

# Pancreatic Head Enlargement Associated with a Pancreatitis- Induced Intrasplenic Pseudocyst in a Patient with Chronic Pancreatitis: Organ Preserving Surgical Treatment

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## Summary

*Intrasplenic pseudocyst is a rare form of a late complication of chronic pancreatitis. We report the case of a 30-year-old man with an intrasplenic pseudocyst associated with chronic alcoholic pancreatitis. The patient was admitted with the third acute phase of chronic relapsing pancreatitis. Abdominal US and CT showed a large cyst in the pancreatic tail with involvement of the spleen. ERCP revealed marked irregularities of the main pancreatic duct without communication to the large cyst and a narrowing of the distal common bile duct by chronic pancreatitis of the head of the pancreas. Organ preserving surgical treatment with duodenum-preserving resection of the head of the pancreas combined with distal pancreatectomy and splenectomy was performed. This procedure may be indicated in selected patients to preserve functional pancreatic tissue and prevent diabetes. It should be in the armamentarium of the specialized pancreatic surgeon.*

**Key words:** chronic pancreatitis, pancreatic pseudocyst, intrasplenic pseudocyst, surgical treatment

## Introduction

Late complications of acute pancreatitis, or of an acute phase of chronic relapsing pancreatitis, are diverse. The most common is formation of a pancreatic pseudocyst appearing in approximately 50% of acute and 25% of chronic pancreatitis cases (1). As the pancreas and the spleen are in close proximity, late complications may also involve the spleen in form of splenic vein thrombosis, splenic rupture and necrosis, or severe bleeding from eroded splenic vessels. The formation of a perisplenic or even intrasplenic pseudocyst in the course of acute or relapsing chronic pancreatitis is extremely rare. Since 1941, when Roton et

al. (2) first described an intrasplenic cyst due to an ectopic pancreas, approximately 40 cases have been reported in the international literature (3).

We report a case of chronic alcoholic pancreatitis with both, involvement of the head and tail of the pancreas associated with formation of an intrasplenic pseudocyst and describe the organ preserving surgical treatment.

## Case report

A 30-year-old man was admitted to our hospital with the third phase of an acute relapsing chronic alcoholic pancreatitis. The diagnosis was made 6 years earlier by ERCP and elevated serum amylase levels with values up to fivefold greater than the normal range. Since then, he had reduced his alcoholic consumption and remained free of symptoms. In July 1994, the patient had a new, painful attack with left lateral discomfort and back pain and complained of a feeling of abdominal fullness. The physical examination showed a mild abdominal tenderness without any mass or organomegaly. Laboratory findings remarked a mild leukocytosis of 10700/mm<sup>3</sup>, serum amylase level of 770 U/I (-200), lipase 1930 U/I (-190), GOT 426 U/I, GPT 133 U/I, GGT 666 U/I, APH 133 U/I (-110) and total bilirubin of 29 µmol/l (-17) with normal electrolytes.

An abdominal ultrasound demonstrated pancreatitis with mild swelling of the pancreas and mild peripancreatic effusion. A large hypoechogenic area was detected in the left upper abdomen. CT scan was performed demonstrating a cyst measuring 15x13x10 cm compressing the spleen in the medio-caudal axis (**Figure 1**). In the head of the pancreas, a small pseudocyst of 1 cm in diameter was detected, but no pancreatic necrosis or calcifications were seen. The common bile duct was enlarged to 9 mm due to compression in the region of the papilla of Vater. An ERCP revealed ductular changes of the main pancreatic duct and side branches in the head, with small cystic cavities in the head of the pancreas. The common bile duct showed a marked compression. There was no communication found between the pancreatic main duct and the large cyst in the left upper abdomen (**Figure 2**).

