Case Report

Pleural Effusion with a Pancreatic Twist: A Case Report on Pancreatic Pleural Fistula

Ronit Kumar[1], Vinod Mutkule[2], Mukundkumar Khandelwal[3], Vidya Bapmare[4], Arpit Gupta[5]

[1]Junior Resident, Department of Respiratory Medicine, Vedantaa Institute of Medical Sciences, Dahanu, Palghar, Maharashtra, India. [2]Assistant Professor, Department of Respiratory Medicine, Vedantaa Institute of Medical Sciences, Dahanu, Palghar, Maharashtra, India. [3]Junior Resident, Department of Social and Preventive Medicine, Vedantaa Institute of Medical Sciences, Dahanu, Palghar, Maharashtra, India. [4]Senior Resident, Department of Cardiology, Dr Topiwala National Medical College & B. Y. L. Nair Charitable Hospital, Mumbai, Maharashtra, India. [5]Junior Resident, Department of Respiratory Medicine, Vedantaa Institute of Medical Sciences, Dahanu, Palghar, Maharashtra, India

Abstract

Background: To report and analyse a rare presentation of pancreatic pleural fistula in a 35-year-old male, emphasizing the importance of considering intra-abdominal aetiologies in cases of unexplained pleural effusion. **Material and Methods:** A 35-year-old male, presented with a 1-month history of productive cough with white expectoration, grade 4 shortness of breath, high-grade continuous fever, weight loss, and anorexia. Clinical examination revealed decreased air entry and dullness over the right lung field. Chest X-ray and HRCT thorax showed gross right pleural effusion. Diagnostic thoracocentesis was performed. Further imaging with contrast-enhanced CT abdomen and ultrasonography was done. Pleural fluid and serum samples were analysed for amylase, lipase, LDH, and other biochemical parameters. **Results:** Radiological investigations confirmed gross right pleural effusion and acute pancreatitis with peripancreatic collection. Pleural fluid analysis showed markedly elevated amylase (16,190 U/L) and lipase (87,442 U/L) levels, with LDH of 829 U/L and 80% lymphocytic predominance. Sputum examination and other routine haematological investigations were within normal limits. USG abdomen revealed features suggestive of diverticulitis. Based on the clinical, radiological, and biochemical findings, a diagnosis of pancreatic pleural fistula was made, an uncommon complication of pancreatitis wherein pancreatic enzymes enters the pleural space. **Conclusion:** Pancreatic pleural fistula is a rare but significant differential diagnosis for massive pleural effusion, especially when associated with elevated pleural fluid amylase and lipase. High clinical suspicion and appropriate imaging are crucial for diagnosis. Early identification can guide targeted management and prevent complications.

Keywords: Pancreatic pleural fistula; Massive pleural effusion; Acute on chronic pancreatitis; Elevated pleural fluid amylase; ERCP; Pancreatic duct disruption.

Received: 01 January 2026 **Revised: 20 January 2026** **Accepted: 03 February 2026** **Published: 11 February 2026**

Introduction

Pancreatic pleural fistula (PPF) is a rare but serious consequence of acute or chronic pancreatitis. It happens when pancreatic enzymes escape into the pleural space because of a ductal disruption or a pseudocyst rupture. The process that leads to PPF starts with an increase in pressure inside the pancreas's ducts. This can happen because of chronic pancreatitis, which causes ductal strictures, calculi, or pseudocyst development, or because of direct inflammation during acute pancreatitis, which causes ductal disruption. This break lets pancreatic secretions that are full of enzymes leak into the retroperitoneal space, where they follow fascial planes and go through natural diaphragmatic apertures or lymphatic channels into the mediastinum and pleural cavity.[1,2]

