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Rapidly Accumulating Pleural Effusion: A Sequela of Chronic Pancreatitis

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Abstract

Chronic pancreatitis presents with epigastric abdominal pain, nausea, vomiting, and weight loss. Acute pancreatitis can also present with a pleural effusion which is typically left-sided, mild in nature, and self-limiting. However, recurrent bouts of pancreatitis may lead to a pancreaticopleural fistula (PPF) with a large, rapidly recurring, unilateral pleural effusion. Among patients with PPF, the most common presenting complaint is dyspnea. We present the case of a 53-year-old man with recurrent bouts of pancreatitis in the setting of alcohol who presented with progressively worsening shortness of breath. A high-resolution computed topography scan of the thorax demonstrated a large right-sided pleural effusion. A thoracentesis was performed with pleural fluid studies showing an exudative effusion with amylase significantly elevated at 18 382 U/L. An endoscopic retrograde cholangiopancreatography was performed which showed a pancreatic duct leak in the tail of the pancreas. A pancreatic sphincterotomy was performed, and a stent was placed into the ventral pancreatic duct. The patient's shortness of breath improved, and he was discharged home with outpatient follow-up. The aim of this report is to present the diagnosis of a rare complication of chronic pancreatitis and discuss the management and options for treatment.

Keywords

gastroenterology, pancreas, pancreaticopleural fistula, pleural effusion

Introduction

Acute and chronic pancreatitis often present with epigastric abdominal pain, nausea, vomiting, and weight loss. Acute pancreatitis can also present with a pleural effusion. These pleural effusions are typically left-sided, mild in nature, and self-limiting.[1] However, in the case of chronic pancreatitis, patients may develop a pancreaticopleural fistula (PPF) leading to a large, rapidly recurring, unilateral pleural effusion. These are oftentimes not amenable to draining. Among patients with PPF, the most common presenting complaint is dyspnea, followed by abdominal pain, cough, and chest pain.[2] The aim of this case report is to present the diagnosis of a rare complication of chronic pancreatitis and subsequently discuss the management and options for treatment.

Case Presentation

We present the case of a 53-year-old man with a history of acquired immunodeficiency syndrome, chronic obstructive pulmonary disease, and recurrent bouts of pancreatitis in the setting of chronic alcohol use who initially presented to his primary care physician's office with a 3-week history of progressively worsening shortness of breath. A chest x-ray showed a severe right pleural effusion, and the patient was sent to the emergency room (Figure 1).

On presentation to the hospital, the patient was hemodynamically stable and afebrile. His respiratory pathogen panel and COVID-19 test were negative. A high-resolution computed topography (CT) scan of the thorax was performed which again demonstrated a large right-sided pleural effusion with only a small portion of aerated right upper lobe (Figure 2). The pulmonology team was consulted, and a bedside thoracentesis was performed. Two thousand milliliters of cloudy red/orange fluid was removed and sent for analysis. Despite fluid removal, the patient continued to complain of shortness of breath. Repeat imaging demonstrated recurrence of the effusion, and the patient was in acute

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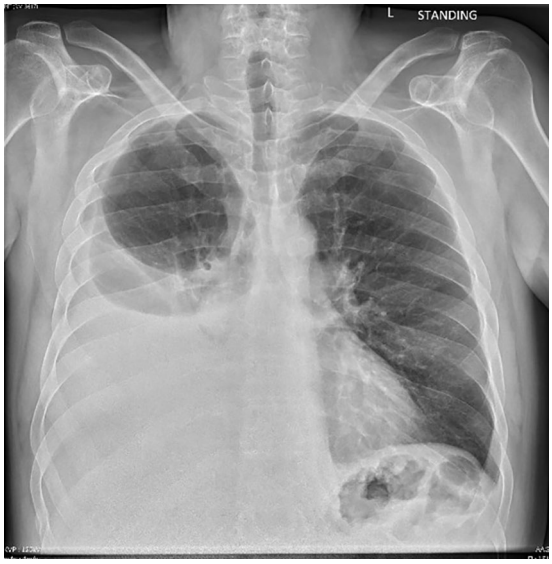

Figure 1. Chest x-ray showing massive right-sided pleural effusion.

Figure 2. Computed tomography of the thorax showing large right-sided pleural effusion.

hypoxic respiratory failure requiring supplemental oxygen. Despite need for further workup, the patient decided to leave the hospital against medical advice.

