

## CASE REPORT

# Giant Pseudoaneurysm of the Splenic Artery

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### ABSTRACT

**Context** Visceral artery pseudoaneurysms are uncommon. They most commonly affect the splenic artery and are secondary to chronic pancreatitis. Giant pseudoaneurysms (5 cm or larger in size) are rare and, until now, only 19 cases have been reported. **Case report** A 47-year-old chronic alcoholic and diabetic male presented with upper abdominal pain of 1-month duration without any other significant complaint. Computed tomography was performed which revealed features of chronic pancreatitis along with a splenic artery pseudoaneurysm measuring 7x4 cm in size. As the disease was confined to the body and tail of the pancreas, the patient underwent a distal pancreatectomy and splenectomy along with resection of the pseudoaneurysm with an uneventful postoperative course. **Conclusion** Splenic artery pseudoaneurysms, especially the giant variety, are uncommon. As they are most commonly secondary to chronic pancreatitis, they are better managed surgically which resolves the pseudoaneurysm as well as its underlying cause (i.e. chronic pancreatitis).

### INTRODUCTION

Visceral artery aneurysms are uncommon and pseudoaneurysms are rare entities. The splenic artery is the most commonly affected artery [1]. Goldberg *et al.* [2] found only 160 cases of splenic artery pseudoaneurysm in the literature which were reported in the last 43 years. The Mayo clinic experience revealed only 10 cases over a period of 18 years [1]. Giant pseudoaneurysms, defined as pseudoaneurysms equal to, or greater than, 5 cm in size, are rare. Only 19 cases have been reported until now. We herein describe the case of a giant pseudoaneurysm of the splenic artery in a patient who presented with abdominal pain without bleeding.

### CASE REPORT

A 47-year-old male patient presented to our out-patient department with a 1-month history of non-radiating epigastric abdominal pain, moderate to severe in intensity occasionally requiring injectable analgesics. There was a history of occasional vomiting. He had been an alcoholic for the past 15 years. Diabetes had

been detected 6 months previously and was controlled with an oral hypoglycemic. There was no history of hematemesis, melena, fever, jaundice, altered bowel habits, anorexia or weight loss. He had undergone an open cholecystectomy 3 years previously for symptomatic gallstones. Physical examination was non-contributory. The patient was initially evaluated elsewhere with abdominal ultrasound which revealed a multilayered lesion with a peripheral anechoic area contiguous with the splenic artery and another cystic lesion (5.5x4 cm) close to the anterior abdominal wall. The patient was admitted to our center and underwent further evaluation.

A hematological work-up, including hemoglobin and liver function tests, was normal. A contrast enhanced computed tomography scan (Figures 1 and 2) revealed features of chronic pancreatitis with multiple foci of calcifications in the pancreatic duct and parenchyma involving the body and tail. The pancreatic duct was not significantly dilated. There was a large pseudoaneurysm measuring 7x4 cm in size in the splenic artery. In addition, there was a pseudocyst measuring 6x4 cm in size in the omentum, separate from the pancreas.

The patient underwent an exploratory laparotomy. The pancreas was firm and there was a large pulsating pseudocyst in the body of the pancreas having a thin wall at places where an intraluminal clot could be seen (Figure 3). It was densely adherent to the stomach and the retroperitoneum. Another pseudocyst was also located in the greater omentum separate from the pancreas. The lesser sac was entered by dividing the gastrocolic omentum and the short gastric vessels. The

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**Figure 1.** CT scan showing calcification in the body and tail of the pancreas, pseudoaneurysm and pseudocyst separate from the pancreas.

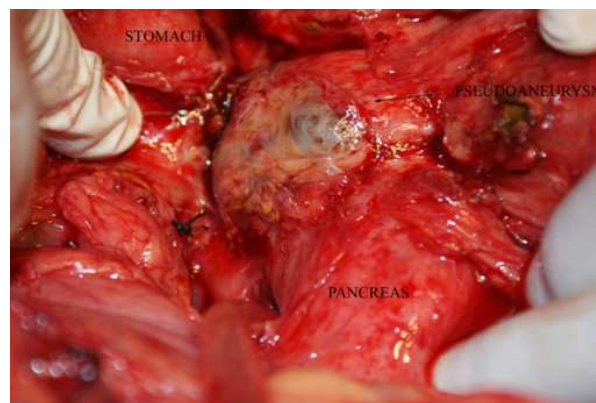
stomach was separated from the pseudoaneurysm and the pancreas by careful dissection. Proximal vascular control of the splenic artery was achieved near its origin. A distal pancreatectomy and splenectomy were then performed in an antegrade manner (Figure 4). The omental pancreatic pseudocyst was also resected. The postoperative period was uneventful and the patient was discharged on the 7<sup>th</sup> postoperative day.