When the enzyme-rich fluid gets into the pleural space, it causes huge, recurring pleural effusions that are typically much worse than the patient's abdominal symptoms, making the usual agony of pancreatitis seem less important. This is because respiratory symptoms such increasing dyspnea, orthopnea, and a nonproductive cough often take center stage in the clinical presentation of PPF, rather than obvious abdominal discomfort. If the clinical suspicion of PPF is not high, this might delay diagnosis. The elevated levels of enzymes, especially amylase and lipase, cause continuing pleural irritation and inflammation, which leads to the formation of pleural effusion. This effusion may come back even after thoracocentesis.[3-6]

Recognizing the very high levels of pleural fluid amylase and lipase is the key to diagnosing PPF. These are clear signs that the effusion came from the pancreas. Pleural amylase levels can usually be higher than 1,000 U/L and can even go over 50,000 U/L. Lipase levels are also usually much higher, which sets PPF apart from other causes of exudative pleural effusions. Advanced

Address for correspondence: Dr. Ronit Kumar, Junior Resident, Department of Respiratory Medicine, Vedantaa Institute of Medical Sciences, Dahanu, Palghar, Maharashtra, India
E-mail: kumar.ronit435@gmail.com

DOI:
10.21276/amit.2026.v13.i1.356

How to cite this article: Kumar R, Mutkule V, Khandelwal M, Bapmare V, Gupta A. Pleural Effusion with a Pancreatic Twist: A Case Report on Pancreatic Pleural Fistula. Acta Med Int. 2026;13(1):381-386.

imaging techniques like contrast-enhanced computed tomography (CECT) or magnetic resonance cholangiopancreatography (MRCP) are very important for confirming the diagnosis, finding the exact location of the ductal disruption, and finding other pancreatic problems like pseudocysts, peripancreatic collections, and ductal irregularities.[7-10]

The first step in treating PPF is to use conservative methods, such as bowel rest to reduce pancreatic stimulation, somatostatin analogues to lower pancreatic secretions, therapeutic thoracocentesis to relieve symptoms, and intercostal drainage for cases of persistent high-output pleural effusion. If conservative treatment doesn't work, endoscopic procedures like endoscopic retrograde cholangiopancreatography (ERCP) with pancreatic duct stenting can help close the fistula and relieve pressure in the ducts, which means less need for surgery[12]. However, surgery may be needed in cases with chronic fistula or complications that come with it, even after the best conservative and endoscopic treatment. This shows how important it is to have a multidisciplinary approach for effective management.

In conclusion, although though less than 1% of people with pancreatitis get PPF, it is very important to think about this illness in people who have large, recurring pleural effusions, especially if they have a history of drinking alcohol or pancreatitis. When high levels of amylase and lipase in pleural fluid are combined with improved imaging techniques, it makes it easier to make an accurate diagnosis and helps plan treatment. Early detection and a tiered, multidisciplinary approach can make a big difference in outcomes and lower the number of people who get sick from this rare but serious complication of pancreatitis.

Aims and Objectives: The goal of this study is to give a detailed look at an unusual case of PPF in a 35year-old man who drank a lot of alcohol and had respiratory symptoms. He was found to have a huge pleural effusion because of PPF. The goals include learning about how pleural fluid tests and imaging can help with diagnosis and talking about how to manage the condition for the best treatment.

Materials and Methods

Case Presentation

A 35-year-old man who had been drinking heavily for a long time came in with a month of worsening shortness of breath, a cough that produced white mucus, a high-grade fever that didn't go away, loss of appetite, and a lot of weight loss. During the clinical exam, tachypnea, reduced air entry, and dullness on percussion were found over the right lung field. A chest X-ray indicated a huge pleural effusion on the right side and a shift in the mediastinum to the left, which was verified by an HRCT thorax. The therapeutic diagnostic thoracocentesis produced fluid that was reddish and opalescent. The analysis showed an exudative effusion with high levels of amylase and lipase, which points to a problem with the pancreas. More tests on the serum confirmed active pancreatitis, and a CECT of the abdomen showed acute pancreatitis with a collection around the pancreas, a pancreas that wasn't uniform, and a broken pancreatic duct in the tail region, as well as splenic vein thrombosis and fatty liver.

