



## Pancreatic-Pleural Fistula Treated by Endoscopy: Report of a Case

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### Abstract

A 43-year-old man presented to a hospital with left chest tightness for 5 months. Chest CT showed left pleural effusion. Thoracentesis showed pleural effusion with a high-level of amylase. Abdominal Enhanced CT and MRCP show a posterior peritoneal sac-like low-density foci on the left side, protruding to the left thoracic cavity, communicating with the pancreatic canal in the tail of the pancreas. Based on the patient's previous history of pancreatitis, we suspected that pleural fluid was caused by pancreatic tube thoracic fistular. We performed an ERCP and identified the fistula at the tail of the pancreas and drained by ENPD, after 2 months of indwelling, the sinus tract closed and the pleural effusion disappeared.

**Keywords:** Pancreatic pleural fistula; Pancreatitis; ERCP

### Introduction

Chronic pancreatitis with pleural fluid is extremely rare, constituting only 0.4% of patients with pancreatitis [1]. It is a serious comorbidity of pancreatitis. The fistula is caused by inflammation or trauma that ruptures pancreatic duct or branches and the pancreas seeps into the peritoneum to form a fistula in the chest chamber. Then the pancreatic fluid flows through the fistula and form pleural effusion [2]. The disease is usually preceded by a large amount of pleural effusion and corresponding discomfort, so that it was difficult to associate an abdominal-related cause and easy to misdiagnose. When a pancreatic pleural fistula is suspected, it is hard to close the fistula by medication alone. But ERCP (Endoscopic Retrograde Cholangiopancreatography) provide with the ability to diagnose and treat pancreatic pleural fistula. At the same time, the fistula can be drained, supplemented with pharmacotherapy to encourage closure of the fistula. Surgery is envisaged only after the failure of endoscopy and drug therapy [3]. We are reporting a patient who has recovered from ERCP therapy with pancreatic-pleural fistula of the pancreatic tube with left pleural effusion.

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### Case Presentation

Male patient age 46, married, Chinese. He was hospitalized for 5 months of chest tightness on his left side. A year ago, he developed pancreatitis and had laparoscopic surgery for a pseudocyst in the pancreas. Before 7 months, he once again suffered from acute pancreatitis, and after medical treatment, he left the hospital. Before 5 months, the local hospital found a left pleural effusion and extracted brownish-yellow mixture liquid, and the cause was not clear. Before 3 months, there was swelling and pain in the side of the left chest, which was apparent after eating. The local hospital extracted the liquid from the chest, draining approximately 4,000 ml of lightly turbid coffee-colored liquid. However, the cause was still unclear, and it was transferred to our hospital's department of respiratory medicine for further diagnosis and treatment. The patient smoked for 20 years, 1 pouch per day; drink alcohol for 20 years, 100 ml per day. For the physical examination the patient with body temperature 36.2°C, pulse 82 times/min, breathing 20 times/min, blood pressure 110/70 mmHg. His respiratory sounds in the lower left lung are weakened, speech fibrillation is reduced, dull percussion is made, and no obvious abnormalities are found on cardiac examination. The abdomen is flat, there is no gastrointestinal type and peristalsis waves, the liver and spleen are not under the ribs, there is no tenderness and rebound pain in the whole abdomen, and the mass is not reached. Blood test results show a Moderate anemia with high blood amylase and lipase. The inflammatory indicator CRP is also significantly elevated. Cancer, tuberculosis and Autoimmune marker are negative (Table 1). Chest puncture was performed and get coffee-colored turbid fluid, and the amylase and lipase were extremely high (Table 2). Chest CT show bilateral pleural effusions with poor distension of the lower lobes of both lungs and pleural effusions on the left (Figure 1A). Abdominal CT shows a posterior peritoneal sac-low-density foci on the left side, considered a

**Table 1:** Laboratory Data of blood on Admission.

Blood			
WBC	$3.49 \times 10^9/L$	Na	139.0 mmol/L
Neut	49.8%	Cl	101.5 mmol/L
Eos	5.2%	K	4.51 mmol/L
Lym	0.6%	AST	23 U/L
		ALT	22 U/L
RBC	$2.83 \times 10^{12}/L$	TP	14.0 s
Hb	82.0 g/L	Alb	40.2 g/L
MCV	26.0%	LDH	171 U/L
Plt	$193.0 \times 10^9/L$	BUN	8.36 mmol/L
		Cr	81 umol//L
AFP	2.24 ng/ml	CRP	1.4 mg/L
CEA	2.64 ng/ml	AMY	206 U/L
CA199	39.90 U/ml	LPS	60.6 IU/L
CA724	1.19 U/ml		

