Case Report

Pancreaticoureteral Fistula: A Rare Complication of Chronic Pancreatitis

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Abstract

Context: Chronic pancreatitis is an inflammatory condition that may result in progressive parenchymal damage and fibrosis which can ultimately lead to destruction of pancreatic tissue. Fistulas to the pleura, peritoneum, pericardium, and peripancreatic organs may form as a complications of pancreatitis. This case report describes an exceedingly rare complication, pancreaticoureteral fistula (PUF). Only two additional cases of PUF have been reported. However, they evolved following traumatic injury to the ureter or pancreatic duct. No published reports describe PUF as a complication of pancreatitis. **Case Report:** A 69-year-old Hispanic female with a past medical history of cholecystectomy, pancreatic pseudocyst, and recurrent episodes of pancreatitis presented with severe, sharp, and constant abdominal pain. Upon imaging, a fistulous tract was visualized between the left renal pelvis (at the level of an upper pole calyx) and the pancreatic duct and a ureteral stent was placed to facilitate fistula closure. Following the procedure, the patient attained symptomatic relief and oral intake was resumed. A left retrograde pyelogram was repeated 2 months after the initial stent placement and demonstrating no evidence of a persistent fistulous tract. **Conclusion:** Due to PUF's unclear etiology and possible variance of presentation, it is important for physicians to keep this rare complication of pancreatitis in mind, especially, when evaluating a patient with recurrent pancreatitis, urinary symptoms and abnormal imaging within the urinary collecting system and pancreas.

Keywords: Chronic pancreatitis, complication, fistula, fistulous tract, pancreas, pancreatitis, pancreaticoureteral, pancreaticoureteral fistula (PUF), ureter

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Introduction

Chronic pancreatitis is an inflammatory condition that may result in progressive parenchymal damage and fibrosis. The destruction of pancreatic tissue can lead to exocrine as well as endocrine dysfunction in addition to biliary, duodenal or gastric obstruction, pseudocysts, pancreatic ascites, pleural effusion, splenic or portal vein thromboses, splenic artery pseudoaneurysm, cancer and pancreatic fistulae. Pancreatic fistulae have been reported to involve the pleura, peritoneum, pericardium, and other peripancreatic organs (i.e., esophagus, stomach, duodenum, and colon).[1-4] This case report describes a pancreaticouretral fistula — An exceedingly rare complication of pancreatitis, manifested as a fistula between the pancreatic duct and the ureter.

Case Presentation

A 69-year-old Hispanic female with a history of recurrent episodes of pancreatitis and cholecystectomy

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presented with complaints of severe, sharp, and constant abdominal pain in the left upper quadrant (LUQ) and flank with radiation to the left lower quadrant (LLQ). The pain was associated with subjective fever, nausea, and nonbloody emesis and was exacerbated by oral intake. The patient denied additional gastrointestinal or genitourinary disturbances, sick contacts, travel, or consumption of unusual food.

Two months prior to presentation, she had an episode of pancreatitis complicated by pseudocyst formation along the greater curvature of the stomach, measuring 13 × 9.5 × 5.5 cm. She underwent ultrasound-guided drainage of approximately 100 mL of cloudy fluid with subsequent placement of a 12-French pigtail catheter. External bag drainage was continued for 2 weeks and removed once the drainage was minimal.

One day after catheter removal, the patient developed progressive abdominal discomfort, which prompted repeat evaluation. Laboratory studies were only significant for an alkaline urine pH of 8.0. A computed tomography (CT) scan of the abdomen revealed a cystic structure with fistulous extension below the pancreas into the left para-aortic space. The reading further commented on the presence of mild left hydronephrosis due to the passage of the ureter near a cluster of lymph nodes and cystic structures from the fistula below the pancreatic tail measuring 2.2 × 3.9 × 4.5 cm [Figure 1].

Magnetic resonance cholangiopancreatography (MRCP) was obtained to further evaluate the pancreatobiliary anatomy. It demonstrated an abnormal pancreatic duct in the body and tail of the pancreas with a complex multiloculated pseudocyst extending anteriorly into the lesser sac, posteriorly and medially to the level of the left kidney with possible ureteral fistula formation, and mild left-sided hydronephrosis [Figures 2 and 3]. An additional smaller fistula was noted to extend medially from the pseudocyst into a soft-tissue mass.

In an effort to optimize pancreatic drainage, a sphincterotomy was performed with pancreatic stent placement during an endoscopic retrograde cholangiopancreatography (ERCP). Additionally, a left retrograde pyelogram was performed to evaluate the level/degree of ureteral obstruction and further assess for the presence of a fistulous tract. A fistulous tract was in fact visualized between the left renal pelvis (at the level of an upper pole calyx) and the pancreatic duct and a ureteral stent was placed to facilitate fistula closure [Figure 4]. The patient was started on imipenem/cilastatin prophylaxis pending blood and pancreatic pseudocyst fluid cultures, which ultimately returned culture negative.