Because the pleural fluid was building up even after several thoracocentesis, an intercostal drain was put in to stabilize the patient before sending them to surgery for a permanent solution.

Table 1: Pleural Fluid Analysis

Parameter	Result	Interpretation
Appearance	Reddish, opalescent	Inflammatory exudate
Protein	2.2 g/dL	Exudative
Glucose	130.5 mg/dL	Normal
LDH	829 U/L	Exudative
Cell count	80% lymphocytes	Chronic inflammation
Amylase	16,190 U/L	Markedly elevated (pancreatic)
Lipase	87,442 U/L	Markedly elevated (pancreatic)

Table 2: Serum Investigations

Parameter	Result	Reference Range	Interpretation
Amylase	1,432 U/L	30-110 U/L	Elevated (pancreatitis)
Lipase	3,258 U/L	13-60 U/L	Elevated (pancreatitis)
CRP	58 mg/L	<6 mg/L	Elevated (inflammation)
HIV, HBsAg, HCV	Negative	-	Infective etiology ruled out

Table 3: Key Imaging Findings (CECT Abdomen)

Findings	Interpretation
Acute pancreatitis with peripancreatic collection	Active inflammation with fluid tracking
Heterogeneous pancreas	Inflammation and structural change
Disruption of main pancreatic duct (tail)	Likely source of enzyme leak
Splenic vein thrombosis with collaterals	Chronic pancreatitis sequelae
Fatty liver	Alcohol-related liver changes
Diverticulitis	Coexistent pathology

Case History

A 35-year-old man who had been drinking heavily for a long time came to the hospital with worsening shortness of breath over the course of a month. He also had a productive cough with white mucus, a high-grade fever that didn't go away, a lot of anorexia, and weight loss. These symptoms started slowly,

and the shortness of breath got worse to the point that it made it hard to do everyday things. The patient was tachypneic, and there was less air entering the body and stony dullness to percussion over the right hemithorax, which is what you would expect with a significant pleural effusion. The patient was stable in terms of blood flow, but they had tachycardia and their oxygen saturation was on the low end, so they needed extra oxygen.

A chest X-ray [Figure 1] showed a large pleural effusion on the right side and a shift of the mediastinum to the left, which means that there was a lot of fluid in the pleural cavity. The HRCT thorax [Figure 2] scan validated this discovery by showing a large right pleural effusion with no signs of parenchymal consolidation or mass lesions, ruling out primary pulmonary disease.

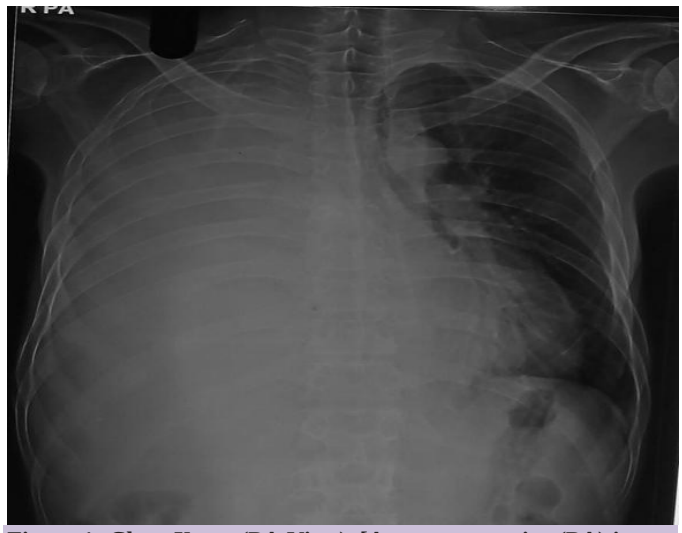

Figure 1: Chest X-ray (PA View). [A posteroanterior (PA) image of the chest shows a huge pleural effusion on the right side. This is shown by a solid mass filling the right hemithorax and blocking the right costophrenic and cardio phrenic angles. There is a shift in the mediastinum to the left side, which means that there is a lot of pleural fluid generating a mass effect. The left lung fields are clear, with no parenchymal opacities, and the bony thorax is normal.]