**Table 2:** Laboratory data of pleural effusion on admission.

Pleural effusion			
Property	Blood	pH	7.8
Cell numb.	4585/uL	ADA	22.3 U/L
Neut	26.30%	LDH	554 U/L
Eos	9.80%		
Lym	30.10%	LPS	>3000IU/L
Protein	4.4g/L	AMY	>7500 U/L

pseudocyst, some slightly protruding to the left chest cavity may be possible, the lesion is similar to the pancreatic canal in the pancreatic tail, with a decrease in local concern of the pancreatic tail, and the local distal pancreatic duct is dilated (Figure 1B). MRCP (Magnetic Resonance Cholangiopancreatography) shows a left retroperitoneal crystal shadow, connected to the tail of the pancreas, and the distal pancreatic duct is dilated (Figure 2A, 2B). Consider pancreatic-pleural fistula and transfer to gastroenterology department for ERCP treatment. Endoscopically observed the esophagus and stomach are normal, the duodenal papilla is papillary, the granular opening, and the guide wire is selectively inserted into the pancreatic tube under the guidance of the incision knife. 3 ml of iodamitanol is injected for pancreatography, and the pancreatic duct is visualized under X-ray, the contrast agent leakage is seen in the tail of the pancreas, the pancreatic duct is narrowed in the tail (Figure 3A). After incising the duodenal papillary sphincter (sphincter of the pancreatic canal), some

stones of the pancreatic canal can be seen, and there is no bleeding on the local wound (Figure 3B). An incision knife is inserted under the guide wire into the pancreatic pseudocyst to suck about 65 ml of dark brown bile. The nasopancreatic drainage is inserted into pancreatic tails which can drainage the pancreatic fluid. The gallbladder and biliary ducts are not visualized. Postoperative rehydration, anti-infective and somatostatin. Indwelling nasal and nasopancreatic drainage (Figure 3C). After half-month, the CT was reviewed. It shows a retroperitoneal enveloping effusion on the left side, which was reduced compared with the previous absorption. Following first month of CT review, left encapsulated retroperitoneal effusion was reduced. And the left pleural effusion and the inferior lobe of the left lung were better absorbed. For the second month of CT review, no pleural effusion was seen. Nasal pancreatography observed the nasal pancreatic tube in place, the original pancreatic leakage does not see the contrast agent leakage, the contrast agent is discharged smoothly (Figure 4). The pancreatic tube is observed under fluoroscopy and no contrast residue is observed, then the nasal pancreatic tube is slowly removed fully under X-ray. After three months, the patient re-evaluated the CT at local hospital and there was no pleural effusion remained.

## Discussion

Pancreatic pleural effusion is the pleural effusion caused by a benign pancreatic illness which developed a pleural fistula of the pancreatic canal which was a rare clinical complication of pancreatitis. Unlike transient peripleural inflammatory effusion caused by acute pancreatitis, the pleural fluid is often voluminous, easy to reproduce, and contains high levels of amylase lipase. It is commonly seen in patients with chronic (alcoholic) pancreatitis [4]. Pancreatic chest fistula usually begins with pulmonary symptoms caused by pleural effusion, and lacks clinical symptoms of the abdomen [5], which are easily dissected.

## Diagnosis

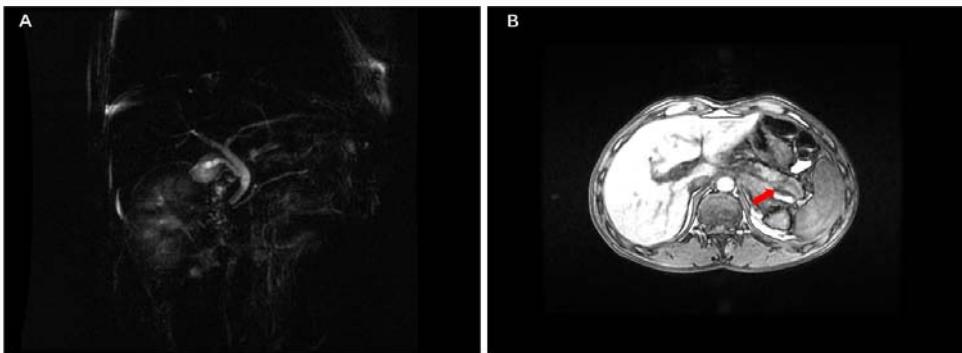
Massive unilateral pleural effusions can be observed by chest radiography and CT, the left side being more common. Pleural flow faucet liquid flow turbid and brown with high level of pleural and amylase. CT scan may display fistulas between the pancreas and the pleural space, while MRCP and ERCP can further confirmed that. Because pancreatic pleural fistulae are often secondary to chronic pancreatitis and serum amylase levels are mostly normal in the non-acute phase [6]. However, since the pancreatic amylase can be passively absorbed from the pleural or peritoneal surface, an increase in amylase lipase can also occur in Pancreatic pleural effusion.