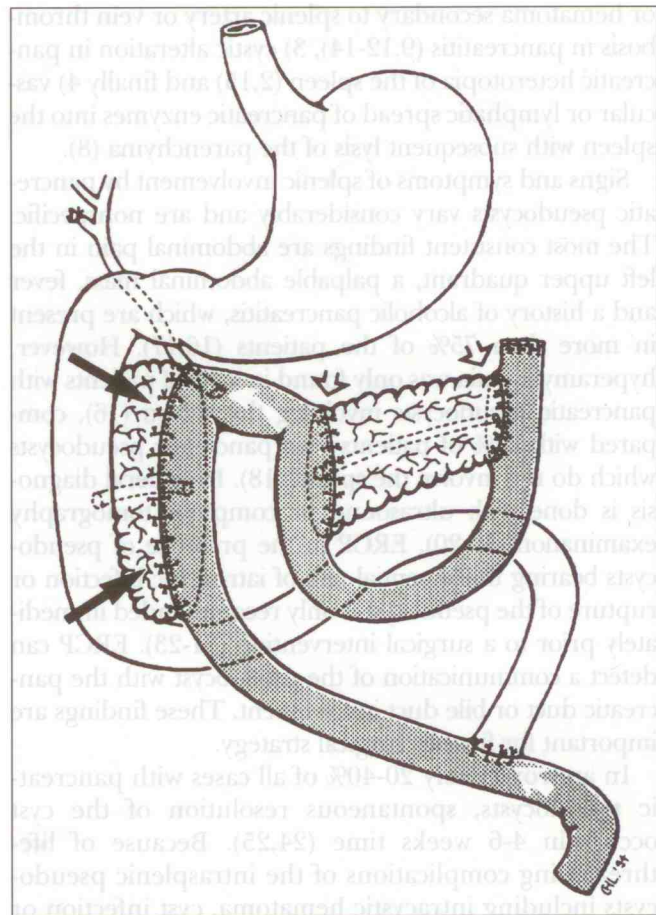
To solve the problem of chronic pancreatitis of the head of the pancreas obstructing the common bile duct with cholestasis, a duodenum-preserving resection of the head of the pancreas was performed at the same time (4). At the end of the two resectional procedures, the remnant of the pancreatic corpus was 4 cm long with a macroscopically normal appearance and a normal pancreatic duct caliber.

Reconstruction after resection of the head of the pancreas was initiated by dissecting the uppermost jejunal loop 40 cm distally to the ligament of Treitz. The aboral jejunal loop was brought up, and a two-row, layered, end-to-side anastomosis was carried out between the proximal part of the remnant pancreas and the jejunal loop (**Figure 4**). A side-to-side anastomosis between the jejunal loop and the remnant of the pancreatic head (approx. 1 cm large) at a distance of approximately 6 cm followed in the same technique (**Figure 4**). To restore bile flow in the upper intestine, an additional anastomosis between the prestenotic common bile duct and the jejunal loop was necessary because of incomplete decompression of the intrapancreatic segment of the common bile duct. The end-to-side anastomosis between the common bile duct and the jejunum was sutured using a single-layer technique. As mandatory in these patients, cholecystectomy followed this procedure. To prevent possible pancreatic fistula on the resection surface of the tail of the pancreas and at the same time to enhance the drainage of pancreatic secretion, a third end-to-side, two-row anastomosis between the distal part of the remnant pancreas and the end of the jejunal loop was performed (**Figure 4**). Finally, a typical Roux-en-Y anastomosis was carried out 40 cm distally to the pancreatico-jejunal anastomosis. Two intestinal drains were placed for anastomosis drainage. To prevent postoperative complications such as peripancreatic fluid collection, leakage and fistula formation, perioperative inhibition of exocrine pancreatic secretion was provided by administering octreotide (Somatostatin, Sandoz, Basel, Switzerland) 200 µg/tid for 6 days.

The postoperative course was uneventful. No leakage was found by normal amylase levels in the drains, which were taken out 3 days after operation. The laboratory follow up tests were within normal limits, including the liver function tests and amylase and lipase. There was no diabetes induced by regular diet. The glucose levels were between 4-5.5 µmol/l (3.66-5.55 µmol/l). Ten days after surgery, the patient was discharged free of symptoms.

