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## Case Report

# Mediastinal extension of pancreatic pseudocysts causing portal hypertension <sup>☆</sup>

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## ABSTRACT

Pancreatic pseudocysts are fluid-filled masses with a pseudo-capsule that appear following a pancreatic injury. Pseudocysts are the most frequent cystic lesions of the pancreas, representing about 85% of all pancreatic cysts. The possible complications of pancreatic pseudocysts include infections, hemorrhage, intestinal stenosis or obstruction, and rupture into nearby organs or the peritoneal/retroperitoneal cavity. However, mediastinal extension of pancreatic pseudocysts with portal hypertension is rare. We present a case of an 18-year-old male with a history of weight loss over a 10-month period, presenting with an abdominal lump, hemoptysis, abdominal pain, and dyspnea. He was diagnosed with large pancreatic pseudocysts that extended into the mediastinum by ultrasonography (US) and contrast-enhanced computed tomography (CT) examination. Portal hypertension occurs as a result of portal vein compression. A histopathological examination proved conclusive of pancreatic pseudocysts. The patient was treated with surgery, where the cyst was drained.

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## Introduction

Pancreatic pseudocysts are localized peripancreatic amylase/lipase-rich homogenous fluid collections surrounded by fibrous walls that appear more than 4 weeks after an acute pancreatitis episode [1]. They occur often as a complication of acute pancreatitis, chronic pancreatitis, and abdominal trauma. Pseudocysts in the pancreas have a 40% chance of spontaneously reabsorbing and have no

risk of developing into cancer [2]. Although pseudocysts are often located in the peripancreatic region, they can occasionally spread to the testicles, neck, and mediastinum. Mediastinal extension is relatively infrequently recorded [1]. In certain situations, the large cyst may compress or obstruct the splenic vein or portal vein, leading to the development of portal hypertension. Only approximately half of pancreatic pseudocysts need surgery because of their complications [3].

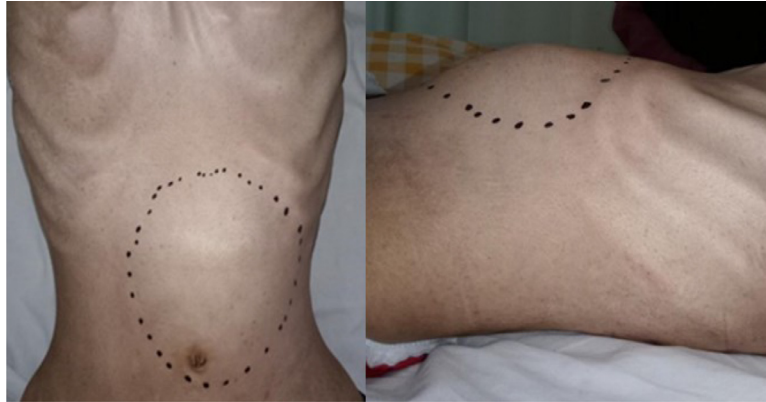
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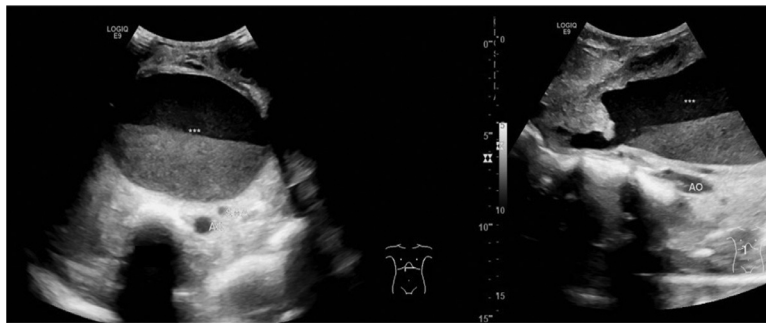
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**Fig. 1 – Abdominal lump in the mid abdomen.**



**Fig. 2 – Abdominal US. (A,B) Transverse and longitudinal view, a well-defined cystic mass with debris inside located in the mid abdomen.**

## Case report

We present a case of pancreatic pseudocysts extending into the mediastinum in an 18-year-old male with history of a progressively enlarging abdominal lump and weight loss over 10 months before hospitalization (Fig. 1). The patient complained of hemoptysis, abdominal pain, and dyspnea. Laboratory investigation revealed mild anemia (hemoglobin 10.1 g/dL), elevated alpha-amylase of 136 U/L (normal range 25-115), and hyponatremia 129 mEq/L (normal range 135-145). Lipase, liver enzyme, and albumin levels were within normal limits.

The patient underwent abdominal US, which demonstrated a well-defined cystic mass with debris inside located in the mid-abdomen, which appeared to originate from the pancreatic head. This was accompanied by liver enlargement, portal hypertension, and ascites (Fig. 2).

