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Case Report

A rare presentation of pleural pseudocyst in chronic calcific pancreatitis: A case report ☆,☆☆

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ABSTRACT

Chronic calcific pancreatitis (CP) is a progressive inflammatory disorder that can lead to complications in multiple organ systems. Pleural pseudocysts, a rare thoracic manifestation of chronic pancreatitis, pose significant diagnostic and therapeutic challenges. This case report highlights the presentation, diagnostic approach, and management of a patient with pleural pseudocyst associated with chronic calcific pancreatitis. A 41-year-old male presented with a one-month history of abdominal pain and a persistent cough. Clinical evaluation and imaging revealed chronic calcific pancreatitis with multiple pseudocysts, left-sided hydropneumothorax, a right pleural pseudocyst, and massive ascites. Diagnostic imaging, including high-resolution computed tomography (HRCT) of the thorax and contrast-enhanced computed tomography (CECT) of the abdomen, confirmed the diagnosis. Biochemical analysis showed elevated amylase levels in pleural and ascitic fluids, consistent with pseudocyst rupture. The patient was managed conservatively with intercostal drain (ICD) insertion, pigtail catheterization, nasojejunal feeding, and broad-spectrum antibiotics. Despite stabilization, the patient declined further surgical interventions, including decortication and endoscopic retrograde cholangiopancreatography (ERCP). This case un-

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derscores the importance of a multidisciplinary approach in managing rare complications of chronic pancreatitis. Advanced imaging and biochemical analysis are pivotal for diagnosis, while nutritional optimization and minimally invasive interventions form the cornerstone of management. Definitive surgical or endoscopic procedures are often required but may be limited by patient preferences or resource constraints. Pleural pseudocyst is a rare but significant complication of chronic pancreatitis requiring prompt diagnosis and tailored management. This report emphasizes the role of a patient-centric approach in addressing complex clinical scenarios.

Introduction

Chronic calcific pancreatitis is a long-standing inflammatory condition of the pancreas characterized by progressive fibrosis, ductal calcification, and pancreatic atrophy, often leading to severe morbidity due to endocrine and exocrine insufficiency. The prevalence of chronic pancreatitis has been reported to range between 50 and 150 per 100,000 individuals globally, with alcohol consumption and smoking being the most commonly implicated etiological factors [1,2]. Other causes include genetic mutations, autoimmune diseases, and idiopathic origins, particularly in younger populations [3,4]. One of the most significant complications of chronic pancreatitis is the development of pancreatic pseudocysts, which occur due to the disruption of the pancreatic ductal system, leading to the accumulation of enzyme-rich fluid encapsulated by granulation tissue [5,6]. These pseudocysts account for approximately 10%-20% of complications in chronic pancreatitis and are usually confined to the peritoneal cavity. However, in rare cases, these fluid collections can extend into the thoracic cavity, resulting in pleural pseudocysts, which are associated with significant morbidity [7,8].

The pathogenesis of pleural pseudocysts involves the passage of pancreatic secretions through diaphragmatic defects or via lymphatic channels, leading to the accumulation of fluid in the pleural space. This condition often presents with nonspecific thoracic symptoms such as cough, dyspnea, or chest pain, making it difficult to distinguish from other thoracic diseases like empyema, tuberculosis, or malignancy [9]. Diagnostic imaging plays a critical role in identifying pleural pseudocysts, with high-resolution computed tomography (HRCT) and contrast-enhanced computed tomography (CECT) being the modalities of choice. These imaging techniques not only define the extent of the disease but also provide crucial insights into the communication between the pancreas and the pleural cavity [10]. Biochemical analysis of pleural fluid is essential for confirming the diagnosis. Elevated pleural fluid amylase levels, often exceeding 1000 IU/L, are highly suggestive of pancreatic origin. Concurrently, elevated lactate dehydrogenase (LDH) and protein levels support an exudative etiology, further differentiating pleural pseudocysts from other conditions [11]. Advanced imaging techniques, including magnetic resonance cholangiopancreatography (MRCP) and endoscopic ultrasound (EUS), have also been increasingly employed for better delineation of pancreatic ductal anomalies and pseudocyst characteristics [12].

