PANCREATIC PSEUDOANEURYSM – A CASE REPORT

Chandan Kumar R 1,a and Dharmendra BL a

1,a Department of Surgical Gastroenterology, Mysore medical college and research institute, Mysore, Karnataka, India

ABSTRACT Pancreatic pseudoaneurysm is a rare and major complication of pancreatitis associated with significantly high morbidity and mortality. It is due to the weakening of the vessel wall caused by the enzymatic action of the peripancreatic fluid. The most common cause is pancreatitis with pseudocyst formation. Other infrequent causes may include biliopancreatic surgeries, anastomotic leaks and trauma. The splenic artery is most commonly involved due to its proximity to the pancreas. The patient may be asymptomatic or present with bleeding complications or pain abdomen. If left untreated, it may be fatal. We present a case of a 21-year-old female with a pancreatic pseudoaneurysm of the splenic artery who was managed surgically for the same.

KEYWORDS Pancreas, Pancreatitis, Pseudoaneurysm

Introduction

Pancreatitis may present with multiple morbid complications. One such rare complication is Pancreatic Pseudoaneurysm which has an ambiguous progression and a severe prognosis. It is important to recognize this condition early as it can result in life-threatening complications. The incidence of pancreatic pseudoaneurysm following pancreatitis is less than 10%. The pseudoaneurysm must be differentiated from a true aneurysm, where the wall of a pseudoaneurysm does not contain the components of an arterial wall but instead consists of fibrous tissue. Pseudoaneurysms occur when the enzyme-rich peri-pancreatic fluid leads to auto digestion and weakening of the walls of the nearby arteries when there is an erosion of a peripancreatic or pancreatic artery into a pseudocyst. The vessel wall may also be damaged by ischemia and compression by inflammatory or necrotic collections. A communication caused by pancreatic or peripancreatic artery erosion into a pseudocyst gives rise to this life-threatening complication. The most common cause is pancreatitis with pseudocyst formation, although they can occur in the absence of pseudocyst. Less frequent causes include biliopancreatic surgeries, anastomotic leak, blunt or penetrating abdominal trauma, and intra-abdominal abscess. The key vessels involved in pancreatic pseudoaneurysms are the splenic artery, less commonly gastroduodenal artery, pancreatoduodenal artery and hepatic arteries. It can rupture into the pseudocyst, leading to bleeding into the GI tract through the ampulla of Vater called Hemosuccus pancreaticus. Although it is a rare complication occurring in less than 10% of cases, it should be considered in patients with chronic pancreatitis, recurrent pain and upper gastrointestinal bleeding. Managing pancreatic pseudocyst-associated pseudoaneurysms remains a challenging problem with high morbidity and death rates. Due to their instability and subsequent risk of massive bleeding, prompt treatment is necessary.

Case Report

A 21-year-old female presented to the gastroenterology OPD with complaints of pain abdomen for 2 months, in the epigastric and left upper quadrant, dull aching, moderate intensity, intermittent in nature, radiating to the back, aggravated on the consumption of meat and partially reduced on medications, associated with nausea with no relation to bowel movements. The patient has a history of multiple hospital admissions for similar complaints over the past 12 years. She was given analgesics and Intravenous fluids. The patient denied fever, vomiting, hematemesis, melena, or diarrhoea. She was diagnosed with Type 1 diabetes mellitus 2 months ago, for which she was started on Inj Insulin. She has a history of receiving 2 blood transfusions for anaemia. She is non-alcoholic and has no significant family history. Clinical examination revealed a pale, moderately built...
adult female who was well nourished. Vitals on admission were blood pressure of 110/87 mm HG, heart rate of 90 beats/min, and oxygen saturation of 98% on room air. Physical examination was positive for mild epigastric and left hypochondriac tenderness without guarding rigidity or distension. Bowel sounds were present in all 4 quadrants. A mildly tender mass was palpated 2cm below the left costal margins with smooth and rounded margins. Laboratory examination revealed Hemoglobin of 10.8 g/dl (reference range: 12 – 15 g/dl), total leucocyte count of 10,940 (reference range: 4,000 – 11,000), platelet count of 479 L (reference range: 1.5 L – 4.5L), fasting blood glucose of 100.8 mg/dl (reference range: 10 – 45 mg/dl), creatinine of 0.35 mg/dl (reference range 0.4–1.4 mg/dl), international normalized ratio of 1.1 (normal 0.65–1.3), triglyceride levels of 135.6 mg/dL (reference range 10–149 mg/dL), calcium of 11.62 mg/dL (reference range 8.6–10.4 mg/dL), lipase of 39.6 U/L (reference range 7–60 U/L), amylase of 51 U/L (reference range: <96 U/L), liver enzymes and thyroid function tests were within normal limits.

