

# Pancreatic-pleural fistula presenting as epigastric pain

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**ABSTRACT:** We are reporting a case of a pancreatic-pleural fistula causing epigastric pain. Chest radiograph revealed pleural effusion reaching the seventh rib. Thoracocentesis was performed and 1600 mL of brownish fluid was removed, which showed an elevated amylase level. Ultimately, the diagnosis was confirmed by computed tomography. Due to the failure of medical and endoscopic treatment, the decision was made to perform surgery. It resulted in total pancreatectomy.

**KEYWORDS:** alcohol abuse, pancreatitis, pancreatic-pleural fistula

## ABBREVIATIONS

**CRP** – C-reactive protein  
**CT** – computed tomography  
**MRI** – magnetic resonance imaging  
**PPF** – pancreatic-pleural fistula

## INTRODUCTION

Pancreatic-pleural fistula is a very rare complication of acute and chronic pancreatitis as well as traumatic or iatrogenic injury to the pancreatic duct with the incidence of 0.4% [1, 2]. However, pancreatic fistulas are most commonly associated with chronic alcohol-induced pancreatitis [1–4].

A pancreatic-pleural fistula is characterized by massive pleural effusion and a tendency for recurrence despite treatment.

In this article, we discuss a case of a patient diagnosed with a right-sided pancreatic-pleural fistula, in whom the surgical treatment (pancreatic resection) was successful.

## CASE REPORT

A 47-year-old female was admitted to the Department of Gastroenterology, Hepatology and Clinical Nutrition due to abdominal pain. The patient complained of epigastric pain for five months, which was squeezing and radiating to the back. The pain worsened one month prior to admission. The patient also complained of low-grade fever and dry cough. She reported nausea, dysphagia, painful swallowing and loss of appetite. Additionally, she reported weight loss by 8 kg within the last months. She also admitted to alcohol addiction.

On admission, the patient was in fair general condition, conscious and verbally responsive, with normal vital signs. The laboratory tests revealed an increased amylase level in serum (354 U/L [25–125]) and urine (1139 U/L [0–460]), and elevated inflammatory markers (CRP – 37.3 mg/L [0.0–6.0], leukocytosis >12 k/uL [4.0–10.0]). On ultrasound, the pancreas had slightly increased echogenicity, uneven contour with numerous small fibrous inclusions. The body of the pancreas was partially visible with the pancreatic



**Fig. 1.** Abdominal CECT: pancreatic fistula penetrating into posterior mediastinum.

duct 0.3 cm in diameter with echogenic walls suggestive of chronic pancreatitis. In the proximity of the head of the pancreas and hepatic hilum, there was a thin-walled fluid collection 4–6 cm in diameter. The chest X-ray report revealed suspected right-sided pneumonia with pleural effusion up to the 7th rib.

Thoracocentesis was performed and 1600 mL of brownish fluid was removed. The laboratory tests revealed a high level of amylase (13818 U/L [no reference values]).

The CT scans showed bilateral pleural effusion and inflammation of the posterior mediastinum at the Th7 level extending inferiorly to the peritoneal cavity, lesser curvature of the stomach, right crus of the diaphragm, and a developing mediastinal abscess was suspected. The abdominal CT was obtained as well, which revealed a fluid collection sized 3 x 3 x 6 cm (transverse x sagittal x axial) medial to the right lobe of the liver and hilum. The collection was connecting to the pancreatic duct within the body of the pancreas with small calcifications and segmental distention of the latter. The collection also projected superiorly through the esophageal hiatus to the posterior mediastinum to the right side of the esophagus. The CT image was consistent with a pancreatic fistula penetrating to the posterior mediastinum (Fig. 1.) Based on all clinical data, a pancreatic-pleural fistula was suspected.

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ERCP was performed in order to remove concretions and to perform pancreatic duct stenting to close the fistula. The catheter was inserted and contrast agent was injected to the intra- and extrahepatic bile ducts, which appeared non-distended, and the common bile duct was 5–6 mm in diameter. Despite repeated attempts, the catheter could only be placed in a small segment of 10 mm in the pancreatic duct, while further insertion was impossible and the contrast was leaking into the duodenum.

The patient was stable with normal vital signs, no dyspnea or signs of pneumonia or any respiratory infection, and no fever; the laboratory test results were following: CRP 33.5 mg/L [0.0–6.0], procalcitonin 0.0453 ng/mL [0.00–0.005].

Despite repeated blood, sputum and pleural fluid cultures, no bacteria or fungi have been identified. The patient received empirical course of Tazocin [piperacillin/tazobactam] for 14 days and continuous IV infusion of somatostatin for 16 days, however, she presented an ongoing inflammation of the mediastinum, lymph node enlargement and small amount of fluid in both pleurae on CT scans (5.8 cm thick on the right and 4.7 cm on the left). After about six weeks the patient was transferred to the Department of General Surgery and Surgical Oncology at Karol Marcinkowski University Hospital in Zielona Góra.