Diagnostic therapeutic thoracocentesis was done, and the pleural fluid that came out was reddish and opalescent, which helped with the symptoms. Light's criteria showed that the pleural fluid was exudative, with very high levels of amylase (16,190 U/L) and lipase (87,442 U/L), which made us quite suspicious that it was caused by the pancreas, especially a pancreatic pleural fistula (PPF).

Blood tests backed up this hunch by showing high levels of amylase (1,432 U/L) and lipase (3,258 U/L), as well as high levels of CRP, which is a sign of chronic inflammation. There were no signs of HIV, HBsAg, or HCV, thus infectious causes were ruled out.

The CECT abdomen showed that the person had acute pancreatitis with a peripancreatic collection since there was a suspicion of PPF.

- A pancreatic parenchyma that is not uniform.
- The primary pancreatic duct at the tail is broken, which is probably where the leak happened.
- Chronic splenic vein thrombosis with the development of collateral vessels.
- Signs of fatty liver that point to alcoholic liver disease.

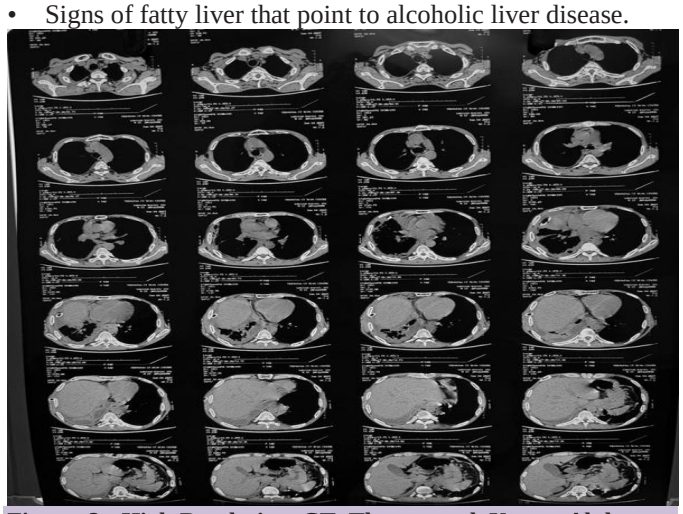

Figure 2: High-Resolution CT Thorax and Upper Abdomen. [High-resolution axial sections from the CT thorax and upper abdomen showing a large pleural effusion on the right side and a shift in the mediastinum on the left side. The lung parenchyma is squished, and the right lower lobe seems to have collapsed because of the effusion. Moving down, portions of the upper abdomen show signs of acute pancreatitis, such as peripancreatic fat stranding and collecting. There is also a lot of variation in the pancreatic parenchyma, and there is a chance that the primary pancreatic duct is broken at the tail region. This can be linked to the clinical situation of pancreatic pleural fistula (PPF). These results back up the diagnosis of PPF in a patient who had a lot of fluid in their pleura and had pancreatitis.]

These results corroborated the diagnosis of a pancreatic pleural fistula that was caused by acute on chronic pancreatitis.

At first, the patient was treated conservatively with: • Resting the bowel to lower pancreatic exocrine stimulation.

- Giving somatostatin analogues (octreotide) to lower the amount of pancreatic secretions.
- Serial therapeutic thoracocentesis to help with symptoms.

Even with these steps, the patient still had high-output pleural drainage, so an intercostal drain (ICD) {fig.3} had to be put in to keep the drainage going and better manage the respiratory compromise.