A transabdominal ultrasound done 2 months ago during an episode of pain abdomen showed an enlarged spleen with multiple tortuous collaterals in the mesentery, splenic hilar and lesser sac. Liver, CBD, and portal vein appeared normal. This was followed up with computed tomography (CT) of the abdomen and pelvis with intravenous contrast, which showed a non-enhancing cystic lesion of size 4.1 X 2.6 cm in the tail region of the pancreas with atrophic head and neck region of the pancreas, likely pseudocyst and dilated pancreatic duct (2.5mm). The spleen was moderately enlarged with a filling defect noted in the splenic vein s/o splenic vein thrombosis. Multiple collaterals were noted in splenic hilar, gastric wall and periportal regions. However, there was no evidence of a pseudoaneurysm. A follow-up Computed tomography (CT) of the abdomen and pelvis with intravenous contrast done 2 months later showed a well-defined irregular isodense lesion with hyperdense contents of size 4.6 X 3.5 X 3.8 cm noted in the tail region of the pancreas in lesser sac closely abutting the posterior surface of the stomach in its anterior aspect and splenic hilum laterally. The lesion showed early blood pool arterial enhancement. A delayed scan shows persistent enhancement and a focal communication of the lesion noted with the splenic artery near the splenic hilum – Splenic artery pseudoaneurysm. It also showed acute necrotizing pancreatitis with walled-off necrosis, splenomegaly and splenic vein thrombosis.

Although there was a pseudoaneurysm, the patient was hemodynamically stable.

On consultation with an interventional radiologist, splenic artery embolization was deferred because of the tortuous course of the splenic artery. However, it was decided to go ahead with distal pancreatectomy and splenectomy, considering the lesion involving the tail of the pancreas and associated splenomegaly.

Intraoperative Findings

A dense desmoplastic reaction was noted around the pancreas and celiac axis on laparotomy. Pancreas approached through lesser sac. Kocherization done. The head, and body of the pancreas, were found to be atrophic. A pseudoaneurysm was noted in the distal aspect of the pancreas in continuity with the hilum of the enlarged spleen. Branches of the celiac axis were identified. Gastroepiploic vessels were found to be enlarged. Short gastric vessels were identified and ligated. Splenic artery and splenic vein identified and ligated. The left gastric artery is secured. The pancreas is tunnelling, then lowering the transverse mesocolon, exposing the inferior surface of the pancreas. The pancreas is transected using linear vascular staplers to the left of the portal vein and mobilised until the pseudoaneurysm. Spleen is mobilized. The cyst wall opened using electrocautery. Blood clots (fresh and old) were evacuated. Deroofing of the cyst done and the attachment of the cyst with stomach and posterior wall left behind. Spleen and cyst walls couldn’t be delineated separately. Splenectomy was done, and the cyst wall adherent to the spleen was removed along with the spleen.

Ultrasonography

![Figure 1](image1.png) Splenomegaly with multiple collaterals in splenorenal axis with multiple tortuous collaterals in the mesentry

CECT Abdomen and Pelvis (2 months ago)

![Figure 2](image2.png) Atrophic head and neck of the pancreas with pseudocyst in the tail with moderate splenomegaly and splenic vein thrombosis.

CECT Abdomen and Pelvis (recent)

![Figure 3](image3.png) Acute necrotizing pancreatitis with walled-off necrosis with splenic artery pseudoaneurysm with multiple periporal, perigastric and periappendicular collaterals
Discussion

A pseudoaneurysm differs from a true aneurysm in that its wall does not contain the components of an artery but instead consists of fibrous tissue, which usually continues to enlarge, creating a pulsating hematoma. Vascular complications of chronic pancreatitis are well-known, but the real prevalence is not well established. Most studies report figures of less than 10%. The time interval varies, ranging from days to years after the acute episode. A bleeding pseudoaneurysm is a serious and rare complication of chronic pancreatitis. Mortality rates can be as high as 40% depending on the patient clinical condition, site and characteristics of the bleeding lesion, and the surgical procedure employed. The transformation of a pseudocyst into a pancreatic pseudoaneurysm can be explained by two mechanisms: the auto digestion of the vascular system due to the action of the pancreatic enzymes or a large pseudocyst eroding into a visceral artery. The most common arteries involved are the splenic artery in 30-50% of the cases since it runs along the course of the pancreas before reaching the spleen, the gastro-duodenal artery in 10-15% of the cases, the pancreaticoduodenal artery in 10% of the cases, and other arteries like the superior mesenteric artery, the hepatic artery, the celiac trunk, the left gastric artery etc. [1,2]

There have been reports of post-traumatic pseudoaneurysm formation in the splenic artery. Since blunt splenic injuries are being managed conservatively, there may be an increasing incidence of splenic artery pseudoaneurysm. When a splenic injury is identified in these patients, they are frequently followed up with CT until the resolution of the splenic injury. Presentation of splenic artery pseudoaneurysm can vary from an incidental finding to acute hemodynamic collapse in some patients [3].

The diagnosis is suggested by the clinical signs of chronic pancreatitis (recurrent pain, weight loss, diabetes), unexplained anaemia, obscure upper gastrointestinal bleeding, pulsatile palpable upper abdominal mass, accompanied by a murmur or tactile fremitus. Pseudoaneurysms may bleed into the gastrointestinal tract, biliopancreatic duct, peritoneal cavity or retroperitoneum, the rupture of the vascular structure is associated with life-threatening haemorrhage and a grim prognosis. Bleeding into the biliopancreatic ducts is known as hemobilia or hemo-succus pancreaticus [4].

