

# Endoscopic Management as a Viable Therapy for Pancreaticopleural and Pancreaticopericardial Fistulas

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## ABSTRACT

Pancreatic fistulas are rare complications of chronic pancreatitis, typically caused when disruption of the pancreatic duct causes leakage of pancreatic fluid that erodes through neighboring organs and structures. Pancreatic fistulas to the pericardium and pleural spaces are extremely rare, and cases of multiple fistulas tracking from the pancreas have not been reported before. Management of these fluid collections is challenging with no consensus described in the current literature. We report a case of a patient with concurrent pancreaticopericardial and pancreaticopleural fistulas who improved with endoscopic management.

## INTRODUCTION

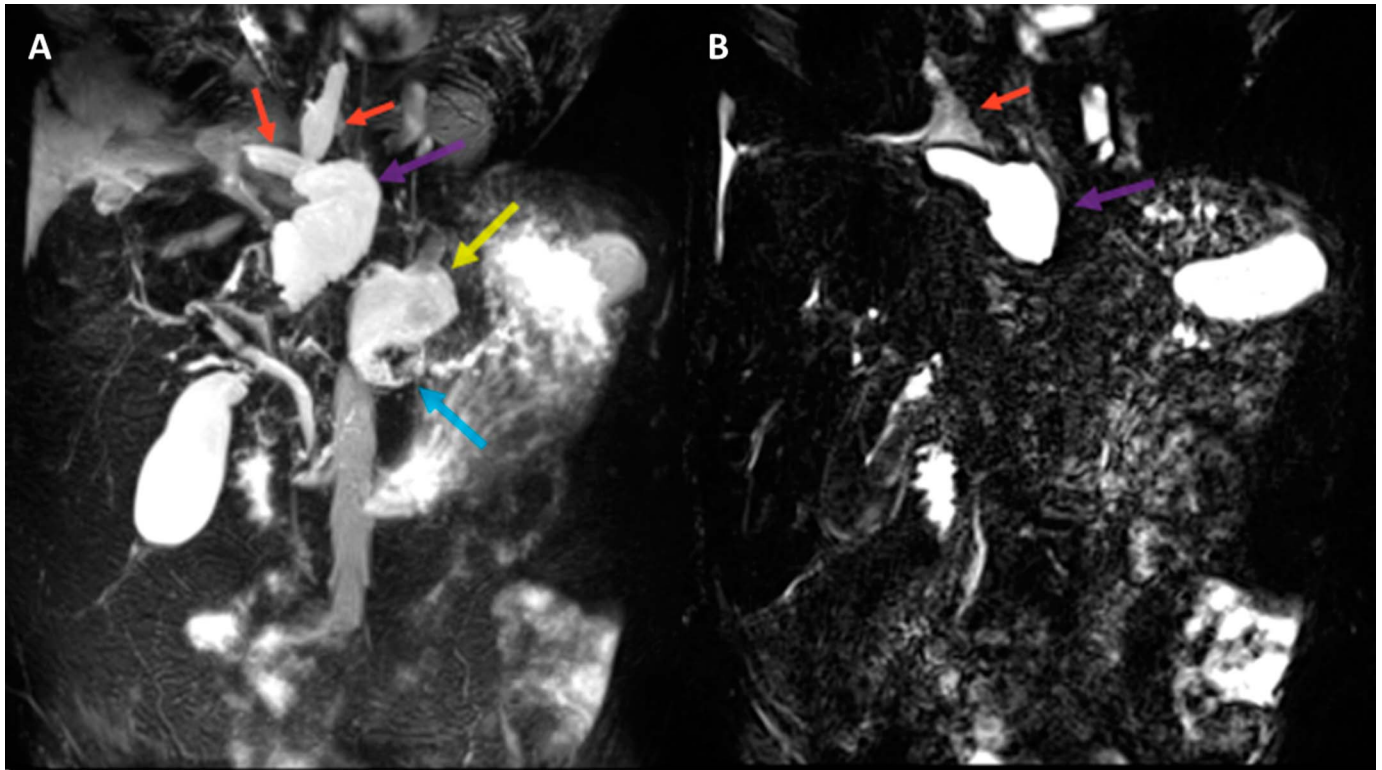
Pancreatic fistulas to the lung or pericardium are rare, but their diagnosis should be considered in patients with chronic pancreatitis who present with new fluid collections in pleural or pericardial spaces.<sup>1-4</sup> Confirmation of pancreatic involvement is made by testing fluid samples for amylase or lipase. Management of these collections has been challenging and range from external drainage tubes to surgical pancreatectomy.<sup>2-4</sup> We present an intriguing case of concurrent pancreaticopleural and pancreaticopericardial fistulas that improved with endoscopic intervention.