Figure 3: Chest X-ray (PA View) Post-ICD Insertion. [Posteroanterior (PA) image of the chest showing the insertion of a post-intercostal drain (ICD) on the right side in a patient with a

lot of pleural effusion. The ICD tube may be seen going into the right pleural area, and its tip is in the ideal place for good drainage. The right-sided pleural effusion has gotten a lot smaller compared to the predrainage radiograph. The right lung fields have expanded again, and the right costophrenic angle is easier to see. There may still be a little bit of pleural fluid in the lower zone. The mediastinum looks more in the middle, which means that the huge pleural effusion has been relieved.]

Because conservative management didn't work, which included persistent pleural drainage, the patient was sent to the Department of Gastroenterology and Surgical Gastroenterology for definitive surgical management. The options included endoscopic retrograde cholangiopancreatography (ERCP) with pancreatic duct stenting to bridge the ductal disruption and reduce leakage. Surgery, like distal pancreatectomy or pancreaticojejunostomy, if endoscopic treatment didn't work or couldn't be done.

The case brings up a few crucial clinical learning points:

- If you have huge, recurring pleural effusions, especially on the left side, you should think about PPF. Right-sided PPF, like in this example, can also happen.
- In PPF, pleural effusions often hide the gastrointestinal symptoms of pancreatitis. • When looked at in the context of the patient's clinical history, pleural fluid analysis with elevated amylase and lipase is diagnostic.
- CECT and MRCP are very important for finding the right place in the body and making plans for treatment.
- Getting gastrointestinal and thoracic surgery teams involved early on is really important for getting the best results for patients.

Management goes through a series of steps, starting with conservative measures and moving on to endoscopic and, if necessary, surgical measures.

To stop problems like empyema, fibrothorax, malnutrition, and sepsis from happening, which can make these patients much sicker, it is important to recognize them early and raise the level of care as needed.

Discussion

Pancreatic pleural fistula (PPF) is a rare but important condition that doctors should consider when a patient has a lot of pleural effusion that keeps coming back, especially if they drink a lot of alcohol and have pancreatitis.[6] The pathophysiology involves pancreatic secretions leaking through holes in the diaphragm or lymphatic channels, which lets enzyme-rich fluid buildup in the pleural space.[7] This causes massive, recurring effusions, and the symptoms are usually more respiratory than abdominal, which can make it harder to diagnose if there isn't a lot of clinical suspicion.[8]

Table 4: Pathophysiology and Clinical Features

Aspect	Details
Etiology	Acute/chronic pancreatitis, pseudocyst rupture, ductal disruption.[6,7]
Pathway	Transdiaphragmatic migration via diaphragmatic defects/lymphatics.[7]
Presentation	Respiratory symptoms overshadowing abdominal pain.[8]
Laterality	Commonly left-sided but can be right-sided or bilateral
Effusion nature	Massive, recurrent pleural effusion
Fluid characteristics	Exudative with very high amylase/lipase.[9]

Diagnostic Workup: The study of pleural fluid is very important. Pleural amylase values are generally higher than 1,000 U/L and sometimes higher than 50,000 U/L.[9] High lipase levels further support the diagnosis. Advanced imaging using CECT and MRCP is very important for establishing the diagnosis, finding the exact location of the ductal disruption, and finding any other problems with the pancreas.[10]

Table 5: Diagnostic Features in PPF

Investigation	Findings	Reference
Pleural Fluid Analysis	Exudative, high amylase (>1000–50,000 U/L), high lipase	[9]
CECT Abdomen	Acute/chronic pancreatitis, ductal disruption, pseudocysts	[10]
MRCP	Non-invasive ductal imaging, fistula delineation	[10]

Management: Management starts with conservative steps such therapeutic thoracocentesis to relieve symptoms, intercostal drainage (ICD) for persistent effusions, bowel rest to lower pancreatic stimulation, and somatostatin analogues (octreotide) to lower pancreatic secretions.[11] If conservative treatment doesn't work, endoscopic procedures like ERCP with pancreatic duct stenting may help close the fistula and relieve pressure in the ducts.[12] In patients that don't respond to other treatments or when endoscopic procedures fail, surgical options such distal pancreatectomy or pancreaticojejunostomy are considered. This shows how important it is to get a team of experts involved early on.[13]