## Discussion

The formation of pseudocysts is one of the most frequent complications of acute or relapsing chronic pancreatitis. Pancreatic pseudocysts are known to expand along the tissue planes into areas far away from the pancreas. So Hamm et al. (5) found a frequency of 22% of atypically located pancreatic pseudocysts in the liver, spleen, stomach wall or even mediastinum. However, formation of



**Figure 4** Schematic drawing of postoperative reconstruction in duodenum-preserving resection of the head of the pancreas, splenectomy and distal pancreatectomy. Side-to-side pancreatico-jejunal anastomosis (black closed arrows). Choledocho-jejunal anastomosis (white bended arrow). End-to-side pancreatico-jejunal anastomosis (black open arrows). Jejunoo-jejunal anastomosis Roux-en-Y (white closed arrow).

an intrasplenic pancreatic pseudocyst is rare (1,3,6). The small incidence of pancreatic pseudocyst extension into the spleen is approximately 1% of patients with acute or relapsing pancreatitis (6). Intrasplenic pseudocysts are seen to be pancreatitis-induced if 1) there is pancreatic tissue histologically proved inside the cyst or in direct contact with the pseudocapsule of the cyst, 2) if puncture of the cyst shows a higher amylase level as in the serum or 3) as in our case, there is a spontaneous formation of an intrasplenic cyst in a patient with well known pancreatitis without having suffered a previous trauma or a primary affection of the spleen (7,8). There are four possible formation mechanisms suggested: 1) direct dissection by pancreatic enzymes along the splenic hilum (9-11), as suspected in our case, 2) liquefaction of a splenic infarct

or hematoma secondary to splenic artery or vein thrombosis in pancreatitis (9,12-14), 3) cystic alteration in pancreatic heterotopia of the spleen (2,15) and finally 4) vascular or lymphatic spread of pancreatic enzymes into the spleen with subsequent lysis of the parenchyma (8).

Signs and symptoms of splenic involvement by pancreatic pseudocysts vary considerably and are nonspecific. The most consistent findings are abdominal pain in the left upper quadrant, a palpable abdominal mass, fever and a history of alcoholic pancreatitis, which are present in more than 75% of the patients (16,17). However, hyperamylasemia was only found in 42% of patients with pancreatic pseudocysts involving the spleen (16), compared with 51% of patients with pancreatic pseudocysts which do not involve the spleen (18). In general diagnosis is done with ultrasound or computer tomography examination (19,20). ERCP in the presence of pseudocysts bearing the potential risk of iatrogenic infection or rupture of the pseudocyst is only recommended immediately prior to a surgical intervention (21-23). ERCP can detect a communication of the pseudocyst with the pancreatic duct or bile duct involvement. These findings are important for further surgical strategy.

In approximately 20-40% of all cases with pancreatic pseudocysts, spontaneous resolution of the cyst occurs in 4-6 weeks time (24,25). Because of life-threatening complications of the intrasplenic pseudocysts including intracystic hematoma, cyst infection or splenic rupture, which are reported in up to 50% (3), immediate surgical treatment with splenectomy and distal pancreatectomy if necessary, is mandatory.

In our case, the complications of chronic pancreatitis in the head of the pancreas were a clear indication for surgical treatment of the head of the pancreas at the same intervention. It is known that resection of the enlarged head in chronic pancreatitis does not only relieve the pain and other complications, such as obstruction of the pancreatic, extrahepatic bile duct or obstruction of the duodenum, but also leads to favorable long-term results interrupting the natural course of the disease of chronic pancreatitis (26). Because of these facts, we combined the distal pancreatectomy with a duodenum-preserving resection of the head of the pancreas, which preserves endocrine function and the interregulation of upper gastrointestinal organs with exocrine and endocrine pancreatic function (4).

Our patient showed a normal endocrine and exocrine pancreatic function of the remnant 4 cm of the pancreas corpus during the postoperative course. This can be explained by the facts that 1) in over 75% of patients with duodenum-preserving head resection of the pancreas, glucose metabolism stays unchanged

(4), and 2) only 10% of normal islet-cell mass is sufficient to maintain normal glucose metabolism and therefore it is the resection of the pancreatic tail, containing the principal mass of islet cells, which in general bears the risk of inducing diabetes in over 40% (27).

The role of perioperative octreotide (Somatostatin) medication to prevent complications after pancreatic resection has been shown in several studies (28-30). The concept is based on perioperative inhibition of exocrine pancreatic secretion by somatostatin and its analogs. Klempa et al. (28) found a total morbidity of 8.3% in patients treated with somatostatin after pancreas resection compared with 33.3% in the group without somatostatin treatment. The prevalence of leakage and formation of a pancreatic fistula, which occurs in 10-40% (31-34) of patients after pancreatic surgery, can be reduced by perioperative administration of octreotide 100 µg/tid over a week (35).

