CASE SERIES

Unresolved Pleural Effusion with Elevated Amylase: A Case Series of Pancreaticopleural Fistula and the Diagnostic Role of MRCP

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ABSTRACT

Background: Pancreaticopleural fistula (PPF) is a rare but important complication of pancreatitis, often presenting as recurrent massive pleural effusion with minimal abdominal symptoms.

Aim: To emphasize the role of Magnetic Resonance Cholangiopancreatography (MRCP) in diagnosing PPF in patients with persistent pleural effusion and elevated pleural fluid amylase.

Methods: Three patients with recurrent pleural effusion underwent pleural fluid biochemical analysis and MRCP evaluation.

Results: All patients demonstrated markedly elevated pleural fluid amylase (>1000 IU/L), lipase, and protein levels. MRCP clearly delineated fistulous communication between pancreatic pathology and the pleural cavity through various diaphragmatic routes including the aortic hiatus, inferior vena cava hiatus, and direct diaphragmatic muscle disruption.

Conclusion: PPF should be suspected in unexplained recurrent pleural effusion with high amylase levels. Early MRCP enables definitive diagnosis, guides management, and prevents unnecessary thoracic interventions.

Keywords: Pancreaticopleural fistula; MRCP; Chronic pancreatitis; Pleural effusion; Pancreatic duct disruption; Pancreatic pseudocyst

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INTRODUCTION

Pancreaticopleural fistula (PPF) is an uncommon thoracic complication of pancreatic disease, predominantly occurring in the setting of chronic pancreatitis. It represents an abnormal communication between the pancreatic ductal system or a pancreatic pseudocyst and the pleural cavity. Although rare, PPF carries significant clinical implications due to delayed recognition and recurrent pleural effusion.

The incidence of PPF has been reported to be approximately 0.4% among patients with pancreatitis and up to 4.5% among those with pancreatic pseudocysts [1]. The pathogenesis involves disruption of the main pancreatic duct (MPD) or rupture of a pseudocyst, allowing enzyme-rich pancreatic secretions to dissect retroperitoneally and ascend into the thoracic cavity through diaphragmatic openings.

Unlike classical pancreatitis presentations, patients with PPF commonly present with respiratory symptoms such as dyspnea, cough, and chest discomfort. Abdominal pain may be mild or absent. This atypical presentation frequently leads to extensive pulmonary evaluation before pancreatic origin is considered.

Pleural fluid biochemical analysis plays a pivotal role in diagnosis. Markedly elevated pleural fluid amylase levels (>1000 IU/L), often several times higher than serum levels, are characteristic. Elevated lipase and protein levels further support pancreatic etiology.

Magnetic Resonance Cholangiopancreatography (MRCP) is currently regarded as the most sensitive non-invasive imaging modality for delineating pancreatic ductal anatomy and identifying fistulous tracts [2,3]. We present three cases illustrating varied anatomical pathways of PPF diagnosed by MRCP.

CASE PRESENTATION

Case 1

A 45-year-old male with a history of chronic alcohol-related pancreatitis presented with progressive

breathlessness of three weeks duration. He had undergone repeated thoracentesis for recurrent left-sided pleural effusion at an outside facility.

On examination, decreased breath sounds were noted over the left hemithorax. Chest radiograph revealed massive left pleural effusion. Diagnostic thoracentesis demonstrated exudative fluid with:

Amylase >1000 IU/L

Lipase markedly elevated

Protein 3.8 g/dL

Contrast-enhanced computed tomography (CECT) of the abdomen showed features of chronic pancreatitis with calcifications and a fluid collection in the lesser sac.

Figure 1: MRCP demonstrates a hyperintense fluid tract extending from the lesser sac collection through the aortic hiatus of the diaphragm into the left pleural cavity, confirming pancreaticopleural fistula.

Case 2

A 50-year-old male with established chronic pancreatitis presented with dyspnea and persistent left pleural effusion unresponsive to repeated drainage.

Pleural fluid analysis revealed:

Amylase 1450 IU/L

Elevated lipase

Protein 3.5 g/dL

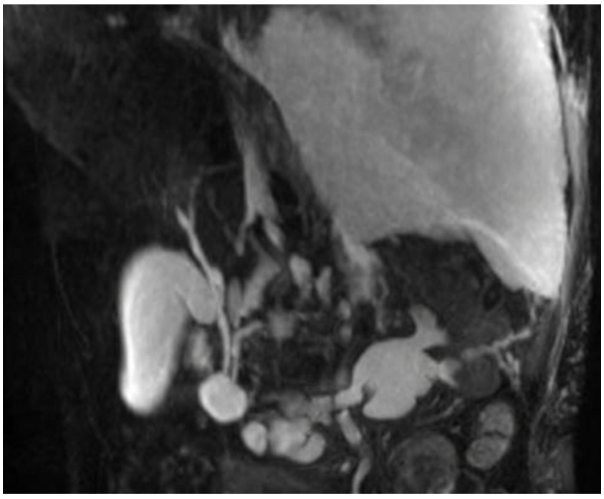

Figure 2: MRCP demonstrates a fistulous tract extending directly through the diaphragm into the left pleural cavity without an intervening pseudocyst.

Case 3

A 38-year-old male presented with right-sided pleural effusion and respiratory distress. He reported intermittent epigastric discomfort but no severe abdominal pain.