## CASE REPORT

A 53-year-old woman with a history of chronic pancreatitis complicated by pseudocysts presented with abdominal pain, shortness of breath, nausea, and vomiting. On presentation, the patient was afebrile, tachycardic to 140 beats per minute, hypotensive with blood pressure 80s/60s, respiratory rate 24 breaths per minute, and with new oxygen requirement, saturating 98% on 4 L of oxygen by nasal cannula. A physical examination was pertinent for decreased lung sounds on the right. Laboratory tests were notable for white blood cell count of 7.8, hemoglobin of 10.3, sodium of 130, and potassium of 4.7. Lipase was greater than 600, but the patient's lipase levels were chronically elevated because of the history of chronic pancreatitis.

Of note, the patient was hospitalized 3 months before this admission for an exacerbation of her chronic pancreatitis, and magnetic resonance imaging showed stable pancreatic fluid collections when compared with previous imaging (Figure 1). The patient was discharged with plans to follow-up outpatient but then represented to the hospital 6 weeks later for an unrelated medical issue. A repeat computed tomography (CT) scan at the time showed increased size of fluid collections and a new fluid collection extending superiorly (Figure 2). The patient was discharged with plans to follow-up outpatient regarding management of her fluid collections. One month after discharge, she returned to the hospital again with the symptoms described above.

The patient was started empirically on vancomycin and Zosyn for meeting the criteria for sepsis. Thoracic and abdominal CT showed a new large pericardial effusion and new large right-sided pleural effusion (Figure 3). An echocardiogram revealed cardiac tamponade and an urgent pericardiocentesis was performed with drainage of 620 mL of reddish, turbid pericardial fluid. Fluid studies showed an elevated lipase suggesting possible communication between the fluid collections and pancreas. Thoracentesis was attempted but was unsuccessful because of the high fluid viscosity of the pleural effusion.



**Figure 1.** Abdominal magnetic resonance cholangiopancreatography demonstrates (A) large peripancreatic fluid collections (T2 hyperintense) with one collection (yellow arrow) along the pancreatic body showing communication with the pancreatic duct (blue arrow). The other larger collection (purple arrow) in this image, located slightly more superior on the right, is along the inferior vena cava and coursing superiorly through the right hemidiaphragm/caval hiatus, and communicates with the right pleural space effusion (red arrows) and (B) re-demonstrates T2 hyperintense peripancreatic fluid collection and mediastinal fluid.