## Treatment

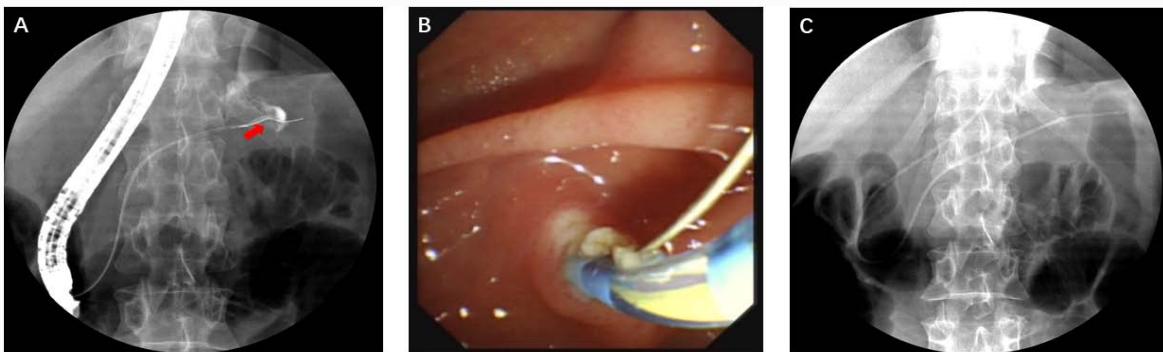
The treatment of pancreatic fistula is divided into medical



**Figure 1:** A. Chest CT showed left pleural effusion. B. Abnormal CT showed a flaky low density around Pancreatic tail.



**Figure 2:** A.B. MRCP imaging suggests a posterior peritoneal cystic shadow on the left side, connected to the tail of the pancreas.



**Figure 3:** A. The pancreatic duct is visualized under X-ray, the contrast agent leakage is seen in the tail of the pancreas. B. After incising the duodenal papillary, some stones of the pancreatic canal can be seen. C. The nasopancreatic drainage is inserted into pancreatic tail which can drainage the pancreatic fluid.



**Figure 4:** Nasal pancreateography observed the nasal pancreatic tube in place, the original pancreatic leakage does not see the contrast agent leakage.

treatment, endoscopic treatment and surgery. The medical treatment consists primarily of octreotide 100 micrograms, three sub-cutaneous injections per day to reduce secretions, and maintaining nutrition through nasogastric tube. Repetitive puncture and thoracentesis and thoracic tube drainage are an integral part of the conservative treatment that promotes healing of fistula. Nonsurgical treatment usually takes two to three weeks. The success rate of this treatment is close to 50%, but there is a high risk of recurrence [7]. If there is no improvement after 2 weeks of medical therapy, endoscopy therapy is attempted. ERCP can determine the location and structure of fistula, and make a pancreatic sphincterectomy, inserting a nasal and pancreatic drainage tube (ENPD, Endoscopic Nasopancreatic Drainage),

pancreatic tube stent or fistula embolization. If no improvement occurs within 7 days after endoscopic therapy, surgery will be performed. Based on the anatomy of the catheter and the associated parenchymal pathology, surgery involves lateral pancreatic jejunostomy, Frey surgery, distal pancreatectomy, and pleural fistula closure [5]. But pancreatic jejunostomy may be needed for proximal pancreatic injuries [8]. In this case, the patient had previously suffered from chronic pancreatitis, and considered chest fistula of the pancreatic tube through a pleural fluid test and CT scene, confirmed by ERCP. At the same time, we performed endoscopic therapy, placed in ENPD drainage for 2 months. Finally, nasal cholangiography was performed to determine fistula cure. Pancreatic-pleural fistula is secondary to chronic pancreatitis, pancreatic traumatic or surgery, which is a rare complication [5], and it was reported that the incidence of pancreatic pleural effusion was as small as 0.4% [1]. ERCP is both a diagnostic and therapeutic tool, reducing hospital stay and mortality compared to traditional surgical management [7]. Although further prospective studies are needed to compare the cost-effectiveness of ERCP with long-term outcome surgery.

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