The patient remained intolerant of oral intake and experienced pain, even after the placement of

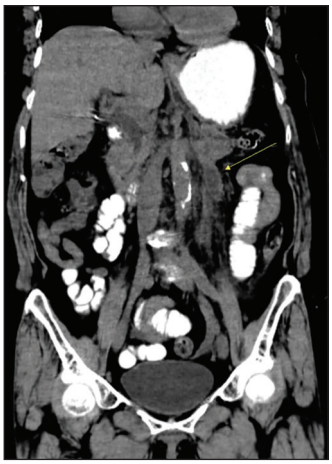

Figure 1: Coronal CT scan demonstrating pancreatic pseudocyst (arrow) extending toward the left renal collecting system

Figure 2: Axial T2-weighted sequence demonstrating the proximity of the pancreatic pseudocyst (arrow head) and the ureter (long arrow)

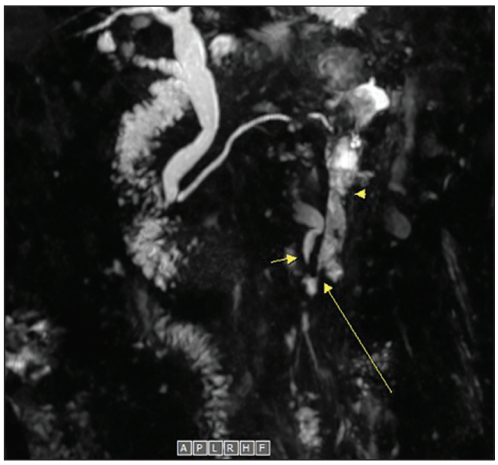

Figure 3: 3D MRCP shows a fistula (long arrow) between the pancreatic pseudocyst (arrow head) and left renal collecting system (short arrow)

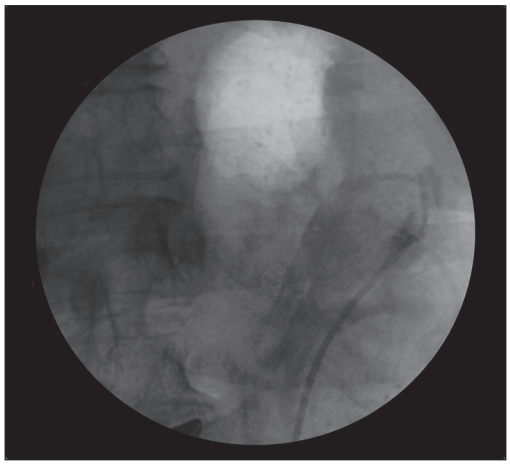

Figure 4: Left retrograde pyelogram demonstrating a fistulous tract between the left renal pelvis (at the level of an upper pole calyx) and the pancreatic duct. A ureteral stent was placed to facilitate fistula closure

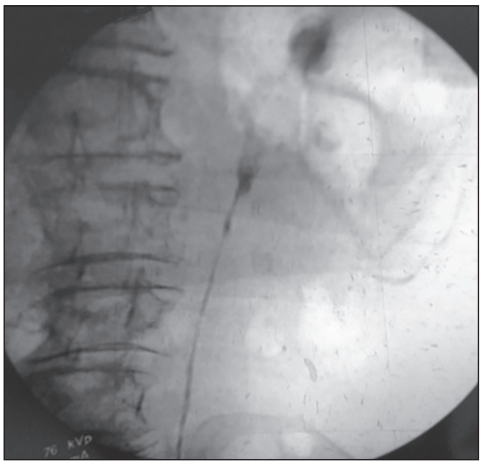

Figure 5: Left retrograde pyelogram, repeated 2 months after initial intervention for PUF, demonstrating no evidence of a fistulous tract

pancreatic and ureteral stents. In an effort to relieve compression of the stomach by the pseudocyst and to facilitate eating, she underwent a successful pancreatic cyst gastrostomy. Following the procedure, the patient attained symptomatic relief and oral intake was successfully resumed. A left retrograde pyelogram was repeated after 2 months demonstrating no evidence of a residual fistulous tract [Figure 5].

