

Received: 2021.07.31

Accepted: 2021.10.26

Available online: 2021.11.27

Published: 2022.01.14

A 58-Year-Old Woman with Gallstones, Chronic Pancreatitis, and Pancreatic Pseudocyst Presenting with Pleural Effusion Due to a Pancreaticopleural Fistula

Authors' Contribution:

Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

AEF 1 **Saad Bin Jamil** 
EF 1 **Syed Hassan Abbas**
EF 2 **Mehrunissa Kazim**
BE 1 **Iqra Patoli**

1 Department of Internal Medicine, St. Mary's Hospital, Waterbury, CT, USA
2 Department of Internal Medicine, Holyoke Health Center, Holyoke, MA, USA

Corresponding Author: Saad Bin Jamil, e-mail: saadbinjamil@hotmail.com
Financial support: None declared
Conflict of interest: None declared

Patient: Female, 58-year-old
Final Diagnosis: Pancreatopleural fistula • pleural effusion
Symptoms: Shortness of breath
Medication: —
Clinical Procedure: Thoracentesis
Specialty: Gastroenterology and Hepatology • Pulmonology

Objective: Rare disease

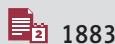
Background: Pancreaticopleural fistula (PPF) is a rare complication of acute and chronic pancreatitis. PPF results from the release of pancreatic enzymes, either from a damaged pancreatic duct or pancreatic pseudocyst. This report is of a 58-year-old woman with a history of chronic pancreatitis associated with gallstones who had a known pancreatic pseudocyst that was being managed conservatively and who presented to the Emergency Department with pleural effusion due to a PPF.

Case Report: A 58-year-old woman with past medical history of gallstone pancreatitis with subsequent development of pancreatic pseudocyst (being managed conservatively) presented with a 2-week history of progressive exertional shortness of breath. Physical examination indicated decreased breath sounds on the right lower lung fields. A chest X-ray revealed possible subphrenic free air. Laboratory test results were unremarkable except for elevated D-dimer levels. Computed tomography angiography revealed a large right-sided pleural effusion, which led to thoracentesis and the results illustrated elevated amylase levels. Magnetic resonance cholangiopancreatography was done, which showed pancreatic pseudocyst and possibly a fistula. Pancreatic enzymes were not checked in pleural fluid, as diagnosis was established with the presence of amylase and imaging findings. The patient felt better clinically after thoracentesis with volume removal and was discharged. She later underwent endoscopic ultrasound, which revealed a pancreatic duct leak requiring stent placement.

Conclusions: Pleural effusions rarely occur secondary to PPF. Physicians must be wary of the presentation, especially in patients with a history of a conservatively managed pancreatitis pseudocyst. Early diagnosis and management can lead to prevention of long-term morbidity and mortality.

Keywords: Pancreatic Fistula • Pancreatic Pseudocyst • Pleural Effusion

Full-text PDF: <https://www.amjcaserep.com/abstract/index/idArt/934247>



1883



—



5



17



Background

Pleural effusion can occur secondary to a number of causes. Pancreatic pathology rarely leads to pleural effusions [1]. Acute and chronic pancreatitis rarely present with pancreaticopleural fistula (PPF), which can result in pleural effusions [1]. PPF is diagnosed in only 0.4% of patients diagnosed with pancreatitis [2,3]. Chronic pancreatitis secondary to alcohol abuse is the most common cause of PPF in adults [4], whereas in children it is mostly secondary to biliary duct obstruction [5]. Other causes include trauma, pancreatic duct anomalies, and gall stones [6]. In patients with pancreatic pseudocyst, PPF is seen in 4.5% of cases [2,3].

Although the primary cause is pancreatitis, the presentation may be due to pulmonary symptoms, which can result in delay of diagnosis. A PPF occurs when inflammation of the pancreas and pancreatic ductal disruption leads to leakage of secretions into the thorax through a fistulous tract [1]. This can result in dyspnea secondary to pleural effusion. Patients usually present with pulmonary symptoms secondary to pleural effusions rather than gastrointestinal symptoms due to pancreatitis, which can result in a delay in diagnosis [7]. In patients with a history of pancreatitis and pleural effusion, the possibility of PPF should be considered. Checking amylase levels in the pleural effusion is the first step in diagnosis of PPF [8]. A more definitive diagnosis can be made through magnetic resonance imaging (MRI), which is superior to computed tomography (CT) [8]. Pancreatic pseudocyst can be treated conservatively or invasively, but the optimal approach has not yet been established [9]. Conservatively, patients can be followed with serial ultrasounds. Invasive approaches include percutaneous drainage or surgical drainage [9].