The identification of a pseudoaneurysm via imaging studies is vital. Ultrasound is of little diagnostic value for a bleeding pseudoaneurysm. A computed tomographic scan is a useful noninvasive approach for detecting pseudoaneurysms and associated pseudocysts. However, small pseudoaneurysms can escape detection. Angiography has improved its diagnostic accuracy for pseudoaneurysms.[5,6]

The most commonly used and most reliable study is angiography, which allows the benefit of transcatheter embolization in appropriate patients. Thus all patients should undergo angiography if tolerable. Unstable patients are best managed by surgery. The optimal treatment of pancreatic pseudoaneurysm remains controversial. Some studies have confirmed the effectiveness of angioembolization for temporary and definite control of bleeding from pseudoaneurysms associated with chronic pancreatitis. Some authors have argued that embolization does not cure a diseased pancreas, and subsequent surgery is always indicated. As limited data is available, no evidence-based guidelines exist regarding the optimal treatment modality. [7]

Pseudoaneurysm related to pseudocyst formation is best treated with surgical excision, rather than transcatheter embolization, because of the difficulty of embolizing large pseudocyst cavities.

Debate still exists about the best surgical procedure for treating pancreatic pseudoaneurysms. Some researchers suggest that proximal and transcystic ligation of a bleeding vessel with internal or external cyst drainage is superior to pancreatic resection. Others have suggested that pancreatic resection should be employed as it is the only way to prevent the very common rebleeding problem. We suggest that surgical treatment for bleeding pseudoaneurysms should be individualized. [8]

Distal pancreatectomy and spleenectomy should be employed to treat bleeding lesions located in the pancreatic tail as these procedures have low morbidity and mortality rates [9].

Patient outcome is better for patients with lesions in the pancreatic body and tail.

The current standard of therapy is to control the bleeding by endovascular transarterial catheter embolization or by placing a covered stent. Patients in whom arterial embolization is unsuccessful or there is rebleeding after embolization, surgery is the only option. However, Surgery carries a higher risk when compared to angiographic vascular intervention.

If the patient is unstable, angiography may not be an option, and an immediate exploratory laparotomy is required. Absolute indications for emergency exploratory laparotomy include hemodynamic instability and failure of endovascular techniques to control active hemorrhage.

Some still prefer surgery with ligation of the feeding artery, especially in cases of pancreatic pseudoaneurysm with obstructive jaundice, because embolization with thrombosis of the pseudoaneurysm does not solve the mass effect which causes the symptoms.

A major controversy is whether transarterial catheter angiography should be the definitive approach or whether it should always be followed by surgical intervention, especially if bleeding is located in the tail or body of the pancreas or is associated with a pseudocyst. Some authors have found no rebleeding after seemingly successful angiobolization of the pseudoaneurysm. Other authors have found statistically significant rebleeding rates, which necessitated surgical resection after embolization. [10]

There is a dilemma whether to perform arterial ligation or pancreatic resection on a bleeding pseudoaneurysm. Some have advocated resection because it is technically easier to do than ligation in an inflammatory milieu. Others have reported better outcomes after performing proximal and distal arterial ligation and intracystic suture ligation[11].

In this case, the aetiology of pancreatitis isn’t clear. After a thorough medical history, most causes of pancreatitis were excluded. The patient had no history of alcoholism or smoking, recent acute illness, abdominal trauma or surgery. There was no
familial history of pancreatitis.

Laboratory analysis ruled out hypertriglyceridemia and other potential causes as well. No elevation of hepatic enzymes or bile duct dilation is suggestive of microlithiasis. Abdominal ultrasound and CT scan showed no signs of cholelithiasis.

On discussion with an interventional radiologist, angioembolization of the splenic artery was deferred due to the tortuous course of the splenic artery and due to the large size of the cyst. As the pseudoaneurysm was situated at the tail of the pancreas abutting the hilum of the spleen and the presence of splenomegaly, we decided to do a distal pancreatectomy and splenectomy. The patient withheld the procedure and was stable at discharge and follow-up.

Conclusion

Visceral artery pseudoaneurysm is uncommon but one of the grave complications of pancreatitis. Management of pseudoaneurysm is challenging and varies from patient to patient. There are no specific guidelines for its management. Although transarterial catheter embolization is the first line of treatment, it is associated with chances of rebleeding. Therefore, it may not be a definitive mode of management. Surgery is the first line of management for larger lesions, hemodynamically unstable patients, and those situated at the tail of the pancreas and has limited failure rates. We suggest that the treatment for bleeding pseudoaneurysms should be individualized.

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Conflict of interest

There are no conflicts of interest to declare by any of the authors of this study.

References


11. Bender, Jeffrey S.; Bouwman, David L.; Levison, Marc A.; Weaver, Donald W. Pseudocysts and Pseudoaneurysms, Pancreas: March 1995 - Volume 10 - Issue 2 - p 143-147