The patient returned to the hospital 10 days later with worsening shortness of breath despite oxygen therapy. The patient's pleural fluid studies ascertained during the previous admission showed an exudative effusion with lactate dehydrogenase (LDH) of 220 U/L, total protein of 3.8 g/dL, and amylase significantly elevated at 18 382 U/L. The neutrophil count in the pleural fluid was 11%. A repeat chest x-ray again showed a large right-sided pleural effusion. The pulmonology team placed a chest tube with serosanguinous fluid drainage. Repeat fluid studies again demonstrated an elevated amylase at 20 116 U/L. Body fluid gram stain and culture, acid-fast bacillus culture, fungal culture, and fluid cytology were all negative. With concern for possible underlying pancreatic fistula or pseudocyst, a CT of the abdomen and pelvis was done, which showed an enlarged pancreatic head and mild peripancreatic fat stranding at the tail.

The gastroenterology team was consulted with concern for the pancreas as the source of this recurrent pleural effusion. An endoscopic retrograde cholangiopancreatography (ERCP) was performed which showed a pancreatic duct leak in the tail of the pancreas. A pancreatic sphincterotomy was performed, and a stent was placed into the ventral pancreatic duct (Figure 3). The patient's shortness of breath subsequently improved. He was discharged home with pulmonology and gastroenterology follow-up. The patient had his chest tube removed, and his shortness of breath has resolved. He states that his oxygen saturation ranges between 96% and 98% at home, and he has not needed to use any supplemental oxygen.

Discussion

Chronic pancreatitis results from episodes of acute pancreatitis of any cause and is an ongoing pathologic response to recurrent pancreatic injury. The differential diagnosis for chronic pancreatitis is broad, but most commonly occurs secondary to alcohol use, smoking, or hypertriglyceridemia. With recurrent bouts of pancreatitis, pancreatic enzymes can dissect into the pleural cavity, creating a tract. This communication may be anterior, leading to a PPF, or posterior with fluid draining into the retroperitoneum.[2]

We described the case of a middle-aged male with a significant history of alcohol use, which is the most common patient population in which PPFs occur.[3] Other etiologies of PPFs include abdominal trauma, gallstone disease, biliary duct disease, and pancreatic duct disease.[4,5] The diagnosis of a PPF presents a clinical challenge as patients will most commonly present with thoracic symptoms such as dyspnea, cough, and chest pain. In fact, dyspnea is the most common presenting symptom in cases of PPF, occurring in 65% to 76% of all cases.[6] Imaging studies demonstrate a large volume, unilateral pleural effusion.

The pleural effusion should be drained to perform fluid studies including gram stain and culture, cell counts and differentials, glucose, amylase, LDH, and cytology. As in our case, pleural effusions that arise secondary to a PPF are rapidly recurring and not cured by thoracentesis but these should be performed for diagnostic purposes. The hallmark diagnostic feature for PPF-related pleural effusion is an exudative fluid with elevated pleural fluid amylase.[7] In our case, the patient's pleural fluid amylase was as high as 18 382 U/L, and remained elevated on subsequent fluid studies.