This report is of a 58-year-old woman with a history of chronic pancreatitis associated with gallstones, who had a known pancreatic pseudocyst that was managed conservatively and who presented as an emergency with pleural effusion due to PPF.

Case Report

A 58-year-old woman presented to the Emergency Department due to worsening shortness of breath for 2 weeks. On further questioning, it was revealed that she had a past medical history significant for hypothyroidism, gallstone pancreatitis (cholecystectomy in the past), pancreatic pseudocyst, and persistent elevated lipase and amylase levels. She did not have any associated altered appetite, night sweats, fever, chills, nausea, vomiting, headache, or visual disturbances. With regard to her history of pancreatic pseudocyst, this was being monitored by serial CT scans as an outpatient. A physical examination revealed decreased breath sounds on the right lower lung field. She did not have any rash or rhonchi on lung examination, and

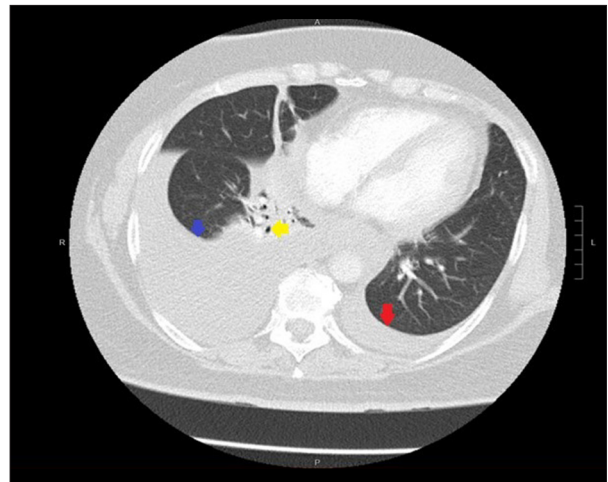


Figure 1. Computed tomography angiography (CTA) of the chest of a 58-year-old woman with gallstones, chronic pancreatitis, and pancreatic pseudocyst presenting with pleural effusion due to a pancreaticopleural fistula. Transverse CT imaging of the thorax shows a right pleural effusion (blue arrow), a small left pleural effusion (red arrow), and a partial collapse of the right lower lobe with air bronchograms (yellow arrow).



Figure 2. CT of abdomen and Pelvis of a 58-year-old woman with gallstones, chronic pancreatitis, and pancreatic pseudocyst presenting with pleural effusion due to a pancreaticopleural fistula. CT imaging shows a 2.8×2.2 cm pancreatic pseudocyst in the inferior part of the pancreatic body (orange arrow).

the examination was otherwise unremarkable. Laboratory results revealed D-dimer levels of 2275 D-DU ng/mL (reference range: <231 D-DU ng/mL), leukocyte count of 8.9 K/uL (reference range: 4.0-10.5 K/uL), amylase level of 129 U/L (reference range: 29-103 U/L), and liver functions tests within normal ranges. A chest X-ray revealed elevation of the right hemidiaphragm

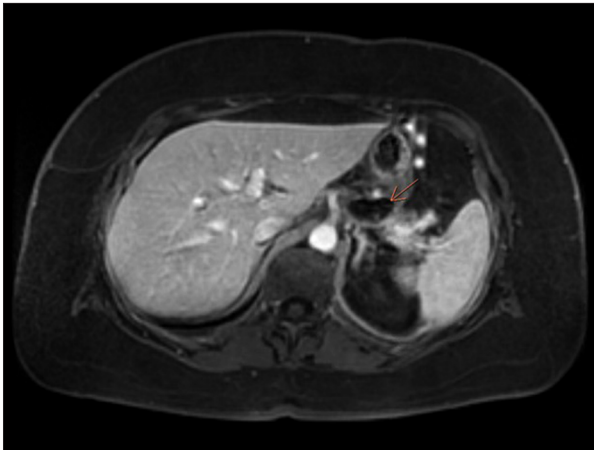


Figure 3. Enhanced MRI of the abdomen of a 58-year-old woman with gallstones, chronic pancreatitis, and pancreatic pseudocyst presenting with pleural effusion due to a pancreatopleural fistula. Imaging shows another fluid collection in the body of the pancreas (orange arrow).