Management of pleural pseudocysts requires a multidisciplinary approach. Initial treatment typically involves conservative measures, including nasojejunal feeding, broad-spectrum antibiotics, and drainage of pleural fluid via intercostal drain (ICD) insertion to relieve symptoms and prevent infections [13]. Definitive treatment options include endoscopic retrograde cholangiopancreatography (ERCP) with pancreatic duct stenting or surgical interventions, such as pseudocyst drainage or decortication in cases complicated by chronic empyema or lung collapse [14]. Timely intervention is critical, as untreated pleural pseudocysts can lead to life-threatening complications, including sepsis, massive pleural effusions, or respiratory failure [15]. This case report illustrates the diagnostic and therapeutic challenges in managing pleural pseudocysts, emphasizing the importance of a patient-centered approach and the role of advanced imaging and multidisciplinary care in achieving optimal outcomes.

Case presentation

A 41-year-old male presented to the emergency department with complaints of abdominal pain and persistent cough, both of one month duration. The abdominal pain was described as dull, nonradiating, and gradually progressive, with no relief from routine analgesics. The patient reported no history of fever, chest pain, breathlessness, palpitations, nausea, vomiting, or diarrhea. He denied significant weight loss, changes in appetite, or bowel habits. There was no history of prior abdominal surgeries or trauma. The patient had no known comorbidities, including hypertension, diabetes mellitus, tuberculosis, or bronchial asthma. He had a history of chronic alcohol consumption but reported abstinence for the past 6 months.

On physical examination, the patient appeared moderately ill. His vital signs included a pulse rate of 120 beats per minute, blood pressure of 100/70 mmHg, respiratory rate of 18 breaths per minute, and he was afebrile. The abdominal examination revealed distension with mild tenderness but no guarding or rigidity. Respiratory system evaluation showed reduced air entry on the left side, while cardiovascular and central nervous system examinations were unremarkable.

Initial investigations revealed leukocytosis and elevated serum amylase levels. A chest X-ray demonstrated left-sided pleural effusion, raising the suspicion of a thoracic complication of pancreatitis. Ultrasonography of the abdomen confirmed multiple pancreatic pseudocysts with significant peripancreatic collections, bilateral pleural effusion, and moderate ascites. High-resolution computed tomography (HRCT) of

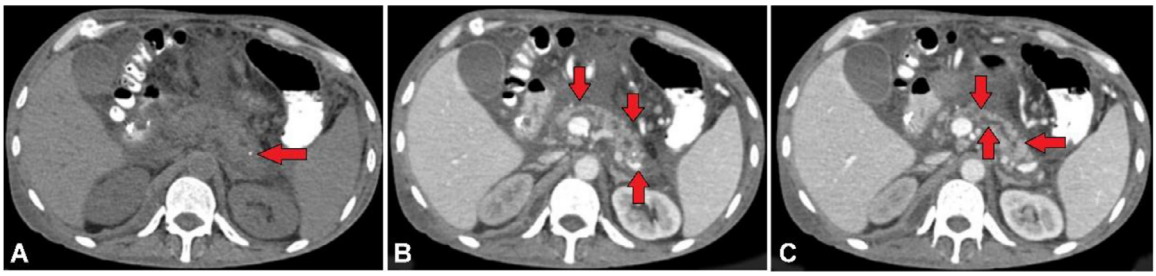

Fig. 1 – Computed Tomography axial sections noncontrast (A), portal venous phase (B), and (C) showing atrophic pancreas with foci of calcification (orange arrows), dilated main pancreatic duct (blue arrow), and ascites suggesting chronic pancreatitis.