As shown in our case, pancreatic preserving surgical treatment maintains normal endocrine and exocrine pancreatic function. To our knowledge, it is the first description of a double segmental pancreas resection with duodenum preservation and reconstruction with a triple pancreaticojejunostomy. This represents a new surgical technique of head- and tail resection in the pancreas.

## References

- 1 Lankisch PG, Löhr-Happe A. Pseudocysts in chronic pancreatitis: natural course. in Beger HG, Büchler M, Malferteiner P (eds): Standards in pancreatic surgery. Berlin, Heidelberg, New York. Springer, 1993; 511-520.
- 2 Roton, Mieng, Auburtin Observation d'un kyste pancréatique de la rate. Rev Med Française d'Extrême Orient, 1941; 19: 139-140.
- 3 Ueda N, Takahashi N, Yamasaki H, Hirano K, Ueda K, Yoshida S, Tanino M, Gabata T. Intrasplenic pancreatic pseudocyst: a case report. Gastroenterol Jap, 1992; 27: 675-682.
- 4 Büchler M, Friess H, Jsenmann R, Bittner R, Beger HG. Duodenum-preserving resection of the head of the pancreas: the Ulm experience. in Beger HG, Büchler M, Malferteiner P (eds): Standards in pancreatic surgery. Berlin, Heidelberg, New York. Springer, 1993; 436-449.
- 5 Hamm B, Franzen N. Atypically located pancreatic pseudocysts in the liver, spleen, stomach wall and mediastinum: their CT diagnosis. Rofo Fortschr Geb Roentgenstr Neuen Bildgeb Verfah, 1993; 159: 522-527.
- 6 Vogel H, Sjiariel M, Maas R, Klapdor R. Pankreaspseudocysteneinbruch in Abdominalorgane. Inn Med, 1983; 10: 243-246.