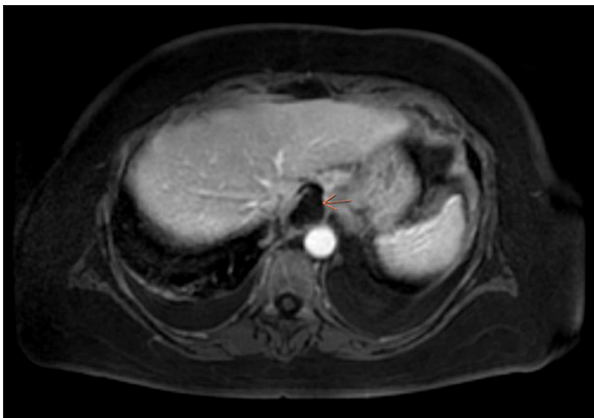


Figure 4. Enhanced MRI of the abdomen of a 58-year-old woman with gallstones, chronic pancreatitis, and pancreatic pseudocyst presenting with pleural effusion due to a pancreatopleural fistula. Imaging shows another fluid collection at the esophageal hiatus (orange arrow).

with subphrenic free air. Due to elevated D-dimer levels and chest X-ray findings, CT angiography was done, which revealed a large right-sided pleural effusion and a small left-sided pleural effusion, and partial collapse of the right lower lobe with air bronchograms of uncertain significance; there was no evidence of pulmonary embolus (**Figure 1**). CT abdomen and pelvis was also done due to the history of pancreatic pseudocyst and it showed a 2.8×2.2 cm cystic structure arising inferior to the pancreatic body. This was most likely related to a pancreatic cyst and likely related to the patient's acute pancreatitis seen on a prior exam (**Figure 2**).

As there was effusion on the CT scan, right-sided thoracentesis was done due to presence of pleural effusion and laboratory

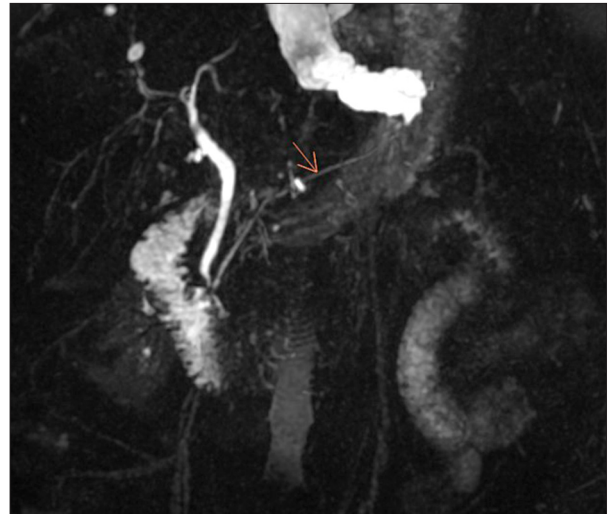


Figure 5. Magnetic resonance cholangiopancreatography (MRCP) of a 58-year-old woman with gallstones, chronic pancreatitis, and pancreatic pseudocyst presenting with pleural effusion due to a pancreato-pleural fistula. The MRCP shows the pancreatic duct (orange arrow) extending toward the collection.

results were sent. Pleural fluid results were as follows: white blood cell (WBC) count was 3.052 K/uL; total protein was 4.7 g/dL (reference range: <3 g/dL); lactate dehydrogenase (LDH) was 372 U/L and amylase level was 2247 U/L. Pleural fluid gram stain was negative. The serum total protein level was 7. Serum LDH levels were not checked. The serum total protein to pleural fluid total protein ratio was greater than 0.5. The pleural fluid LDH level of 372 U/L was not greater than 2/3 the upper limit of normal serum LDH levels (normal range 140-271 U/L). However, since serum LDH was not checked, the Light criteria were unable to be completely checked. Gastroenterology and general surgery specialists were consulted and there was concern for a pancreatic pseudocyst-pleural fistula leading to pleural effusion. Gastroenterology suggested performing MRI and MRI cholangiopancreatography (MRCP). MRI and MRCP were done and showed a 2.5×2.0 cm pseudocyst along the body of the pancreas, which extended inferiorly. In addition, a second collection was noted that extended from the body of the pancreas to the esophageal hiatus and had surrounding enhancing soft tissue. This finding suggested secondary inflammation from previous known pancreatitis. This collection, extending from the pancreatic body to the esophageal hiatus, was considered to possibly be an atypical pseudocyst or a fistula (**Figures 3-5**).