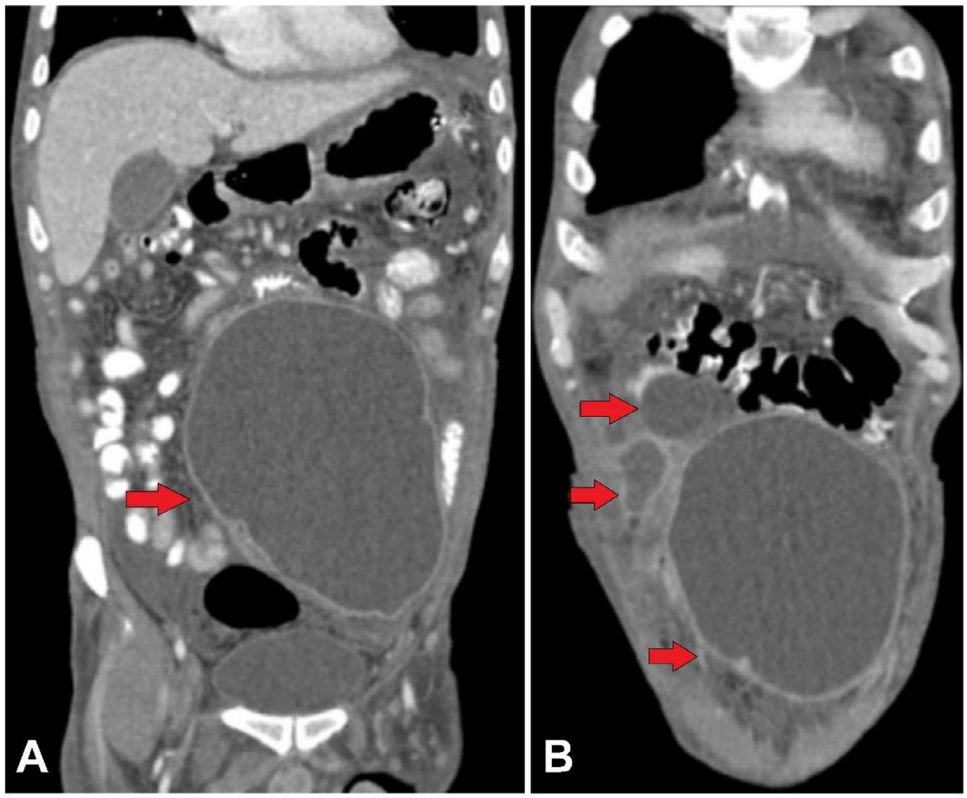

Fig. 2 – Computed tomography venous phase coronal sections (A) and (B) showing multiple well-defined peripherally enhancing cystic intra-peritoneal lesions (orange arrows) suggesting intra-peritoneal pseudocysts.

the thorax showed left lung hydropneumothorax, left-sided pleural effusion, and a well-defined cystic lesion in the right lower lung lobe, suggestive of a pleural pseudocyst. Contrast-enhanced computed tomography (CECT) of the abdomen revealed an atrophic pancreas with ductal dilatation, calcifications, and multiple intra-abdominal pseudocysts (Figs. 1-3).

Further diagnostic tests included fluid analysis from the pleural and peritoneal cavities, which showed elevated amylase levels, confirming the diagnosis of pseudocyst rupture. The pleural fluid was exudative with elevated lactate dehydrogenase (LDH) levels and a protein content of 2.0 g/dL.

The patient was managed with nasojejunal (NJ) feeding for nutritional support, intercostal drain (ICD) insertion for pleural effusion, and pigtail catheter insertion for ascites. Broad-spectrum antibiotics were administered to prevent secondary infections. Despite stabilization and symptom resolution, the patient declined further interventions, including endoscopic retrograde cholangiopancreatography (ERCP) and decortication surgery. He was discharged on request with instructions for outpatient follow-up, abstinence from alcohol and tobacco, and supportive care.

This case illustrates the diagnostic and therapeutic challenges of managing pleural pseudocyst in chronic calcific pancreatitis, emphasizing the need for comprehensive and multidisciplinary care.