On admission, control tests were performed and specialist consultations were obtained, and the patient was prepared for surgery in terms of improved nutritional status (supplementary parenteral nutrition due to a weight loss of 12 kg and visible sarcopenia i.e. protein degradation with low creatinine level). During the operation, the fistula located at the border between the head and body of the pancreas was identified with the width of 2 to 3 cm, extending along the lesser curvature of the stomach to the posterior mediastinum. On the lesser curvature of the stomach, partial damage to the wall was noted (massive erosion without perforation). The fistula was opened and the necrotic tissues were removed. The rest of the body and tail was atrophic with the length of 3 to 4 cm (due to chronic pancreatitis). The stump was not suitable for reattachment to the alimentary tract. During the operation, we performed a simultaneous duodenectomy, partial gastrectomy with attachment to the ileum, cholecystectomy, splenectomy and attachment of the common bile duct to the intestines, as well as Braun anastomosis and abdominal drainage.

Suction drainage was applied to the fistula bed. After surgery, the patient was hospitalized in the Intensive Care Unit and later was

transferred to the Department of General Surgery and Surgical Oncology. On postoperative day 7, eventration ensued and the patient required surgical closure of the abdominal wall. During induction of anesthesia, the patient aspirated the bile contents into the airways. In the operating room, bronchoscopy was performed with airway clearance. The patient required aggressive mechanical ventilation. Following surgery, the patient stayed in the Intensive Care Unit for two days. After returning to the Department of General Surgery and Surgical Oncology, the patient was hemodynamically stable. After numerous diabetology consultations and adjusting insulin regime to nutrition the patient was transferred to the Department of Internal Medicine with Diabetology Unit to optimize diabetes therapy, which was diagnosed postoperatively. The patient was discharged on day 29 since the first intervention with minimal serous discharge from the wound edges and was registered for a visit at the surgical clinic, and also referred to the diabetology clinic. The last follow-up visit at the surgery clinic took place three months after the discharge. On the follow-up visit, the patient was in good general condition with well-controlled glucose levels.

## DISCUSSION

Pleural effusion is common in pancreatic dysfunction due to e.g. acute or chronic pancreatitis, or pancreatic abscess [5]. Pathology of the pancreas can lead to two types of exudate. The first type is associated with acute pancreatitis and resolves as the patient recovers. It is characterized by normal amylase level and low protein concentration (< 3 g/dL) [5]. The second type is associated with a pancreatic-pleural fistula (PPF) in the course of chronic or recurrent acute pancreatitis. It usually presents with high amylase level and protein concentration (> 3 g/dL), large volume effusion and recurrences [1]. It should be noted that type 2 exudate is more common on the left side, but in 20% of cases it can be right-sided and in 15% – bilateral [6].

When the amylase level in the fluid is raised, there are a few possible ways to make the diagnosis of PPF. The sensitivity of computed tomography, ERCP and cholangio-MRI is 47%, 78% and 80% respectively [3].

The pathogenesis of a pancreatic-pleural fistula is usually a leak from incompletely formed or burst pseudocyst [4, 7–10], or less frequently a direct leak from the pancreatic duct [8–10]. The pancreatic juice flows into the posterior mediastinum through the aortic or esophageal hiatus, or directly through a defect in damaged diaphragm.

Injury to the pancreatic duct at different parts can manifest itself in various ways. When the anterior wall is damaged, a pancreatic-peritoneal fistula can form leading to ascites [4–10]. If the posterior wall is damaged, however, the pancreatic juice tends to collect in the retroperitoneal space and can flow into the posterior mediastinum through the aortic or esophageal hiatus, where it forms a pleural fistula or mediastinal cyst. The cyst can burst creating a pleural fistula [8–10].

The standard treatment of pancreatic-pleural fistulas starts with 2 to 3 weeks of conservative therapy including nothing by mouth, pleural drainage and somatostatin infusion [1, 2, 11]. In patients with functioning alimentary tract, enteral nutrition via

a nasogastric tube is recommended. In other patients and those where less than 60% of daily caloric and protein requirements can be supplied enterally, parenteral nutrition should be instituted [5, 15]. Medical treatment is successful only in 31% to 65% of patients [1–4]. The treatment takes many weeks and requires prolonged hospital stay, which generates costs. Unsuccessful medical therapy is associated with an increased risk of complications and prolonged hospital stay [3]. In the study by Lipsett et al. [11], 80% of deaths in patients treated medically for internal pancreatic fistula occurred when the surgical intervention was postponed over three weeks. The decision about the therapeutic approach should be made considering the risk of death due to postponed intervention, bearing in mind the perioperative risk as well.

Endoscopy is recommended as a second-line treatment in patients who did not respond to medical therapy. It brings good results, and at the same time is characterized by less frequent complications and lower mortality than surgical intervention [8, 12].

Surgical intervention is recommended when both medical and endoscopic treatment failed [6, 8, 12, 14]. The choice of type of operation depends on many factors such as the degree of pancreatic duct involvement, location of injury, extent of inflammation.

The surgery usually includes internal pancreatic drainage (most commonly – attachment of small intestinal loop onto the fistula) and/or pancreatic resection [12, 15].

Before endoscopic treatment became widely available and used, surgical intervention was often the first-line treatment for a pancreatic-pleural fistula. Nowadays, surgery is considered the last hope and it is performed in refractory cases after endoscopic treatment has failed [2, 14]. It should be remembered that delayed surgical intervention can be associated with an increased complication rate and mortality [2]. Furthermore, currently only surgical centers specializing in pancreatic surgery have the acceptable complication and mortality rates.

## CONCLUSIONS

Formation of a pancreaticopleural fistula is a rare complication of pancreatitis and can be followed by grave sequelae. In the case presented above, the surgical intervention was conducted after medical and endoscopic treatment have failed, and because of the worsening patient's condition it was considered the only possible therapeutic option.

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