Discussion

Pancreaticoureteral fistulae (PUF) are exceedingly rare. Upon reviewing the literature only two case reports were identified.[5,6] However, unlike our case, those fistulae evolved following traumatic injury to the ureter or pancreatic duct. No reports were found to describe PUF as a complication of chronic pancreatitis. In trauma related cases, pancreatic fistula most likely form secondary to persistent leakage of pancreatic secretions from a disrupted pancreatic duct. This may lead to persistent inflammation and result in erosion into surrounding structures. Many etiologies, including pancreatitis, trauma, biopsy, or surgery, can result in pancreatic duct disruption.[1,7,8] One proposed etiology for the evolution of a PUF in our patient may involve recurrent inflammatory infiltrate progressively eroding surrounding structures and intimately extending into the retroperitoneal space.

Multiple modalities are available to diagnose pancreatic fistula. ERCP, MRCP, CT scan, and fistulography are often the main imaging studies implemented. ERCP was found to be 100% sensitive and specific in the diagnosis of pancreatic ductal rupture in one prospectively study and was superior to CT scan[9,10] and MRCP, which are reported to detect pancreatic duct abnormalities with similar accuracy.[11] In addition to the common complications of pancreatic fistulae, complications specific for PUF can include metabolic abnormalities (hyperchloremic metabolic acidosis, electrolytes imbalance), urological complications (chemical cystitis, urethritis, hematuria, urinary tract infection, and bladder stones), and reflux pancreatitis.[12-16] Metabolic complications are due to a loss of alkaline exocrine pancreatic secretions in the urine while pancreatic enzymes secreted in the urine may cause urological complications.

Up to 50% of internal pancreatic fistulas and 70% to 90% of external pancreatic fistulas may heal with conservative measures.[17] For patients presenting with a main pancreatic duct dilatation, without ductal disruption or stricture, conservative therapy (broad spectrum antibiotics, enteral nutrition, and correction of fluid and electrolyte imbalances) should be pursued.[18] Of note, enteral nutrition is associated with significantly higher closure rates and shorter time to closure, than parenteral nutrition.[19] Additionally, somatostatin analog administration is reported to promote pancreatic fistula closure by decreasing the volume of fistulous tract output.[20-22]

If conservative measures fail or if the fistula becomes complicated by infection or bleeding, endoscopic or surgical interventions are warranted.[1] ERCP is a safe and effective modality and can be considered the first-line therapy in the management of pancreatic fistulae. Early ERCP and pancreatic stent insertion promote fistula resolution and may allow delay or avoidance of surgical measures.[23-27] Due to their significant complication profile, surgical interventions should be reserved for cases not responsive to conservative measures.

Conclusion

Pancreatic fistula formation is a rare complication of pancreatitis. PUF, in particular, is an exceedingly unusual manifestation of a pancreatic fistula. A number of imaging modalities, such as ERCP, MRCP, CT scan, or fistulography, can assist in the diagnosis of PUF. Nonoperative modalities, including medical and endoscopic measures, may initially be pursued for the management of PUF. Failure of these conservative approaches may warrant pursuit of surgical measures.

Due to PUF's unclear etiology and possible variance of presentation, it is important for physicians to keep this rare complication of pancreatitis in mind while evaluating patients with recurrent pancreatitis, urinary symptoms, and/or imaging suggestive of abnormalities within the urinary collecting system and pancreas.

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Conflicts of interest

There are no conflicts of interest.