## DISCUSSION

Visceral artery pseudoaneurysms are uncommon. The splenic artery is the most commonly affected visceral artery [1]. They usually develop secondary to pancreatic diseases. They develop more commonly in chronic pancreatitis (46%) than in acute pancreatitis (6%) [1]. Our patient developed a splenic artery pseudoaneurysm secondary to chronic pancreatitis. The



**Figure 2.** CT scan coronal reconstruction showing a giant pseudoaneurysm of the splenic artery with the artery passing through the pseudoaneurysm.

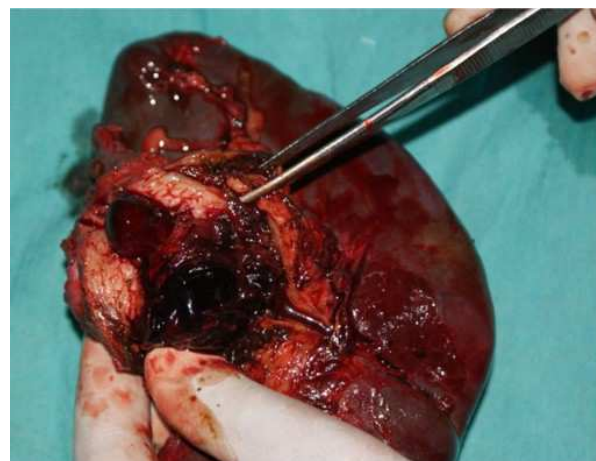


**Figure 3.** Intraoperative photograph showing the pseudoaneurysm with a thin wall. The pancreas has been looped near the neck region.

mechanisms of the formation of pseudoaneurysms in pancreatitis include inflammation with enzymatic digestion of the pancreatic or peripancreatic artery, visceral artery erosion by pseudocysts and pseudocyst erosion into the bowel wall and intramural artery [3]. Abdominal trauma is the second most common cause. Damage to the intima and elastic lamina due to rapid deceleration may lead to the formation of such a pseudoaneurysm [4]. Other causes described are peptic ulcer disease and iatrogenic causes (e.g. prior abdominal surgery or endovascular interventions) [1, 2].

Most of these pseudoaneurysms are symptomatic at presentation; however, 2.5% of cases have been incidental [1]. They most commonly present with abdominal pain (as in our case) or with bleeding into the gut which may be catastrophic at times. Large or giant pseudoaneurysms may also present with an abdominal lump (Table 1).

Diagnosis is usually made from computed tomography (including CT angiography) or transcatheter angiography. They can also be detected on color Doppler or MR angiography. Transcatheter angiography is considered the gold standard and also has therapeutic potential.