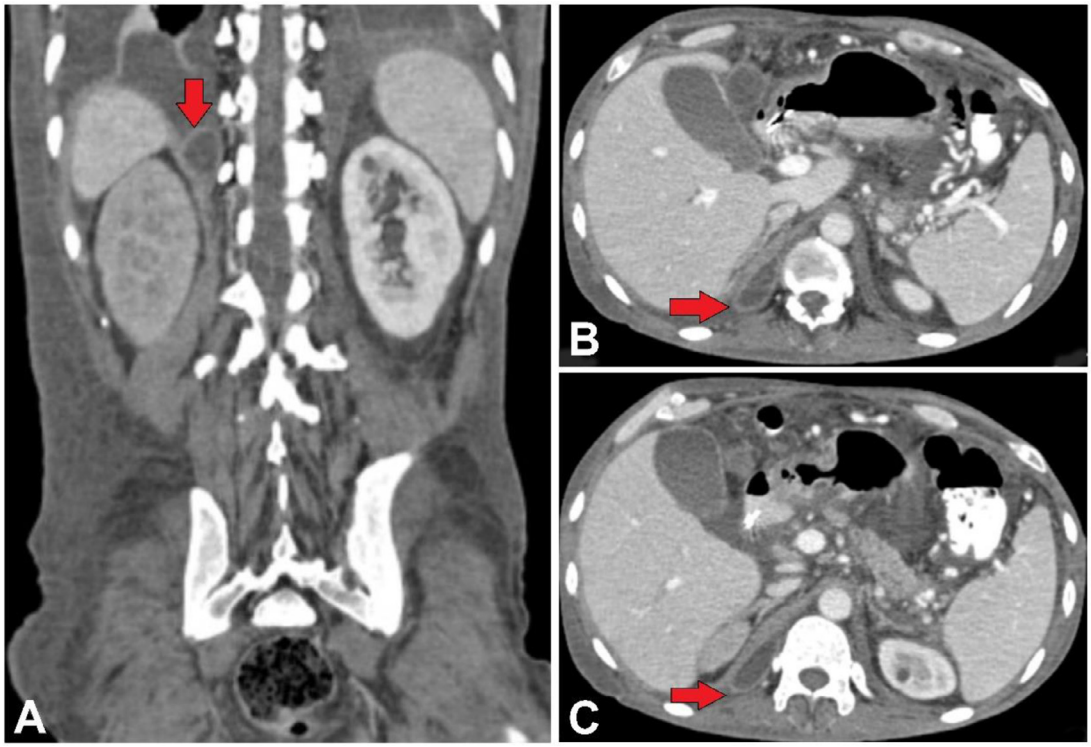

Fig. 3 – Computed tomography venous phase coronal section (A) and axial sections (B) and (C) showing well-defined peripherally enhancing cystic lesion in the postero-basal segment of the right lower lobe (orange arrows) suggesting pleural pseudocyst.

Discussion

Chronic calcific pancreatitis (CCP) is a complex inflammatory condition that not only affects pancreatic function but also predisposes patients to systemic and extrapancreatic complications, such as pseudocyst formation. Pseudocysts arise due to the disruption of the pancreatic ductal system, leading to the accumulation of pancreatic enzymes within a fibrous wall [16]. While intra-abdominal pseudocysts are a recognized complication, their extension into the pleural cavity, termed pleural pseudocysts, is exceedingly rare and poses significant diagnostic and therapeutic challenges [16]. Pleural pseudocysts result from the extension of pancreatic secretions into the pleural space via diaphragmatic defects or lymphatic pathways. These are often accompanied by other complications, such as ascites and hydropneumothorax, as observed in this patient [17]. The clinical presentation is nonspecific and may include chest pain, cough, and dyspnea, which can mimic pulmonary infections or malignancies. In this case, the combination of abdominal pain and persistent cough raised the suspicion of thoracic involvement secondary to pancreatitis [17].

Imaging studies are critical for diagnosis. Ultrasound, while useful as an initial modality, is limited in its ability to characterize thoracic extensions. High-resolution computed tomography (HRCT) and contrast-enhanced computed tomography (CECT) provide detailed visualization of pancreatic abnormalities, including calcifications, pseudocysts, and ductal dilatation, as well as associated complications like pleural pseudocysts [18]. In this patient, HRCT revealed a peripherally enhancing cystic lesion in the right lower lobe, diagnostic of a pleural pseudocyst, which is consistent with findings from other reports [19]. Biochemical analysis of pleural and peritoneal fluid is indispensable for confirming the diagnosis. Elevated amylase levels in these fluids, as seen in this patient, are a hallmark of pseudocyst rupture or pancreatic-pleural fistula, a condition reported in 0.4% to 4.5% of pancreatitis cases [20]. The pleural fluid in this patient exhibited an exudative profile with elevated lactate dehydrogenase (LDH), consistent with pancreatic etiology.