Pleural fluid analysis demonstrated:

Amylase >1200 IU/L

Elevated lipase

Protein 3.6 g/dL

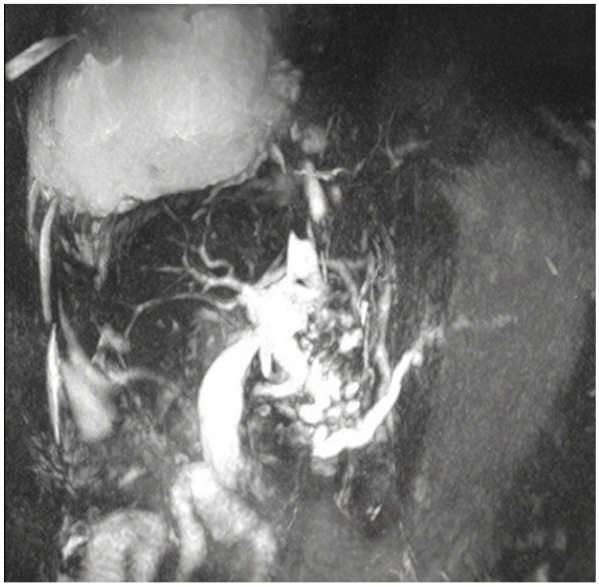

Figure 3: MRCP revealed a well-defined pancreatic pseudocyst in the pancreatic body communicating with the right pleural cavity via the inferior vena cava hiatus of the diaphragm.

DISCUSSION

Pathophysiology

PPF results from pancreatic ductal disruption due to

inflammation, obstruction, or increased intraductal pressure. Enzyme-rich pancreatic secretions dissect along retroperitoneal planes and may track superiorly into the mediastinum and pleural cavity.

The fistulous tract may traverse:

- Aortic hiatus
- Esophageal hiatus
- Inferior vena cava hiatus
- Direct diaphragmatic muscle erosion

The predominance of left-sided effusion is explained by the anatomical position of the pancreas adjacent to the left hemidiaphragm. However, right-sided PPF, though uncommon, can occur depending on tract direction.

Clinical Features

Respiratory symptoms dominate clinical presentation. Massive pleural effusion may recur rapidly after thoracentesis. Minimal abdominal symptoms may delay suspicion of pancreatic etiology.

Diagnostic Evaluation

Pleural Fluid Analysis

Pleural fluid amylase levels exceeding 1000 IU/L are strongly suggestive of pancreatic origin. Differential diagnoses for high pleural amylase include:

- Esophageal rupture
- Malignancy
- Pancreatic disease

Correlation with clinical and imaging findings is essential.

Imaging

CT Scan:

Identifies pancreatitis, ductal dilatation, and pseudocysts but may not always delineate the fistulous tract.

MRCP:

Provides superior visualization of pancreatic duct anatomy and fluid tracts. It is non-invasive, avoids ionizing radiation, and allows multiplanar imaging.

ERCP:

Considered both diagnostic and therapeutic but invasive.

In our series, MRCP successfully demonstrated fistulous tracts in all three cases with varying anatomical routes, highlighting its diagnostic reliability.

Management

Management strategies depend on ductal anatomy and clinical severity:

- Conservative therapy (bowel rest, octreotide)
- Endoscopic pancreatic duct stenting via ERCP
- Surgical intervention for refractory cases

Early identification prevents repeated thoracentesis and reduces morbidity.

CONCLUSION

Pancreaticopleural fistula is a rare but important cause of recurrent, non-resolving pleural effusion. It should be strongly suspected in patients presenting with:

Predominant respiratory symptoms

Massive or recurrent pleural effusion

Pleural fluid amylase >1000 IU/L

MRCP is the imaging modality of choice for non-invasive delineation of the fistulous tract and pancreatic ductal pathology. Early diagnosis facilitates appropriate management and improves patient outcomes.

Table 1: Summary of Clinical and Imaging Findings

Case	Side of Effusion	Pancreatic Source	Route of Fistula
1	Left	Lesser sac collection	Aortic hiatus
2	Left	MPD disruption	Direct diaphragmatic tract
3	Right	Pseudocyst	IVC hiatus

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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ETHICS APPROVAL AND CONSENT

Written informed consent was obtained from all patients.

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REFERENCES

1. Ali, T., Srinivasan, N., Le, V., Chimpiri, A. R., & Tierney, W. (2008). MRCP as a diagnostic study for pleuropancreatic fistula: 178. The American Journal of Gastroenterology, 103, S69–S70. https://doi.org/10.14309/00000434-200809001-00178
2. Bediwy, A. S. (2015). Pancreatico-pleural fistula: A rare cause of massive right-sided pleural effusion. The Egyptian Journal of Chest Diseases and Tuberculosis, 64(1), 149–151. https://doi.org/10.1016/j.ejcdt.2014.08.004
3. Halligan, S. (2002). Textbook of Gastrointestinal Radiology, 2nd edn, vols 1 and 2: Edited by R M Gore, M S Levine. UK: Harcourt Publishers Ltd, 2000, 265, illustrated, pp 2261. ISBN 072167836. Gut, 51(2), 298–298. https://doi.org/10.1136/gut.51.2.298
4. MR Cholangiopancreatography of Bile and Pancreatic Duct Abnormalities with Emphasis on the Single-Shot Fast Spin-Echo Technique1. (n.d.).
5. Patel, K. R., Parikh, J., Hussain, Z., Gourtsoyianni, S., & Griffin, N. (2015). The diagnostic and technical quality of magnetic resonance cholangiopancreatography (MRCP). Clinical Radiology, 70, S17. https://doi.org/10.1016/j.crad.2015.06.063
6. Vidal, B. P. C., Lahan-Martins, D., Penachim, T. J., Rodstein, M. A. M., Cardia, P. P., & Prando, A. (2020). MR cholangiopancreatography: What every radiology resident must know. *Radiographics: A Review Publication of the Radiological Society of North*

America, Inc, *40*(5), 1263–1264.
https://doi.org/10.1148/rg.2020200030