**Figure 4.** Resected specimen of a distal pancreatectomy and splenectomy showing clots inside the pseudoaneurysm.

**Table 1.** Summary of cases of giant pseudoaneurysms of the splenic artery.

Author/ year	Age/ Sex	Presentation	Etiology	Size	Intervention	Remarks
Lee <i>et al.</i> 1996 [9]	43/M	Pain	Acute pancreatitis	8x7 cm	Distal pancreatectomy plus splenectomy	Chronic alcoholic
LiPuma <i>et al.</i> 1997 [10]	30/F	Pain	Acute pancreatitis	8x6 cm	Percutaneous angiographic embolization	-
Waslen <i>et al.</i> 1998 [11]	65/F	Pain; intestinal bleeding	Acute pancreatitis	Large	Splenectomy plus resection of pseudoaneurysm	Size of the pseudoaneurysm not mentioned
Lin <i>et al.</i> 1999 [12]	66/M	Abdominal lump	Spontaneous rupture of saccular aneurysm of the splenic artery	12x11 cm	Splenectomy plus resection of pseudoaneurysm	Liver cirrhosis present
De Santis <i>et al.</i> 2000[13]	74/M	Pain	Acute pancreatitis	8x5 cm	Percutaneous angiographic embolization	-
Carr <i>et al.</i> 2000 [14]	36/M	Pain	Acute pancreatitis	17 cm	Marsupialization, external drainage, splenic artery ligation	-
Carr <i>et al.</i> 2000 [14]	45/M	Pain	Acute pancreatitis	8 cm	Distal pancreatectomy plus splenectomy	-
Carr <i>et al.</i> 2000 [14]	50/M	Pain	Acute pancreatitis	6cm	Percutaneous angiographic embolization	-
Huang <i>et al.</i> 2004 [15]	51/M	Pain	Chronic pancreatitis	6.8x5.8 cm	Percutaneous thrombin-collagen injection	Failed transcatheter embolization, associated splenic vein thrombosis present
Hung <i>et al.</i> 2005 [16]	55/F	Pain; intestinal bleeding	Chronic pancreatitis	4.5x7x7 cm	Transcatheter coil embolization	Hepatitis C, alcohol abuse, esophageal and gastric varices present
Michalak <i>et al.</i> 2005 [17]	56/M	Pain; intestinal bleeding	Acute pancreatitis	9cm	Resection	-
Goldberg <i>et al.</i> 2010 [2]	68/M	Pain	Iatrogenic	19 cm	Resection	Celiac artery stenosis, supraceliac aortic control during resection
Present case	47/M	Pain	Chronic pancreatitis	7x4 cm	Distal pancreatectomy plus splenectomy	Chronic alcoholic

A giant pseudoaneurysm is defined as a pseudoaneurysm equal to, or greater than, 5 cm in size. In the literature, size has ranged from 5-18 cm [1, 2]. Only 19 cases of giant pseudoaneurysms have been reported. Most of these (n=15) have been seen in association with pancreatic diseases [1] (Table 1). Erosion of the splenic artery by an enlarging pseudocyst due to enzymatic digestion and, thus, conversion of the pseudocyst into a pseudoaneurysm can explain the formation of a giant pseudoaneurysm. The remaining 4 cases were secondary to iatrogenic causes: e.g., splenectomy in 2 cases, cystogastrostomy in one and a prior attempt at repairing a splenic artery aneurysm in the last reported case [2].

All splenic artery pseudoaneurysms should be treated when detected as size is not a determinant of future rupture. This is more relevant in patients with chronic pancreatitis as it is an ongoing inflammatory process. A review of the literature suggests that these giant pseudoaneurysms have been managed by both surgical and non-surgical means (Table 1). Different methods of treatment have been trans-angiographic embolization (n=8), distal pancreatectomy/splenectomy (n=7), thrombin injection (n=2), pancreatectomy (n=1) and resection of pseudoaneurysm only (n=1) [2]. However, a pseudoaneurysm associated with a pseudocyst should be treated surgically as the literature indicated that transcatheter embolization has a higher failure rate (20%) as a primary treatment in these patients than in those without pseudocysts (13%) [1].

Hsu *et al.* [3] have also reported a high (66.7%) rebleeding rate after angiographic embolization. There are recent reports of successful treatment by endovascular stent graft occlusion of these pseudoaneurysms [5]. A pseudoaneurysm related to pseudocyst formation is best treated with surgical excision [1, 6, 7, 8]. Different surgical options exist including splenectomy with or without distal pancreatectomy, ligation of the splenic artery with resection of the pseudoaneurysm and trans-cystic ligation of the bleeding vessel with internal or external drainage of the pseudocyst. Splenectomy, with or without distal pancreatectomy, is a procedure with no reported failure over long periods of time [1]. Distal pancreatectomy and splenectomy should be employed to treat bleeding pseudoaneurysms located in the distal body and tail of the pancreas. Pancreatic resection is the only way to treat these pseudoaneurysms together with the underlying pathologic process in the pancreas which is the primary cause of the pseudoaneurysm. This may be curative in cases where chronic pancreatitis changes are confined to the body and tail of the pancreas, as in our case. However, surgical treatment may not be straightforward especially, in cases of giant pseudoaneurysm.

**Conflicts of interest** The authors have no potential conflicts of interest

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