Unusual locations of pseudo aneurysms as a sequel of chronic pancreatitis

Nnupama Nagar, Nachiket Dubale, Jagadeesh R, Piyal Nag, Nageshwar D Reddy, G V Rao

Asian Institute of Gastroenterology

Key words: pseudoaneurysm, chronic pancreatitis, angioembolisation, superior mesenteric artery, inferior phrenic artery

Abbreviations: CECT, contrast enhanced computer tomography; SMA, superior mesenteric artery; IPA, inferior phrenic artery

In patients with chronic pancreatitis, an actively bleeding pseudo aneurysm can be life threatening. Common sites of pseudoaneurysms are splenic, gastro-duodenal, superior & inferior pancreaticoduodenal arterial branches. Angioembolisation is an effective alternative to a complex and morbid operative management. Here we report 4 cases of unusual sites of pseudoaneurysms as a complication of pancreatitis, involving superior mesenteric and inferior phrenic arteries. Successful angioembolisation using glue and coil was achieved in 3 patients where as one underwent surgery. Technical success was 100% with the combination approach, though one patient died from multiorgan failure. This short case series reiterates the importance of vascular complications in pancreatitis at rare sites and also timely combined radiological and surgical approach for ensuring favorable outcome.

Introduction

Gastrointestinal bleeding complications in chronic pancreatitis are frequently attributed to peptic ulcer, erosive gastritis, or esophageal and gastric varices secondary to left sided portal hypertension. A bleeding pseudoaneurysm is a serious complication of chronic pancreatitis with an incidence upto 10%.¹ Mortality of a treated rupture of pseudoaneurysm ranges from 12-57%, or as high as 90-100% in untreated cases.²

Pseudoaneurysm related bleed can be seen as hemosuccus pancreaticus if it is communicating with the main pancreatic duct or may be regarded as bleed inside a pseudocyst or in the peritoneal cavity. In the setting of chronic pancreatitis causing pseudoaneurysm, splenic artery is the most commonly involved (60-65%), followed by gastroduodenal (20-25%), pancreaticoduodenal (10-15%), hepatic (5-10%) and left gastric arteries (2-5%). Less frequently involved are dorsal pancreatic, hepatic and superior mesenteric artery.^{3,4} We describe single centre experience of 4 cases of pseudoaneurysm from inferior phrenic artery to superior mesenteric artery in the setting of pancreatitis.

Case profiles

Clinical characteristics of four patients are described in **Table 1**.

Angiography of celiac and SMA was done via transfemoral route using 5 Fr Simmon's 1 catheter in all four cases.

Embolisation of feeding artery and/or pseudoaneurysm was performed after selective catheterization using stainless steel coil and glue (N-butyl 2-cyanoacrylate mixed with lipiodol in 1:3 ratio).

Case 1

A 56-year-old male was diagnosed with chronic pancreatitis induced by alcohol 1 year ago, and presented one month history of repeated episodes of melena preceded by severe epigastric pain. An abdominal CT angiography showed a large pseudoaneurysm 4 x 5cm arising from SMA (**Fig. 1**). Endoscopy showed blood oozing from papilla of Vater. Angiogram showed that pseudoaneurysm arose from proximal branch of SMA. Superselective catheterization of the feeding vessel was done with a 4 Fr catheter (Slip Cath Beacon Tip-Cook) and embolisation was performed with two 4 mm stainless steel coils into the pseudoaneurysm and two 3 mm coils into the feeding artery resulting in cessation of bleeding (**Fig. 2**). During a follow-up after 6 months, the patient was well.

Case 2

The second patient, a 40-year-old female with idiopathic pancreatitis, on a follow-up period of 6 months, presented shock in the emergency department. On examination, she had hypotension, cold peripheries and distended tense abdomen with hemorrhagic ascites. In view of her unstable clinical condition, CECT was deferred and angiogram showed a 3 x 4 cm pseudoaneurysm communicating with proximal branch of SMA. Glue embolisation was performed (**Fig. 3**). Despite successful hemostasis, patient died of multiorgan failure 2 weeks later.

*Correspondence to: Nachiket Dubale; Email: dnachi@yahoo.co.in
Submitted: Jul/18/2010; Revised: Jul/23/2010; Accepted: Jul/25/2010
Previously published online: www.landesbioscience.com/journals/jig
DOI: 10.4161/jig.1.1.14597

Table 1. Clinical characteristics of patients with pseudoaneurysms

	Age in years, Sex	Etiology of chronic pancreatitis	Symptoms	Size & location of pseudo-aneurysm on angiography	Intervention done	Clinical Outcome
Case 1	56 M	Alcohol	Hemosuccus pancreaticus	4 x 5 cm arising from proximal SMA	Embolisation with coils	Hemostasis achieved
Case 2	40 F	Idiopathic	Shock, Hemoperitoneum	3 cm arising from proximal SMA	Glue embolisation.	Hemostasis achieved but died due to multiorgan failure after 2 weeks
Case 3	36 M	Alcohol	Epigastric pain, no bleed	2 x 2 cm from left IPA	Glue embolisation	Hemostasis achieved
Case 4	23 M	Tropical calcific pancreatitis	Shock Hemoperitoneum	2.5 x 2 cm from left IPA	Failed cannulation, underwent surgery	Hemostasis achieved

Figure 1. CT angiograph image (case 1). Pseudoaneurysm (black arrow) from proximal SMA (white arrow).