Management of pleural pseudocysts is guided by the patient's clinical status and the severity of complications. Conservative measures, including nutritional support via nasojejunal feeding, drainage of fluid collections, and broad-spectrum antibiotics, are the cornerstone of initial management [21]. Interventional procedures, such as intercostal drainage (ICD) and pigtail catheterization, help alleviate symptoms and prevent secondary infections, as demonstrated in this case. For refractory or complicated cases, definitive interventions such as endoscopic retrograde cholangiopancreatography (ERCP) to address ductal disruptions or decortication surgery for pleural thickening are required [22]. The role of minimally invasive techniques, such as endoscopic ultrasound-guided drainage and necrosectomy, has gained prominence in recent years. These approaches offer reduced morbidity compared to surgical methods and are increasingly employed in managing pancreatic fluid collections, including

pleural pseudocysts [23]. However, patient reluctance for invasive interventions, as seen in this case, often limits the application of these advanced techniques, underscoring the importance of patient education and shared decision-making.

Despite advances in management, the prognosis of pleural pseudocysts depends on timely diagnosis and comprehensive treatment. Delayed intervention can lead to complications such as infections, sepsis, or chronic lung damage [24]. This case highlights the importance of multidisciplinary care involving gastroenterologists, pulmonologists, and surgeons in addressing these complex cases effectively. Future research should aim to standardize diagnostic and therapeutic approaches for pleural pseudocysts, focusing on the efficacy and timing of endoscopic and surgical interventions. Additionally, long-term follow-up studies are needed to assess recurrence rates and the impact of conservative versus invasive management strategies on patient outcomes [25].

Conclusion

This case highlights the rare presentation of pleural pseudocyst as a complication of chronic calcific pancreatitis, underscoring the diagnostic and therapeutic complexities involved. The condition requires a high index of suspicion, especially in patients presenting with thoracic symptoms and a history of pancreatitis. Advanced imaging techniques, such as HRCT and CECT, combined with fluid analysis, play a pivotal role in confirming the diagnosis. Management is often multidisciplinary, involving nutritional support, minimally invasive interventions, and, when necessary, surgical or endoscopic procedures. However, patient preferences and the availability of resources significantly influence the course of treatment. This case emphasizes the importance of tailored, patient-centric care and the need for thorough counseling regarding the prognosis and potential outcomes to ensure optimal management and adherence to treatment plans.

Patient consent

Written informed consent was obtained from the patient for the publication of this case report.

REFERENCES

[1] Ammann RW, Muellhaupt B. Progression of alcoholic acute to chronic pancreatitis. Gut 1994;35:552–6. doi:10.1136/gut.35.4.552.

[2] Whitcomb DC. Genetic risk factors for pancreatic disorders. Gastroenterology 2013;144:1292–302. doi:10.1053/j.gastro.2013.01.069.

[3] Dominguez-Munoz JE, Drewes AM, Lindkvist B, et al. Recommendations from the United European Gastroenterology evidence-based guidelines for the diagnosis and therapy of chronic pancreatitis. Pancreatology 2018;18:847–54. doi:10.1016/j.pan.2018.09.016.

[4] Pham A, Forsmark C. Chronic pancreatitis: review and update of etiology, risk factors, and management. F1000Res 2018;7 F1000 Faculty Rev-607. doi:10.12688/f1000research.12852.1.

[5] Sandy JT, Taylor RH, Christensen RM, Scudamore C, Leckie P. Pancreatic pseudocyst. Changing concepts in management. Am J Surg 1981;141:574–6. doi:10.1016/0002-9610(81)90052-0.

[6] Banks PA, Freeman ML. Practice Parameters Committee of the American College of Gastroenterology: practice guidelines in acute pancreatitis. Am J Gastroenterol 2006;101:2379–400. doi:10.1111/j.1572-0241.2006.00856.x.

[7] Sankaran S, Walt AJ. The natural and unnatural history of pancreatic pseudocysts. Br J Surg 1975;62:37–44. doi:10.1002/bjs.1800620110.