Abdominal CT scan showed multiple retrogastric nonenhancing cystic masses with the largest size of  $17.25 \times 9.21 \times 7.45$  cm originating from the head and the corpus pancreas. This was accompanied by dilatation of the pancreatic duct, which compressed the abdominal aorta and portal vein, causing portal hypertension. Superiorly, the mass extended into the posterior mediastinum and compressed the esophagus (Fig. 3). Portal hypertension is characterized by dilatation with tortuous features of the portal vein, sinistra

gastric vein, splenic vein, superior and inferior mesenteric veins (Fig. 4). In addition, liver enlargement, ascites, right pleural effusion, and localized pneumothorax were also present (Fig. 5).

The patient underwent laparotomy for the exploration and drainage of the cyst, which obtained approximately 1200 cc of a brownish-green fluid. Cystojejunostomy was carried out 15 cm distal to the ligament of Treitz, and Braun anastomosis was performed 10 cm distal to the cystojejunostomy (Fig. 6). Cytologic examination of the drained fluid showed elevated alpha-amylase (18.120 U/L), and a biopsy of the cyst wall confirmed its pancreatic origin. A follow-up abdominal CT scan evaluation done 5 months after the procedure revealed no more cystic masses in the pancreatic parenchyma. Dilatation of pancreatic duct was smaller than previously imaged. A small cystic lesion sized  $2.39 \times 1.60 \times 2.37$  cm was found near the left lobe of the liver behind the dilated stomach, which appeared to be residual pancreatic pseudocysts (Fig. 7).

## Discussion

The most frequent cystic lesions of the pancreas are pseudocysts. Pancreatic pseudocysts are described as a localized collection of amylase-rich fluid surrounded by a fibrous wall



Fig. 3 – Abdominal CT. (A,B) Axial and sagittal view, cystic masses nonenhancing with the largest size of 17.25 x 9.21 x 7.45 cm originating from the pancreas with dilatation of the pancreatic duct, (C,D) the mass superiorly extending to the posterior mediastinum.

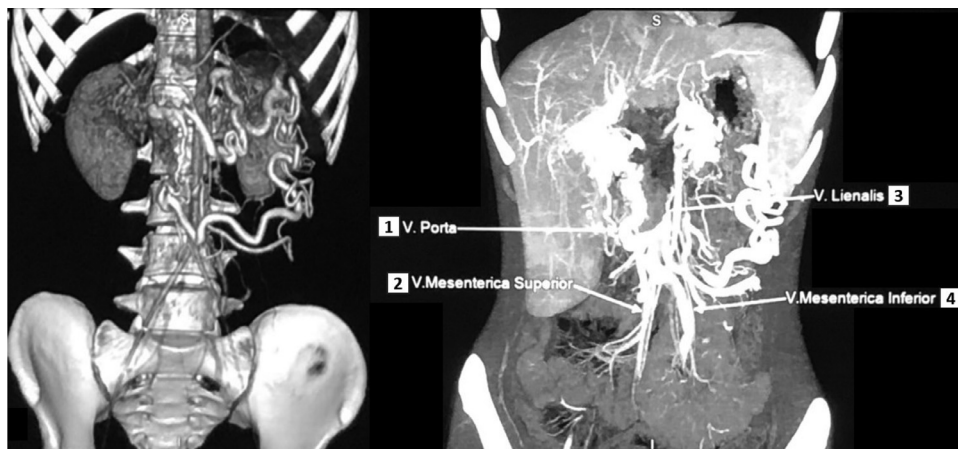
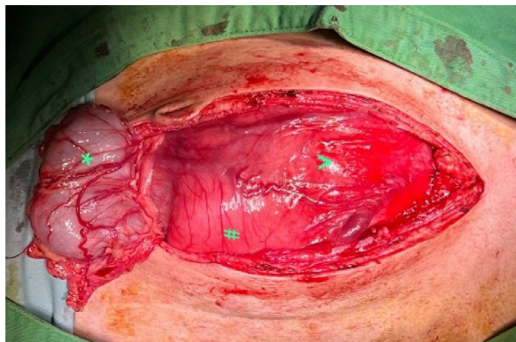


Fig. 4 – (A,B) Coronal view 3D reconstruction from abdominal CT demonstrated a feature of portal hypertension. (1): portal vein, (2): superior mesenteric vein, (3): splenic vein, (4): inferior mesenteric vein.



Fig. 5 – (A) Chest radiograph showed right pleural effusion, (B) Abdominal CT axial view and (C) Lung window CT, demonstrated right pleural effusion and localized pneumothorax.



**Fig. 6 – Prelaparotomy of pancreatic pseudocysts.**

with no epithelial lining that is found within the pancreatic parenchyma or next to the pancreas [1,4]. Its pathogenesis begins with disruption of the pancreatic duct, which causes the release of pancreatic fluid and the activation of enzymes. These enzymes subsequently cause damage to nearby structures and result in a fluid collection. Conditions that may predispose the development of pancreatic pseudocysts include acute or chronic pancreatitis, pancreatic trauma, and pancreatic duct obstruction [2,5,6].