Case 3

A 36-year-old male with ethanol related chronic calcific pancreatitis in the last 10 years was admitted with recurrent episodes of pain abdomen. There was no history of upper GI bleed. CECT showed a chronic calcific pancreatitis with dilated duct of 8 mm and a 2 x 2 cm pseudoaneurysm arising from the inferior phrenic artery. Endoscopy showed a normal papilla. Glue embolisation of IPA was done (**Fig. 4**). Post procedure, patient had transient hemoptysis which resolved with conservative therapy. He was well in a follow-up after 3 months.

Case 4

A 23-year-old male with tropical calcific pancreatitis and diabetes presented with sudden loss of consciousness followed by

abdominal distension. On admission, the patient had hypotension and hemoperitoneum. Angiogram done after stabilization of fluids and blood transfusion showed 2.5 x 2 cm pseudoaneurysm arising from left IPA, which was originating from coeliac trunk (**Fig. 5**). IPA cannulation was unsuccessful due to an acute angulation, hence patient underwent laparotomy and ligation of the bleeding vessel. Postoperative recovery was uneventful and the patient was discharged after 10 days.

Discussion

The rate of pseudoaneurysm formation in pancreatitis varies from 4% to 17%.⁵ The highlight of this case series is uncommon locations of pseudoaneurysms involving SMA and IPA in the setting of chronic pancreatitis. SMA pseudoaneurysm has been reported in literature in different clinical settings like post pancreatic surgery and acute or chronic pancreatitis.⁶⁻¹³ Two large series comprising of 68 patients with vascular complications in relation to pancreatitis have reported only one case of pseudoaneurysm arising from SMA similar to our experience.^{12, 13} However, so far no case has been reported with respect to pseudoaneurysm from IPA. We believe ours to be the first report.

Angiography is considered the gold standard for assessing the vascular supply of the pseudoaneurysms, and is an important treatment modality. Contrast-enhanced multidetector CT angiography is a fast, noninvasive first line diagnostic modality for localizing the site of pseudoaneurysm, especially in the context of acute arterial bleeding. Apart from differentiating true from pseudoaneurysms, it allows for endovascular treatment planning before invasive angiography to ensure a one-step treatment option for the unstable patient. Magnetic resonance angiography is also useful in situations like contrast media anaphylaxis & renal failure. Though it has shown equal sensitivity and specificity as compared with CT angiography, the high expense in terms of both money and time make its routine use impractical in detecting pseudoaneurysms.⁹

Traditionally surgery was the treatment of choice, which includes arterial ligation, direct intrapseudocystic ligation and resection of a part of pancreas. The morbidity of a surgical intervention ranges from 16-50% in various reports.^{15,16} With advancement of endovascular techniques, angiographic embolisation has become the first intervention of choice. The reported

Figure 2. Angiography (case 1). A: Pseudoaneurysm arising from proximal part of SMA (arrow); B: Successful coil embolisation of the pseudoaneurysm (arrow).

Figure 3. Angiography (case 2). A: Pseudoaneurysm arising from proximal SMA (arrow); B: Successfully embolised with glue, seen as a glue cast (arrow).

success rate of angiographic embolisation is from 79-100% and mortality from 12 to 33%.^{8,15} The main complication of this intervention is embolisation of undesired artery. Coils and glue both are found to be equally effective, but coil may not be always successfully delivered due to vessel tortuosity.¹⁷ Some authors have argued that embolization does not cure a diseased pancreas and subsequent surgery is always indicated.¹⁸

One patient with left IPA aneurysm had post embolisation transient hemoptysis, and this can be explained by the fact that IPA is being the important communicating vessel between abdominal and pulmonary vasculature.¹⁹ Our technical success with angiographic embolisation was seen in three out of four patients and one needed surgical intervention. Except for one, all survived had no rebleed on follow-up.

Figure 4. Angiography (case 3). IPA pseudoaneurysm. A: CECT image showing hematoma in left subphrenic region with a pseudoaneurysm; B: Angiogram showing cannulation of left IPA, with a pseudoaneurysm; C: Angiogram taken after glue embolisation. Pancreatic calcifications (white arrow) in the background.

Figure 5. Angiography (Case 4). Pseudoaneurysm seen as a blush (white arrow) from left inferior phrenic artery arising from celiac trunk (black arrow).