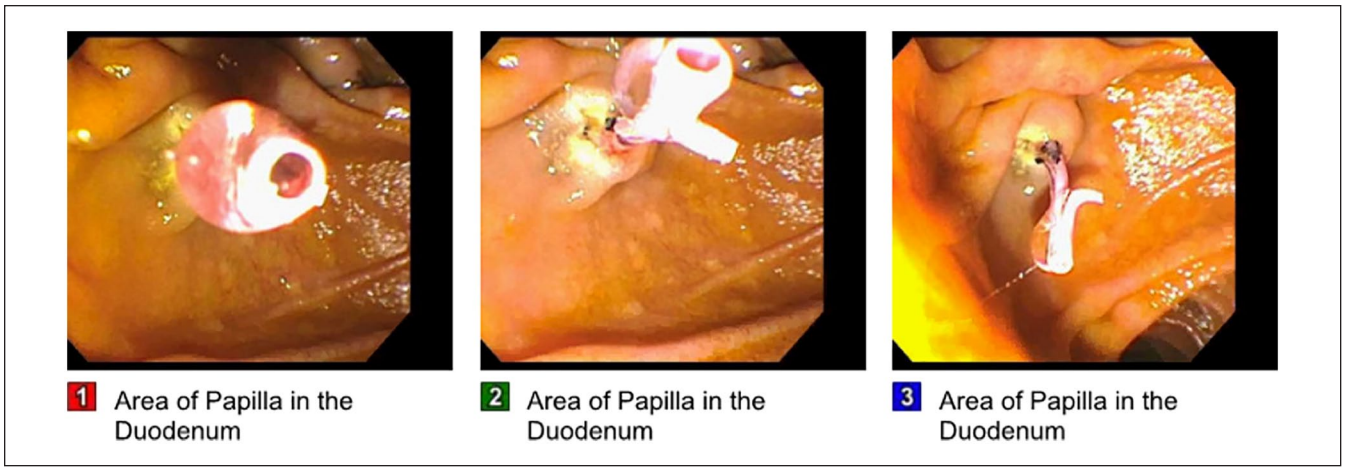

Figure 3. Endoscopic retrograde cholangiopancreatography imaging showing pancreatic duct leak in the tail of the pancreas. A stent was placed in the ventral pancreatic duct.

The next step in the diagnosis of a PPF is to perform radiologic studies to visualize the fistulous tract. Magnetic resonance cholangiopancreatography and ERCP both have relatively high sensitivities in detecting a PPF (80% and 78%, respectively).[8] Magnetic resonance cholangiopancreatography is usually performed first due to its noninvasive nature.

Pancreaticopleural fistula management ranges from conservative medical therapy to surgical interventions and is controversial without definitive criteria to outline which patients would benefit from which type of therapy. Further studies are warranted to better understand effective treatment for this condition. Medical therapy involves parenteral nutrition and infusion of somatostatin analogues, with or without pleural drainage.[9] Somatostatin analogues can be used to reduce pancreatic exocrine secretion.[10] Medical therapy may be the first option for treatment, however fails in 59% to 69% of cases, and patients who fail medical therapy have increased rate of complications,[3] including development of loculations within the effusion and worsening infection. Therefore, ERCP has emerged as both a diagnostic and a therapeutic modality for PPF as duct disruption is often amenable to stent placement.[8] An ERCP with stent placement is used to keep the pancreatic duct open and allow pancreatic secretions to flow into the duodenum instead of the pleura.[11] Stent placement can only be deemed successful if the stent is able to be placed at the site of leakage. Gallstones or strictures which may have contributed to chronic pancreatitis can also contribute to treatment failure after endoscopic intervention. In cases with ERCP treatment failure, early surgical intervention is recommended to prevent further infectious complications.[1]

In fact, prior to the use of endoscopic therapy, surgery was used more frequently in the management of PPFs. It is currently reserved for patients who fail medical and endoscopic therapy. The most common surgery used in the management of PPF is a distal pancreatectomy with pancreaticojejunostomy,[10] which is used to form a pancreaticojejunal connection that facilitates drainage of pancreatic secretions. Surgical intervention does carry the risk of pancreaticocutaneous fistula development; however, these are less of a concern for septic complications, and can be managed long term with medical therapy.[12]

Chronic pancreatitis is a common condition seen frequently in the inpatient setting. Pancreaticopleural fistula is a rare complication with an atypical presentation that requires a multidisciplinary approach to diagnosis, management, and follow-up. Therefore, clinicians need to have a high index of suspicion in patients with a history of recurrent bouts of pancreatitis who are now presenting to the hospital with worsening shortness of breath. Further studies are required to determine a gold standard for therapy.

Conclusion

Pancreaticopleural fistula development secondary to chronic pancreatitis presents a diagnostic dilemma as patients often present with thoracic symptoms such as cough, shortness of breath, and chest pain. Imaging will show large volume, rapidly accumulating unilateral pleural effusion, often refractory to thoracentesis. Our case of recurrent massive pleural effusion secondary to chronic pancreatitis highlights the need to be cognizant of a pancreatic source of pleural effusion in patients with an elevated fluid amylase, as these effusions reaccumulate quickly and are important to identify early. Endoscopic therapy has emerged as the preferred choice for management, although medical and operative managements remain.

Authors' Note

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Ethics Approval

Our institution does not require ethical approval for reporting individual cases or case series.

Informed Consent

Written informed consent was obtained from the patients for their anonymized information to be published in this article.

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