Retrogastric pseudocysts that form between the pancreatic ventral border and the posterior parietal peritoneum may enlarge and extend into the omental bursa. Pancreatic ascites may develop if the pseudocyst erodes the posterior parietal peritoneum. Then, fluid collection may spread to the mesenteric layer, commonly the transverse mesocolon. Finally, the pseudocysts may extend to the diaphragm and mediastinum, or the extraperitoneal area of the pelvis along the psoas muscle. The scrotal bursa and inguinal canal may be affected in severe cases [2].

Pseudocysts will extend into the mediastinum when peripancreatic fluid enters the posterior mediastinum through the

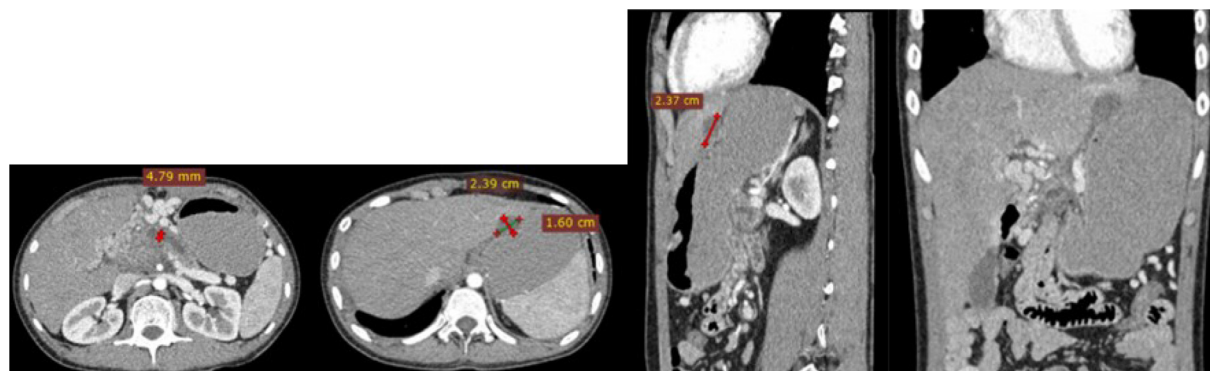
esophageal or aortic hiatus, as in the situation that is being discussed. Additionally, peripancreatic fluid may enter the middle or anterior mediastinum [1,6,7]. Rarely, portal hypertension related to pancreatic pseudocysts is caused by extrinsic splenic vein compression [8].

Imaging is used in the treatment of pseudocysts to identify lesions, as well as determine their number, size, general and internal structure, contents, exact location, and association with surrounding structures. Two modalities are used in imaging pseudocysts: ultrasonography and computed tomography [2].

In US, pseudocysts are solitary unilocular cystic lesions with homogenous anechoic content that are enclosed by a thin wall and exhibit acoustic enhancement posteriorly. Cellular debris leads to inhomogeneous fluid content, which produces internal echoes and could show fluid-debris levels. On the other hand, mature lesions have reduced internal echoes as a result of autolysis, leaving an anechoic water-like content [2,3].

CT is the most commonly used imaging tool in the diagnosis of pancreatic cystic lesions. The sensitivity of CT in identifying pseudocysts and their complications is improved by optimizing the pancreatic contrast enhancement pattern and observing peripancreatic blood vessels. Complications occur in 30%-50% of patients. The most common complications are infection, bleeding, bowel stenosis or obstruction, and rupture into nearby organs or the peritoneal/retroperitoneal cavity. The purpose of a nonenhanced CT examination is to detect pancreatic calcification (chronic pancreatitis) or hemorrhage [2]. The diagnosis is confirmed when amylase is detected in the fluid after ultrasound-guided aspiration [7].

The treatment of mediastinal pancreatic pseudocysts can be accomplished in a variety of ways. These are determined by anatomy, the size of the pseudocyst, and the existence and severity of symptoms. Invasive treatments including surgery (distal pancreatectomy, pancreatic head resection, cystojejunostomy, or cystogastrostomy) or drainage may be required for large or symptomatic pseudocysts [3,6].



**Fig. 7 – Abdominal CT evaluation. (A) The axial view showed dilatation of pancreatic duct smaller than previously (B,C,D) Axial, sagittal, and coronal view. Small cystic lesion sized 2.39 × 1.60 × 2.37 cm near the left lobe of the liver behind the dilated gaster.**



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## Conclusion

Mediastinal extension with portal hypertension is a rare complication of pancreatic pseudocysts, which can be fatal when diagnosis is delayed. Imaging plays an important role in diagnosing a pancreatic pseudocyst and its complications so that treatment can be done promptly and appropriately.

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## Patient consent

Complete written informed consent was obtained from the patient for the publication of this study and accompanying images.

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