Table 6: Stepwise Management Approach

Step	Details	Reference
Conservative Management	Thoracocentesis, ICD, bowel rest, somatostatin analogues	[11]
Endoscopic Management	ERCP with pancreatic duct stenting	[12]
Surgical Management	Distal pancreatectomy, pancreaticojejunostomy if refractory	[13]
Multidisciplinary Approach	Early involvement of gastroenterology and thoracic surgery	[13]

Results

The patient had a huge pleural effusion on the right side, which was obvious from their severe breathing problems and verified by chest X-ray and HRCT thorax. The first diagnostic thoracocentesis gave symptomatic relief and produced reddish,

opalescent fluid. The study of the pleural fluid showed exudative characteristics, with very high levels of amylase (16,190 U/L) and lipase (87,442 U/L), which strongly suggests a pancreatic cause, namely a pancreatic pleural fistula (PPF). A CECT abdominal scan showed signs of acute pancreatitis with a peripancreatic collection, a heterogeneous pancreatic parenchyma, and a broken main pancreatic duct in the tail area. This was the anatomical basis for the ongoing leakage into the pleural cavity. There were also signs of chronic splenic vein thrombosis with collateral development and fatty liver alterations, which are consistent with longterm alcohol consumption and point to acute on chronic pancreatitis being the etiology.

Table 7: Pleural Fluid Analysis

Parameter	Result	Interpretation
Appearance	Reddish, opalescent	Inflammatory exudate
Protein	2.2 g/dL	Exudative
Glucose	130.5 mg/dL	Normal
LDH	829 U/L	Exudative
Cell Count	80% lymphocytes	Chronic inflammation
Amylase	16,190 U/L	Markedly elevated (pancreatic origin)
Lipase	87,442 U/L	Markedly elevated (pancreatic origin)

At first, the patient was treated conservatively with bowel rest, somatostatin analogues (octreotide), and repeated therapeutic thoracocentesis to ease breathing problems. Even with these steps, there was still a lot of leakage from the pleural cavity, so an intercostal drain (ICD) had to be put in. This worked well to drain the fluid and ease the symptoms.

Table 8: Imaging Findings on CECT Abdomen

Findings	Interpretation
Acute pancreatitis with peripancreatic collection	Active inflammation with fluid tracking
Heterogeneous pancreatic parenchyma	Structural changes associated with inflammation
Disruption of main pancreatic duct at tail	Source of persistent pancreatic enzyme leakage
Splenic vein thrombosis with collaterals	Sequelae of chronic pancreatitis
Fatty liver	Alcohol-related hepatic changes

The ICD's insertion stabilized the patient's breathing, but because the drainage was still high-output, definite care was needed. The patient was sent to the Department of Gastroenterology and Surgical Gastroenterology for surgery that would fix the problem once and for all. Planned interventions included the possibility of endoscopic retrograde cholangiopancreatography (ERCP) with pancreatic duct stenting to bridge the disruption location, or surgical options including distal pancreatectomy or pancreaticojejunostomy if endoscopic intervention was not possible. This case shows how important it is to find PPF early, how useful biochemical markers and advanced imaging are for making an accurate diagnosis, and how important it is to start with conservative treatment and work your way up to definitive surgical management for this rare but serious complication of pancreatitis.

Conclusion

Pancreatic pleural fistula (PPF) is an uncommon but crucial differential diagnosis for people who have large, recurring pleural effusions, especially those who have a history of prolonged alcohol consumption and pancreatitis. The problem happens when pancreatic secretions seep into the pleural cavity because of a broken duct or a pseudocyst rupture. This causes huge amounts of enzyme-rich pleural effusions that often hide usual abdominal symptoms, therefore it is important for doctors to be suspicious in order to catch it early.

