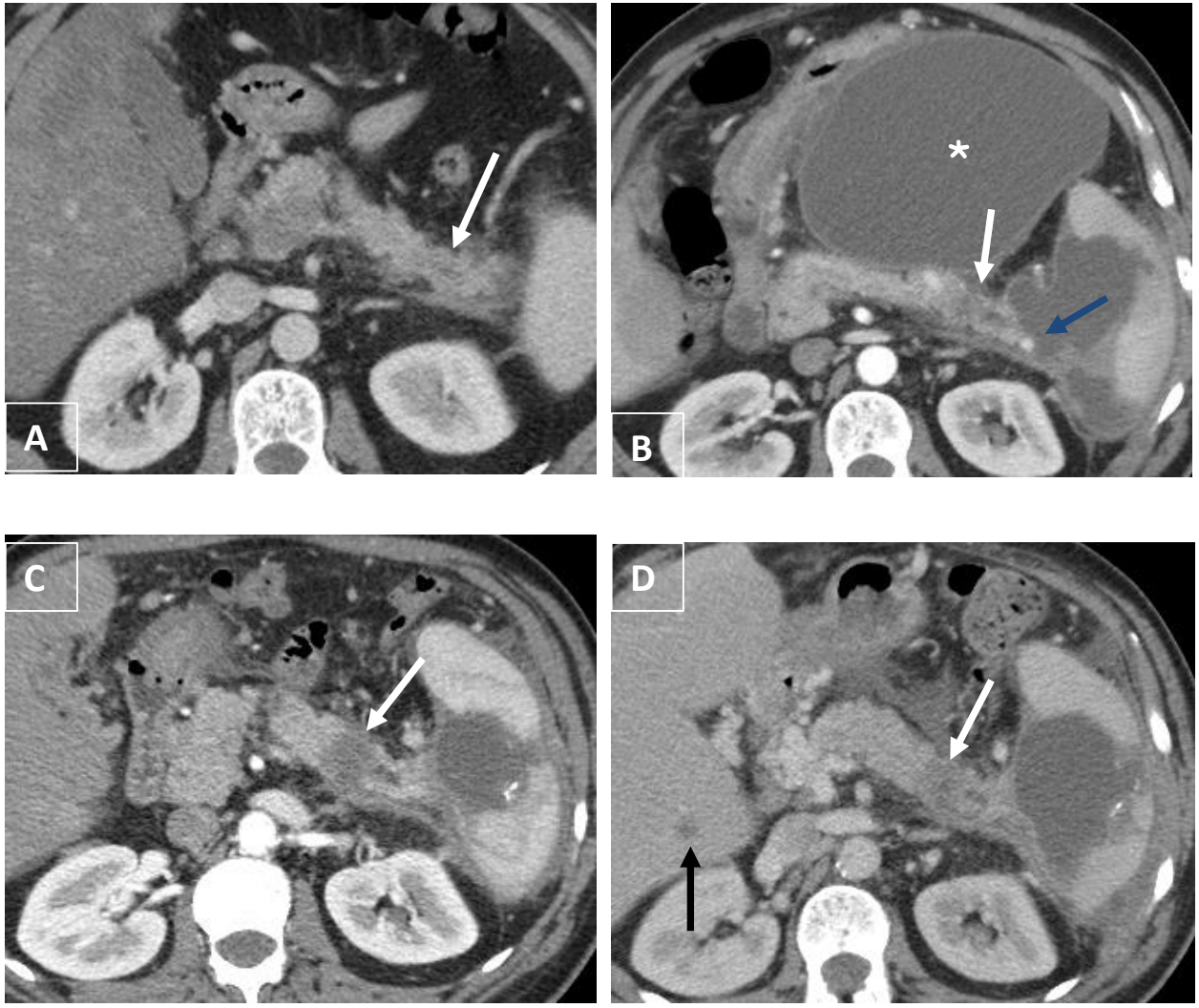
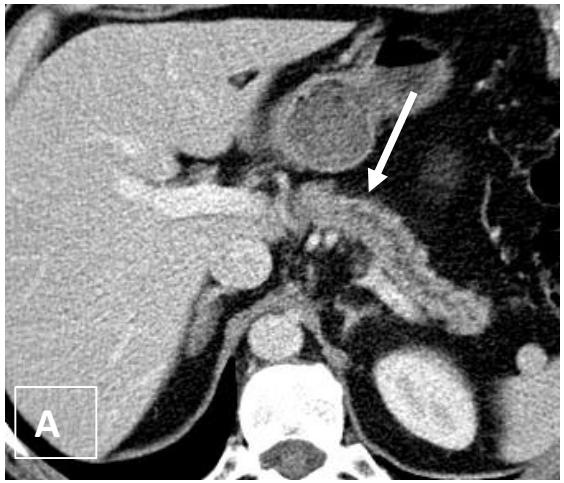
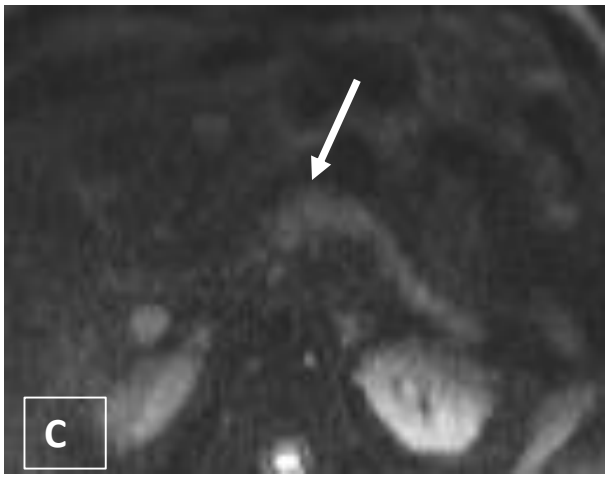