- 7 B chler M, Malfertheiner P, Krautzberger W, Heymer B, Maier W, Beger HG. Pankreatitis-induzierte Pseudozyste der Milz. *Akt Chir*, 1984; 19: 60-64.
- 8 Bolivar JC, Lempke RE. Pancreatic pseudocyst of the spleen. *Ann Surg*, 1974; 179: 73-78.
- 9 Moreau J, Bismuth H. Les complications spl niques des pancr atites chroniques. *Presse Med*, 1969; 77: 1467.
- 10 Razemon P, Salembier Y, Gautier-Benoit Cl, Houcke M, Therry Cl. Kystes h matiques de la rate en relation avec une pancr atite. *Presse Med*, 1965; 73: 2863.
- 11 Caroli J, Julien B, Chevreil B, Eteve J, Demisleau J. Necrose h patospl nique d'origine pancr atique. by Linquette M et al: Colloque de l'Hopital Saint Antoine, Paris 1965, in: Pseudo-Kyste H matique de la Rate et Pancr atite. *Lille Med*, 1966; 11: 1012.
- 12 Leger L. L'atteinte de la veine spl nique au cours et au d cours des faux kystes du pancreas. *J. de Chirurgie*, 1961; 81: 15.
- 13 Hoffmann E. Non parasitic cysts of the spleen. *Amer J Surg*, 1957; 93: 765.
- 14 Hastings OM, Jain KM, Khademi M, Lazaro EJ. Intrasplenic pancreatic pseudocyst complicating severe acute pancreatitis. *Am J Gastroenterol*, 1978; 69: 182-186.
- 15 Barbosa de Castro JJ, Dockerty MB, Waugh JM. Pancreatic heterotopia. *Surg Gynec Obstet*, 1946; 82: 527.
- 16 McMahan NG, Norwood SH, Silva JS. Pancreatic pseudocyst with splenic involvement: an uncommon complication of pancreatitis. *South Med J*, 1988; 81: 910-912.
- 17 Lankisch PG. The spleen in inflammatory pancreatic disease. *Gastroenterol*, 1990; 98: 509-516.
- 18 Shatney CH, Lillehei RC. Surgical treatment of pancreatic pseudocyst-analysis of 119 cases. *Ann Surg*, 1979; 189: 386-394.
- 19 Gaia E, Babini G, Dughera L, Marino BM, Drago GV, Emanuelli G. Intrasplenic penetration of a pancreatic pseudocyst: early ultrasonographic detection. *J Clin Ultrasound*, 1992; 20: 608-611.
- 20 Baekelandt M, Rigauts H, Wilms G. Perisplenic pseudocyst. *JBR-BTR*, 1993; 76: 394.
- 21 Layer P, Grandt D. Diagnosis of pancreatic pseudocysts. in: Beger HG, B chler M, Malfertheiner P (eds): *Standards in pancreatic surgery*. Berlin, Heidelberg, New York Springer, 1993: 520-525.
- 22 Mainwaring R, Kern J, Schenk WG, Rudolf LE. Differentiating pancreatic pseudocyst and pancreatic necrosis using computerized tomography. *Ann Surg*, 1989; 209: 5262-5267.
- 23 Nealon WH, Townsend CM jr., Thompson JC. Preoperative ERCP in patients with pancreatic pseudocyst associated with resolving acute or chronic pancreatitis. *Ann Surg*, 1989; 209: 532-538.
- 24 Bradley EL, Clements JL, Gonzales AC. The natural history of pancreatic pseudocysts-a unified concept of management. *Am J Surg*, 1979; 137: 135-141.
- 25 Flautner LE. Management of pancreatic pseudocysts. in: Beger HG, B chler M, Malfertheiner P (eds): *Standards in pancreatic surgery*. Berlin, Heidelberg, New York Springer, 1993: 533-539.
- 26 B chler M, Malfertheiner P, Friess H, Senn T, Beger HG. Chronic pancreatitis with inflammatory mass in the head of the pancreas: a special entity? in: Beger HG, B chler M, Ditschuneit H, Malfertheiner P (eds): *Chronic pancreatitis*. Berlin, Heidelberg, New York Springer, 1990: 41-46.
- 27 Gebhardt C. Left resection in chronic pancreatitis. in: Beger HG, B chler M, Malfertheiner P (eds): *Standards in pancreatic surgery*. Berlin, Heidelberg, New York Springer, 1993: 392-395.
- 28 Klempa I, Baca I, Menzel J, Morr H, Schuszdiarra V. Exocrine and endocrine pancreatic secretion following pancreatic resection. in: Beger HG, B chler M, Malfertheiner P (eds): *Standards in pancreatic surgery*. Berlin, Heidelberg, New York Springer, 1993: 703-712.
- 29 Klempa I, Schwedes U, Encke A, Usadel KH. Somatostatin therapy in pancreatic surgery. in: Raptis S, Rosenthal J, Gerich JE (eds): *Proceedings of the 2nd international symposium on somatostatin*. T bingen Attempto, 1989.
- 30 B chler M, Friess H, Klempa I, Hermanek P, Salkowski U, Becker H, Schafmayer A, Baca I, Lorenz D, Meister R, Kremer B, Wagner P, Witte J, Zurnmeyer EL, Saeger HD, Rieck B, Dollinger P, Glaser K, Teichmann R, Konradt J, Gaus W, Dennerl HJ, Welzel D, Beger HG. The role of somatostatin analogue octreotide in the prevention of postoperative complications following pancreatic resection. The results of a multicenter controlled trial. *Am J Surg*, 1992; 163: 125-131.
- 31 Trede M, Schwall G. The complications of pancreatectomy. *Ann Surg*, 1988; 207: 39-47.
- 32 Pellegrine CA, Heck CF, Raper S, Way LW. An analysis of the reduced morbidity and mortality rates after pancreaticoduodenectomy. *Arch Surg*, 1989; 124: 778-781.
- 33 Crist DW, Sitzmann JV, Cameron JL. Improved hospital morbidity, mortality, and survival after the Whipple procedure. *Ann Surg*, 1987; 206: 358-365.
- 34 Howald JM. Surgical treatment of chronic pancreatitis. in: Howald JM, Jordan GL jr, Reber HA (eds): *Surgical diseases of the pancreas*. Philadelphia Lea and Febiger, 1987; 496-521.
- 35 B chler M, Friess H, Hatzitheoklitos M, Uhl W, Beger HG. Perioperative inhibition of pancreatic secretion with octreotide. in: Beger HG, B chler M, Malfertheiner P (eds): *Standards in pancreatic surgery*. Berlin, Heidelberg, New York Springer, 1993; 713-722.

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