References

1. Alexakis N, Sutton R, Neoptolemos JP. Surgical treatment of pancreatic fistula. Dig Surg 2004;21:262-74.
2. Cullen JJ, Sarr MG, Ilstrup DM. Pancreatic anastomotic leak after pancreaticoduodenectomy: Incidence, significance, and management. Am J Surg 1994;168:295-8.
3. Tajima Y, Fukuda K, Tsuneoka N, Tsutsumi R, Kuroki T, Onizuka S, *et al*. Demonstration of a pancreaticopleural fistula with magnetic resonance cholangiopancreatography. Am J Surg 2004;187:741-2.
4. Balasubramanian P, Jeyamani R, Govil S, Chacko A, Kurian C, Subhash HS, *et al*. Pancreatico-pericardial fistula: A rare complication of chronic pancreatitis. Indian J Gastroenterol 2004;23:31-2.
5. Toporoff B, Sclafani S, Scalea T, Vieux E, Atweh N, Duncan A, *et al*. Percutaneous antegrade ureteral stenting as an adjunct for treatment of complicated ureteral injuries. J Trauma 1992;33:534-8.
6. Wolf JH, Miller G, Ashinoff R, Dave J, Lefleur RS, Frangos SG, *et al*. Pancreaticoureteral fistula following penetrating abdominal trauma. JOP 2007;8:613-6.
7. Donald GW, Hines JO. Pancreatic ductal disruptions leading to pancreatic fistula, pancreatic ascites or pancreatic pleural effusion. In: Cameron JL, editor. Current Surgical Therapy. 11th ed. Philadelphia: Elsevier; 2014. p. 408-15.
8. Bassi C, Butturini G, Molinari E, Mascetta G, Salvia R, Falconi M, *et al*. Pancreatic fistula rate after pancreatic resection. The importance of definitions. Dig Surg 2004;21:54-9.
9. Barkin JS, Ferstenberg RM, Panullo W, Manten HD, Davis RC Jr. Endoscopic retrograde cholangiopancreatography in pancreatic trauma. Gastrointest Endosc 1988;34:102-5.
10. Bradley EL 3rd, Young PR Jr, Chang MC, Allen JE, Baker CC, Meredith W, *et al*. Diagnosis and initial management of blunt pancreatic trauma: Guidelines from a multiinstitutional review. Ann Surg 1998;227:861-9.
11. Sica GT, Braver J, Cooney MJ, Miller FH, Chai JL, Adams DF. Comparison of endoscopic retrograde cholangiopancreatography with MR cholangiopancreatography in patients with pancreatitis. Radiology 1999;210:605-10.
12. Al-Quorain AA, Ismail MH, Al-Mulhim AA, Yasawy MI, Elhassan AY, Al-Mulhim FA. Prospective comparative study of mrcp and ercp in biliary and pancreatic duct abnormalities. Sci J of King Faisal Univ 2010;11:193-201.
13. Vitellas KM, Keogan MT, Spritzer CE, Nelson RC. MR Cholangiopancreatography of bile and pancreatic duct abnormalities with emphasis on the single-shot fast spin-echo technique. Radiographics 2000;20:939-57; quiz 1107-8, 1112.
14. Hekimoglu K, Ustundag Y, Dusak A, Erdem Z, Karademir B, Aydemir S, *et al*. MRCP vs. ERCP in the evaluation of biliary pathologies: Review of current literature. J Dig Dis 2008;9:162-9.
15. Hickey DP, Bakthavatsalam R, Bannon CA, O'Malley K, Corr J, Little DM. Urological complications of pancreatic transplantation. J Urol 1997;157:2042-8.
16. Regueiro López JC, Padillo Ruiz FJ, Requena Tapia MJ, Alvarez Kindelan J, Carmona Campos E, Anglada Curado J. Urologic complications of pancreas-kidney simultaneous transplantation. Actas Urol Esp 1998;22:193-203.
17. Voss M, PappasT. Pancreatic fistulas. Curr Treat Options Gastroenterol 2002;5:345-53.
18. Chebli JM, Gaburri PD, de Souza AF, Ornellas AT, Martins Junior EV, Chebli LA, *et al*. Internal pancreatic fistulas: Proposal of a management algorithm based on a case series analysis. J Clin Gastroenterol 2004;38:795-800.
19. Klek S, Sierzega M, Turczynowski L, Szybinski P, Szczepanek K, Kulig J. Enteral and parenteral nutrition in the conservative treatment of pancreatic fistula: A randomized clinical trial. Gastroenterology 2011;141:157-63, 163.e1.
20. Prinz RA, Pickleman J, Hoffman JP. Treatment of pancreatic cutaneous fistulas with a somatostatin analog. Am J Surg 1988;155:36-42.
21. Barnes SM, Kontny BG, Prinz RA. Somatostatin analog treatment of pancreatic fistulas. Int J Pancreatol 1993;14:181-8.
22. Koti RS, Gurusamy KS, Fusai G, Davidson BR. Meta-analysis of randomized controlled trials on the effectiveness of somatostatin analogues for pancreatic surgery: A Cochrane review. HPB (Oxford) 2010;12:155-65.
23. Halttunen J, Weckman L, Kemppainen E, Kylänpää ML. The endoscopic management of pancreatic fistulas. Surg Endosc 2005;19:559-62.
24. Boerma D, Rauws EA, van Gulik TM, Huibregtse K, Obertop H, Gouma DJ. Endoscopic stent placement for pancreaticocutaneous fistula after surgical drainage of the pancreas. Br J Surg 2000;87:1506-9.
25. Bracher GA, Manocha AP, DeBanto JR, Gates LK Jr, Slivka A, Whitcomb DC, *et al*. Endoscopic pancreatic duct stenting to treat pancreatic ascites. Gastrointest Endosc 1999;49:710-5.
26. Telford JJ, Farrell JJ, Saltzman JR, Shields SJ, Banks PA, Lichtenstein DR, *et al*. Pancreatic stent placement for duct disruption. Gastrointest Endosc 2002;56:18-24.
27. Arvanitakis M, Delhaye M, Bali MA, Matos C, Le Moine O, Devière J. Endoscopic treatment of external pancreatic fistulas: When draining the main pancreatic duct is not enough. Am J Gastroenterol 2007;102:516-24.