Fig.9. Patient 3. Contrast enhanced CT (A, B). Mild acute left side pancreatitis (A) which on follow-up developed huge pseudocysts (*) and a pseudoaneurysm on splenic artery with hemorrhage (blue arrow, B).
On Retrospective review of first CT there was segmental ectasia of MPD (A, arrow) with no evident mass and atrophy of pancreatic tale. There was a hypodense area on B (arrow) close to segmental dilation, that was misinterpreted as inflammatory changes in the context of complicated pancreatitis.
On follow-up CT acquired two months later (C, D) there was an evident pancreatic mass (arrow) consistent with adenocarcinoma on cytology. Note liver metastasis on D (black arrow).

IMAGING FINDINGS





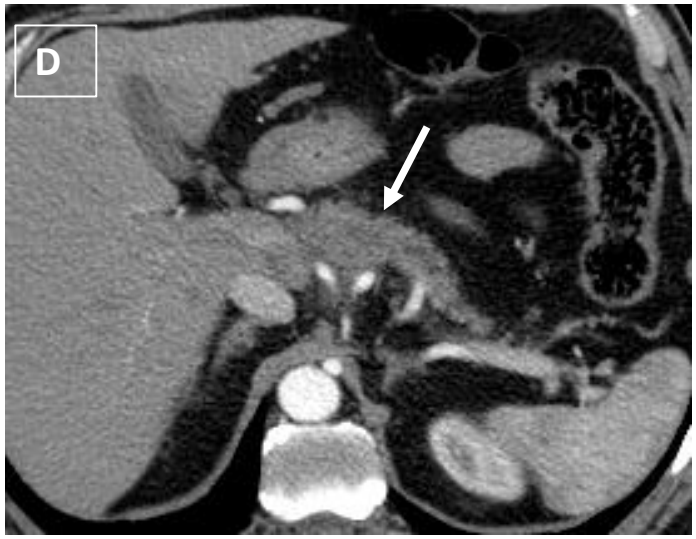


Fig.10. Patient 4. Contrast enhanced CT, MR T2 and MR Dw sequences.
Ct was done to rule out kidney stone (not shown).
Segmental dilation of MPD was found as incidental finding. There was not an evident mass on CT or MR at the point of MPD stenosis (arrow A, B, C).
USE-FNA demonstrated subcentrimetric nodule however cytology was not conclusive.
On follow up CT acquired two months later, there was a mass on the neck of the pancreas consistent with ADK on second USE-guided performed cytology.
Tumor was unresectable due to celiac trunk invasion.

CONCLUSIONS

- PAC obstructing the MPD may clinically present as acute pancreatitis.

- The knowledge of this atypical clinical presentation of PAC is of the utmost importance in order to detect the patients that require additional morphological studies (MR/MRCP, endoscopic ultrasound and close monitoring) to rule out underlying PAC as the etiology of an acute pancreatitis. The early detection is essential to permit a correct diagnosis in a potentially surgical resectable stage.

- Any acute pancreatitis where the etiology has not been found or with an atypical presentation (left location, duct segmental dilatation or segmental atrophy) must be further investigated to rule out underlying PAC.

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