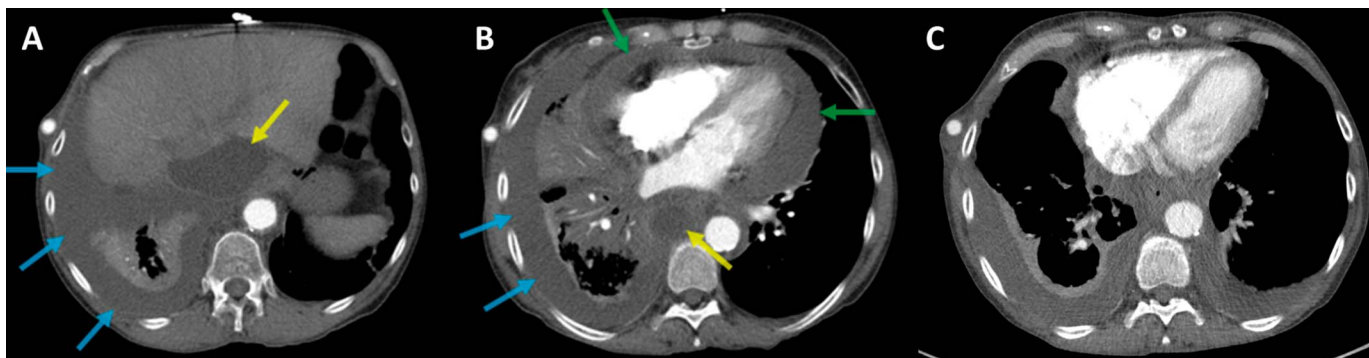
Further review of the CT scans revealed concern for a pancreaticopleural and pancreaticopericardial fistula. Thoracic surgery declined immediate operative intervention for chest tube and planned to explore this after endoscopic drainage. An endoscopic retrograde cholangiopancreatography (ERCP) was performed with fluoroscopic images demonstrating a pancreatic duct disruption in the genu of the pancreas and main pancreatic duct with a fistula tracking from the main pancreatic duct into the mediastinum. A 0.025-inch Jagwire was passed into the pancreatic duct with difficulty crossing the disruption. A pancreatic sphincterotomy was performed using ERBE electrocautery. A 5 French by 6 cm plastic pancreatic stent with full external pigtail and a single internal flap was placed in the ventral pancreatic duct to allow for drainage. The patient became hemodynamically stable after ERCP without signs of systemic infection and with improved respiratory status. The patient declined further invasive procedures with thoracic surgery and opted for outpatient follow-up with this service. General surgery was consulted for evaluation of distal pancreatectomy for persistent fluid collections and believed that the surgery was not warranted and would be of high risk.

A repeat thoracic CT a week after ERCP showed significant improvement in pleural effusion without additional intervention (Figures 3 and 4). ERCP was repeated at 4 weeks to avoid prolonged stenting and subsequent risk of ductal injury.

The repeat ERCP showed no contrast extravasation out of the pancreas, suggesting resolution of the fistulas. The initial pancreatic stent was exchanged for one 7 French by a 7 cm plastic pancreatic stent. Another stent was placed because of instrumentation of the duct and injection of contrast during the ERCP with plans for removal in 1 week.



**Figure 2.** Abdominal and pelvic computed tomography a month before presentation shows peripancreatic fluid collection located along the intrahepatic inferior vena cava with communication with the right pleural space likely through the caval hiatus/diaphragm (coronal [left] and sagittal [right] images).



**Figure 3.** (A) Both axial computed tomography angiogram images showing worsening right pleural effusion (blue arrow) and (B) new pericardial effusion (green arrow). Partially imaged abdominal peripancreatic fluid collection (yellow arrow) with suspected communication between all the compartments. (C) Axial contrast thoracic computed tomography approximately 1-week after endoscopic retrograde cholangiopancreatography shows almost complete resolution of the pericardial effusion and residual small right pleural effusion, with new small left pleural effusion.