Conclusion

This case series highlights rare locations of pseudoaneurysms complicating pancreatitis leading to major vascular catastrophe, which were successfully managed by combined angiographic embolisation and surgery.

References

1. Balthazar EJ, Fisher LA. Hemorrhagic complications of pancreatitis: radiologic evaluation with emphasis on CT imaging. *Pancreatol* 2001; 1:306-13.
2. Kapoor S, Pankaj R, Pal S, Chatopadhyay TK. Hemosuccus pancreaticus: an uncommon cause of gastrointestinal hemorrhage. A case report. *JOP* 2004; 5:373-6.
3. El Hamel A, Parc R, Adda G, Bouteloup PY, Huguet C, Malafosse M. Bleeding pseudocysts and pseudoaneurysms in chronic pancreatitis. *Br J Surg* 1991; 78:1059-63.
4. Balachandra S, Siriwardena A. Systematic appraisal of the management of major vascular complications of pancreatitis. *Am J Surg* 2005; 190:489-95.
5. Marshall GT, Howell DA, Hansen BL, Amberson SM, Abourjaily GS, Bredenberg CE. Multidisciplinary approach to pseudoaneurysms complicating pancreatic pseudocysts. Impact of pretreatment diagnosis. *Arch Surg* 1996; 131:278-83.
6. He Q, Liu YQ, Liu Y, Guan YS. Acute necrotizing pancreatitis complicated with pancreatic pseudoaneurysm of the superior mesenteric artery: a case report. *World J Gastroenterol* 2008; 14:2612-4.
7. Lermite E, Regenet N, Tuech JJ, Pessaix P, Meurette G, Briday V, et al. Diagnosis & treatment of hemosuccus pancreaticus: development of endovascular management.

- Pancreas 2007; 34:229-32.
8. Ogino H, Banno T, Sato Y, Hara M, Shibamoto Y. Superior mesenteric artery stent-graft placement in a patient with pseudoaneurysm developing from a pancreatic pseudocyst. *Cardiovasc Intervent Radiol* 2004; 27:68-70.
 9. Ahmed HK, Hagspiel KD, McGahren ED 3rd, Angle JF, Leung DA, Spinosa DJ, et al. Pancreatic pseudoaneurysm in a child with hereditary pancreatitis: diagnosis with multidetector CT angiography. *Pediatr Radiol* 2004; 34:656-9.
 10. Rocck M, Peregrin JH, Dutka J, Ryska M, Belina F, Lastovckova J. Percutaneous treatment of superior mesenteric artery pseudoaneurysm using stent graft. *AJR Am J Roentgenol* 2002; 178:1459-61.
 11. Cowan S, Kahn MB, Bonn J, Becker GJ, Dimuzio P, Leichter R, et al. Superior mesenteric artery pseudoaneurysm successfully treated with polytetrafluoroethylene covered stent. *J Vasc Surg* 2002; 35:805-7.
 12. Hyare H, Desigan S, Brookes JA, Guiney MJ, Lees WR. Endovascular management of major arterial hemorrhage as a complication of inflammatory pancreatic disease. *J Vasc Interv Radiol* 2007; 18:591-6.
 13. Udd M, Leppäniemi AK, Bidet S, Keto P, Roth WD, Haapiainen RK. Treatment of bleeding pseudoaneurysms in patients with chronic pancreatitis. *World J Surg* 2007; 31:504-10.
 14. Keeling AN, McGrath FP, Lee MJ. Interventional radiology in the diagnosis, management, and follow-up of pseudoaneurysms. *Cardiovasc Intervent Radiol* 2009; 32:2-18.
 15. Yamakado K, Nakatsuka A, Tanaka N, Takano K, Matsumura K, Takeda K. Transcatheter arterial embolization of ruptured pseudoaneurysms with coils and n-butyl cyanoacrylate. *J Vasc Interv Radiol*, 2000; 11:66-72.
 16. Dasgupta R, Davies NJ, Williamson RC, Jackson JE. Haemosuccus pancreaticus: treatment by arterial embolization. *Clin Radiol* 2002; 57:1021-7.
 17. Bergert H, Hinterseher I, Kersting S, Leonhardt J, Bloomenthal A, Saeger HD. Management and outcome of hemorrhage due to arterial pseudoaneurysms in pancreatitis. *Surgery* 2005; 137:323-8.
 18. de Perrot M, Berney T, Bühler L, Delgadillo X, Mentha G, Morel P. Management of bleeding pseudoaneurysms in patients with pancreatitis. *Br J Surg* 1999; 86:29-32.
 19. Gwon DI, Ko GY, Yoon HK, Sung KB, Lee JM, Ryu SJ, Seo MH, et al. Inferior phrenic artery: anatomy, variations, pathologic conditions, and interventional management. *Radiographics* 2007; 27:687-705.