The patient's presentation was considered to be due to pleural effusion due to pancreatic pseudocyst-pleural fistula. Her elevated pleural fluid amylase levels and MRCP findings were consistent with this etiology. After the thoracentesis, her shortness of breath improved significantly. Gastroenterology and

surgery consultations followed and, because patient's primary gastroenterologist was from a different facility and the patient had clinically improved, it was recommended to discharge her to follow-up with their primary gastroenterologist. Further work-up (such as levels of pancreatic enzymes in the pleural fluid) was not pursued because the elevated amylase level and MRI findings were considered to be adequate for diagnosis.

Discussion

PPF is a rare complication of conservatively managed pancreatic pseudocysts and can lead to pleural effusions that are difficult to diagnose. Pancreaticopleural fistula (PPF) is an unusual complication of chronic pancreatitis [10]. This is a rare presentation, but such cases have been reported in the literature. It can have variable presentation, multiple-organ system involvement, and multiple etiologies, all of which make it difficult to recognize. PPF is rare and requires a high index of suspicion in patients with a history of pancreatitis or alcohol abuse who present with pleural effusion PPF [10]. There can also be recurrence of effusions after initial treatment, which can prompt physicians to consider PPF as the primary cause of effusion. In patients who have a history of recurrent pulmonary effusions and prior history of pancreatitis, PPF should be considered in the differential diagnosis [1]. Diagnosing pleural effusion due to PPF can be challenging. The presentation may be in the form of pulmonary symptoms due to extra-thoracic fluid, usually presenting with chest symptoms due to pleural effusion, pleural pseudocyst, or mediastinal pseudocyst [11]. Interestingly, abdominal symptoms such as tenderness or nausea are often absent, making the diagnosis even more challenging [12].

Pancreatic disease can lead to disruption of the pancreatic duct, which results in PPF [13]. This can lead to fluid accumulating in the pleural cavity through fistula. Hence, the fluid is extra-thoracic. Diagnosis of PPF leading to pleural effusion can be pursued in a stepwise manner. The most important diagnostic tests according to review is amylase level in the pleural fluid [14]. There is scant literature regarding the utility of checking further pancreatic enzymes in the pleural effusion, apart from amylase, as the diagnosis is best established by MRI. If the pleural effusion has elevated amylase levels, physicians should consider the possibility of an intra-abdominal source.

This is even more relevant in patients with a history of alcohol abuse or pancreatitis. If the amylase level is elevated, imaging studies can then be done to establish a diagnosis. MRCP is the recommended imaging modality for visualizing the fistula, as it is superior to both CT and endoscopic retrograde cholangiopancreatography (ERCP) in delineating the tract within the pancreatic region [14].

Management of pseudocysts can involve a conservative approach or a more invasive one. A study by Cheruvu et al focused on conservative management of pancreatic pseudocyst, showing that patients with pancreatic pseudocysts can be managed conservatively if symptoms are controlled [15]. However, they reported that a few patients who were managed conservatively had cyst enteric drainage leading to abscess formation [15]. Invasive measures include percutaneous drainage, surgical drainage with pseudocystgastrostomy, cystogastrostomy or cystojejunostomy, and laparoscopic cystogastrostomy [9]. At present there are no clear established guidelines on treatment of PPF based on randomized control trials [16]. Conservative or surgical approaches can be pursued depending on clinical presentation. Patients are initially managed clinically with parenteral nutrition and somatostatin analogs infusion lasting 2 to 3 weeks; thoracentesis may or may not be performed [16]. Fistulas in outpatients can be reduced by octreotide, which can decrease fistula closure time [12]. Parenteral nutrition has several limitations and associated risks (eg, sepsis), which makes its long- or short-term use less desirable. There is variable response to conservative treatment, which often fails to lead to complete resolution of symptoms or fistula closure. However, due to the potential for avoidance of surgical or endoscopic intervention, it can be considered as an initial treatment modality. If the results are sub-optimal, endoscopic or surgical approaches may be required. ERCP with pancreatic duct stenting to restore the anatomic continuity of the pancreatic duct is an effective therapeutic option with minimal morbidity and mortality [17]. Due to a less aggressive approach, there is an added advantage of decreased postoperative complications. Surgical intervention is also an option, although this modality was more common prior to the availability of endoscopic modalities. However, surgery may still be required in cases when the endoscopic approach is not successful or leads to a complication. Surgery is based on internal pancreatic drainage, especially by pancreatojejunostomy and/or pancreatic resections, depending on the degree of involvement of the main duct and the portion of the pancreas involved [15].