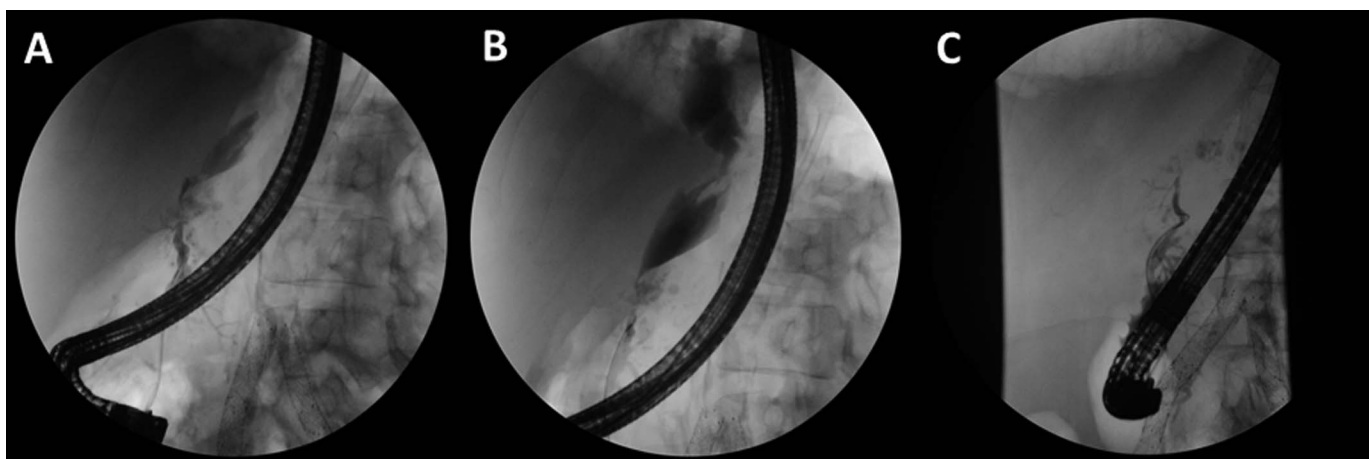
## DISCUSSION

Our patient with a history of chronic pancreatitis and intra-pancreatic walled off necrotic cysts who presented with abdominal pain, nausea, and vomiting in the setting of sepsis found to have pancreaticopericardial and pancreaticopleural fistula.

Pancreaticopleural fistulas occur in approximately 0.4% of patients with pancreatitis.<sup>4-6</sup> Pancreaticopericardial fistulas are even rarer with only approximately 17 cases reported in the literature between 1970 and 2020.<sup>7</sup> To our knowledge, this is the only case of a presentation with concurrent pericardial and pleural fistulas. Owing to the rarity of this complication, management is not well defined. Previous case reports have focused primarily on externally draining the fluid collections with a few cases of endoscopic management described.<sup>4,8</sup> Fistulous tracts that are bridged endoscopically with stents have a healing rate of more than 90%.<sup>9,10</sup> However, the fistula in our patient closed with pancreatic duct drainage only despite the fact that the fistulous tract was not bridged. Our case demonstrates that appropriate endoscopic drainage can be a viable therapy and should be

considered in the management of pancreaticopleural and pancreaticopericardial fistulas. Pancreatic duct stent placement can be enough to alter the pressure gradient within the pancreas and divert antegrade flow of secretions to the gastrointestinal tract. ERCP with sphincterotomy and pancreatic duct stent placement mechanically blocks the connecting track from the pancreatic duct and forces the pancreatic duct open so that the secretions can drain to the duodenum instead of the pleura or pericardium.<sup>3</sup> If spontaneous fistula resolution is achieved with follow-up imaging, as demonstrated in our patient, an invasive surgery could be avoided. Surgical treatment is warranted if patients demonstrate persistent fistulas or worsening pancreatic collections at follow-up. Distal pancreatectomy with pancreaticojejunostomy is most commonly performed.<sup>3</sup>

Rapid diagnosis of pancreaticopleural or pancreaticopericardial fistulas is essential to facilitate prompt and appropriate treatment. As demonstrated in our patient, multiple significant fistulas may be present and should be assessed to provide optimal care and timely resolution of symptoms. Ultimately, ERCP with stenting



**Figure 4.** Pancreatograms depicting (A) pancreatic duct fistula into the pleura and (B) all the way into the pericardium. Pancreatogram showing (C) contrast within the right upper abdomen collection communicating superiorly with the right pleural space/pericardium.

may be sufficient for resolution of pancreatic fistula drainage without need for external drainage or surgical intervention. Although pancreaticopleural and pancreaticopericardial fistulas are rare, they are similar to other peripancreatic fluid collections and can be successfully managed with endoscopic management.

## DISCLOSURES

**Author contributions:** S. Chan and M. Petersile wrote the manuscript. G. Churrango and J. Zivny revised the manuscript. J. Zivny is the article guarantor.

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**Informed consent** was obtained for this case report.

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