[8] Roch A, Teyssedou J, Mutter D, Marescaux J, Pessaux P. Chronic pancreatitis: a surgical disease? Role of the Frey procedure. World J Gastrointest Surg 2014;6:129–35. doi:10.4240/wjgs.v6.i7.129.

[9] Neff R. Pancreatic pseudocysts and fluid collections: percutaneous approaches. Surg Clin North Am 2001;81 399–403, xii. doi:10.1016/s0039-6109(05)70127-4.

[10] Hallifax RJ, Talwar A, Wrightson JM, Edey A, Gleeson FV. State-of-the-art: radiological investigation of pleural disease. Respir Med 2017;124:88–99. doi:10.1016/j.rmed.2017.02.013.

[11] Mercer RM, Corcoran JP, Porcel JM, Rahman NM, Psallidas I. Interpreting pleural fluid results. Clin Med (Lond) 2019;19:213–17. doi:10.7861/clinmedicine.19-3-213.

[12] Parakh A, Tirkes T. Advanced imaging techniques for chronic pancreatitis. Abdom Radiol (NY) 2020;45:1420–38. doi:10.1007/s00261-019-02191-0.

[13] Yu H. Management of pleural effusion, empyema, and lung abscess. Semin Intervent Radiol. 2011;28:75–86. doi:10.1055/s-0031-1273942.

[14] Nealon WH, Townsend CM, Thompson JC. Preoperative endoscopic retrograde cholangiopancreatography (ERCP) in patients with pancreatic pseudocyst associated with resolving acute and chronic pancreatitis. Ann Surg 1989;209:532–8 discussion 538-540. doi:10.1097/00000658-198905000-00004.

[15] Lui JK, Billatos E, Schembri F. Evaluation and management of pleural sepsis. Respir Med 2021;187:106553. doi:10.1016/j.rmed.2021.106553.

[16] Bahl G, Hussain MS, Upadhyay DK, Varma M, Singh R, Das S. Chronic calcific pancreatitis and its association with secondary diabetes mellitus. J Endocrinol Metabol 2023;13:89–95. doi:10.14740/jem.v0i0.884.

[17] Gapp J, Hoilat GJ, Leslie SW, Chandra S. Pancreatic Ascites. StatPearls. Treasure Island, Florida: StatPearls Publishing; 2024.

[18] Bashir M, Inzamam W, Banday MK, Rasool SR, Bhat MH, Vladulescu C, et al. Lung ultrasonography is an acceptable imaging modality to diagnose COVID-19 and effectively correlates with HRCT chest—a prospective study. Diagnostics (Basel) 2023;13:2091. doi:10.3390/diagnostics13122091.

[19] Sabri YY, Fouad MA, Assal H-AH, Abdullah HE. Cystic lesions in multislice computed tomography of the chest: a diagnostic approach. Egypt J Radiol Nucl Med 2016;47:1313–22. doi:10.1016/j.ejrnm.2016.08.003.

[20] Chubb SP, Williams RA. Biochemical analysis of pleural fluid and ascites. Clin Biochem Rev 2018;39:39–50.

[21] Hu K, Chopra A, Kurman J, Huggins JT. Management of complex pleural disease in the critically ill patient. J Thorac Dis 2021;13:5205–22. doi:10.21037/jtd-2021-31.

[22] Gammie JS, Banks MC, Fuhrman CR, Pham SM, Griffith B p, Keenan RJ, et al. The pigtail catheter for pleural drainage: a less invasive alternative to tube thoracostomy. JSLS 1999;3:57–61.

[23] Fabbri C, Luigiano C, Maimone A, Polifemo AM, Tarantino I, Cennamo V. Endoscopic ultrasound-guided drainage of

pancreatic fluid collections. World J Gastrointest Endosc 2012;4:479–88. doi:10.4253/wjge.v4.i11.479.
[24] Presti T, Asghar A, Ravikumar N. Management of pleural infection: a historical review and updates. J Respiration 2024;4:112–27. doi:10.3390/jor4020010.
[25] Teoh AYB, Dhir V, Jin Z-D, Kida M, Seo DW, Ho KY. Systematic review comparing endoscopic, percutaneous and surgical pancreatic pseudocyst drainage. World J Gastrointest Endosc 2016;8:310–18. doi:10.4253/wjge.v8.i6.310.