Our patient, who presented to the hospital due to shortness of breath, was found to have PPF due to chronic pancreatitis, which resulted in a pleural effusion. Patients with such presentation may not have classic pancreatitis-related abdominal symptoms, as was the case in our patient. She underwent diagnostic and therapeutic thoracentesis, which indicated an elevated amylase level, prompting MRI and MRCP studies. The MRI studies suggested a fistula. Initially, a conservative approach was attempted; her symptoms of shortness of breath improved and she was discharged with recommendations for outpatient follow-up, where she eventually had a ERCP done, which showed a pancreatic duct leak requiring stent placement. This case report highlights the correlation of PPF with

pleural effusion along with the diagnostic dilemma physicians may face in such cases. Early diagnosis can lead to decreased in long-term morbidity and mortality.

Conclusions

PPF can rarely lead to pleural effusions, which can be difficult to diagnose. These patients often do not have abdominal signs or symptoms. Physicians should have a high index of suspicion for a pancreatic etiology as the source of pleural effusion in patients who have a history of pancreatitis or

pancreatic pseudocyst. Thoracentesis results indicating high amylase levels can also be useful in diagnosis. Although there are no clear guidelines, treatment is usually tailored toward addressing the primary source (ie, PPF). Stent placement through ERCP is feasible. Early diagnosis and management can lead to prevention of long-term morbidity or mortality.

Declaration of Figures' Authenticity

All figures submitted have been created by the authors who confirm that the images are original with no duplication and have not been previously published in whole or in part.

References:

1. Abdalla S, Nikolopoulos I, Kerwat R. Pancreatic pseudocyst pleural fistula in gallstone pancreatitis. *Case Rep Emerg Med.* 2016;2016:4269424
2. Sut M, Gray R, Ramachandran M, Diamond T. Pancreaticopleural fistula: A rare complication of ERCP-induced pancreatitis. *Ulster Med J.* 2009;78(3):185-86
3. Fulcher AS, Capps GW, Turner MA. Thoracopancreatic fistula: Clinical and imaging findings. *J Comput Assist Tomogr.* 1999;23(2):181-87
4. Wypych K, Serafin Z, Gałazka P, et al. Pancreaticopleural fistulas of different origin: Report of two cases and a review of literature. *Pol J Radiol.* 2011;76(2):56-60
5. Sonoda S, Taniguchi M, Sato T, et al. Bilateral pleural fluid caused by a pancreaticopleural fistula requiring surgical treatment. *Intern Med.* 2012;51(18):2655-61
6. King JC, Reber HA, Shiraga S, Hines OJ. Pancreatic-pleural fistula is best managed by early operative intervention. *Surgery.* 2010;147(1):154-59
7. Tay CM, Chang SK. Diagnosis and management of pancreaticopleural fistula. *Singapore Med J.* 2013;54(4):190-94
8. Bustamante Bernal MA, Gonzalez Martinez JL, Ortiz A, Zuckerman MJ. Recurrent pleural effusion secondary to a pancreatic-pleural fistula treated endoscopically. *Am J Case Rep.* 2017;18:750-53
9. Tan JH, Chin W, Shaikh AL, Zheng S. Pancreatic pseudocyst: Dilemma of its recent management (review). *Exp Ther Med.* 2021;21(2):159
10. Ali T, Srinivasan N, Le V, Chimpiri AR, Tierney WM. Pancreaticopleural fistula. *Pancreas.* 2009;38(1):e26-31
11. Machado NO. Pancreaticopleural fistula: Revisited. *Diagn Ther Endosc.* 2012;2012:815476
12. Aswani Y, Hira P. Pancreaticopleural fistula: A review. *JOP.* 2015;16(1):90-94
13. Wronski M, Slodkowski M, Cebulski W, et al. Optimizing management of pancreaticopleural fistulas. *World J Gastroenterol.* 2011;17(42):4696-703
14. Tay CM, Chang SK. Diagnosis and management of pancreaticopleural fistula. *Singapore Med J.* 2013;54(4):190-94
15. Cheruvu CV, Clarke MG, Prentice M, Eyre-Brook IA. Conservative treatment as an option in the management of pancreatic pseudocyst. *Ann R Coll Surg Engl.* 2003;85(5):313-16
16. Cazzo E, Apodaca-Rueda M, Gestic MA, et al. Management of pancreaticopleural fistulas secondary to chronic pancreatitis. *Arq Bras Cir Dig.* 2017;30(3):225-28
17. Yang J, Lu L, Jin HB, Yang JF, Zhang XF. Endoscopic management of pancreaticopleural fistula in a pediatric patient: A case report and literature review. *Medicine (Baltimore).* 2020;99(23):e20657