Finding very high levels of amylase and lipase in the pleural fluid is an important part of confirming the diagnosis. Advanced imaging techniques like contrastenhanced computed tomography (CECT) and magnetic resonance cholangiopancreatography (MRCP) are also very important for finding the ductal disruption and assessing the anatomy. These steps are very important for deciding how to take care of a patient and ruling out other possible causes of exudative pleural effusions.

To treat PPF, you need to take a step-by-step approach that involves many different fields. The first steps are conservative, such as therapeutic thoracocentesis, intercostal drainage for persistent effusion, bowel rest, and giving somatostatin analogues to lower pancreatic secretions. Endoscopic procedures like ERCP with pancreatic duct stenting work well to close fistulas in situations that don't respond to conservative treatment. If endoscopic therapy doesn't work or if the problem keeps coming back, surgery such distal pancreatectomy or pancreaticojejunostomy may be needed.

To avoid problems like empyema, fibrothorax, malnutrition, and sepsis, which can make patients much sicker, it is important to diagnose them early and raise the level of care as needed. This case shows how important it is to keep a high level of suspicion, do systematic evaluations using pleural biochemistry and imaging, and work with people from other fields to treat PPF effectively and improve patient outcomes.

Table 9: Summary of PPF Key Points

Aspect	Details
Definition	Rare complication of pancreatitis due to ductal disruption leading to enzyme-rich pleural effusion

Key Features	Massive, recurrent pleural effusions, high pleural amylase and lipase, overshadowing abdominal symptoms
Diagnostic Tools	Pleural fluid analysis, CECT, MRCP for anatomical localization
Initial Management	Thoracocentesis, ICD, bowel rest, somatostatin analogues
Definitive Management	ERCP with duct stenting; surgery if refractory (distal pancreatectomy, pancreaticojejunostomy)
Importance	Early recognition and multidisciplinary approach reduce morbidity and improve outcomes

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

References
1. Rockey DC, Cello JP. Pancreatic pleural effusion: report of 7 patients and review of the literature. Medicine (Baltimore). 1990. PubMed
2. Materne R, et al. Pancreaticopleural fistula: diagnosis with magnetic resonance pancreatography. Chest. 2000. PubMed
3. Cameron JL, et al. Internal pancreatic fistulas: pancreatic ascites and pleural effusions. Ann Surg. 1976. PubMed
4. King JC, et al. Pancreatic-pleural fistula is best managed by early operative intervention. Surgery. 2010. PubMed
5. Ali T, et al. Pancreaticopleural fistula. Pancreas. 2009. PubMed
6. Uchiyama T, et al. Therapeutic strategy for pancreatic pleural effusion: a report of seven cases. Hepatogastroenterology. 2000.
7. Safadi BY, Marks JM. Pancreatic-pleural fistula: the role of ERCP in diagnosis and treatment. Gastrointest Endosc. 2000.
8. Pezzilli R, et al. Pleural effusion in acute pancreatitis. World J Gastroenterol. 2010.
9. Tiwary SK, et al. Pancreaticopleural fistula: an uncommon complication of chronic pancreatitis. JOP. 2012.
10. Smith EB, et al. Pancreaticopleural fistula: a review. Ann Thorac Surg. 2000.
11. Koh H, et al. Pancreatic pleural effusion: a rare complication. Pediatr Gastroenterol Hepatol Nutr. 2012.
12. Levy MJ, et al. Idiopathic pancreatic pleural effusion. Gastrointest Endosc. 2001.
13. Yeguez JF, et al. Pancreaticopleural fistula: recognition and management. Am Surg. 1999.
14. Ohtsubo K, et al. Pancreatic pleural effusion. Intern Med. 2002.
15. Bhasin DK, et al. Management of pancreatic pleural effusion by endoscopic transpapillary stent placement. Gastrointest Endosc. 2000.