Visceral artery pseudoaneurysm: A report of three cases

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ABSTRACT

Pseudoaneurysm of the visceral arteries is a rare condition. The common causes for pseudoaneurysm are pancreatitis, infection, autoimmune disorders, vascular intervention, surgery, and blunt trauma. Pseudoaneurysm is usually noticed during investigation in an emergency situation. Such rare cases involving superior mesenteric artery, gastroduodenal artery, and splenic artery were managed recently using endovascular techniques.

Key words: Endovascular, pseudoaneurysm, visceral artery aneurysm

INTRODUCTION

Prevalence of the aneurysms of the visceral arteries is approximately 0.1-2%.[1] Splenic and hepatic artery aneurysms are the most common followed by superior mesenteric artery (SMA) aneurysms.[2] The true incidence of the pseudoaneurysm of the visceral arteries is unknown.[3] The common causes for pseudoaneurysm are pancreatitis, infection, autoimmune disorders, vascular intervention, surgery, and blunt trauma.[4] Pseudoaneurysm is usually noticed during investigation in an emergency situation. When untreated, mortality in these patients may approach 90%. Timely intervention in a specialist center can reduce the mortality below 15%.[5]

CASE REPORTS

Case report-1
A 45-year-old woman presented with a history of intermittent crampy abdominal pain of 3 days duration associated with shortness of breath. She also gave a history of rheumatic heart disease. On examination, she was thin built and anemic. Abdomen was distended with diffuse tenderness and guarding. Digital rectal examination revealed normal stools. Possible bowel ischemia was suspected, and she was evaluated.

Investigations revealed hemoglobin of 6.8 g%. She was transfused two units of packed cells. Ultrasonogram revealed a 9 cm × 5.3 cm sized pseudoaneurysm from the SMA, with 6 mm intramural thrombus. Since there was a suspicion of peritonitis, a diagnostic peritoneal lavage was done, which was negative. Echocardiogram was showing large vegetation attached to the anterior mitral leaflet tip. She was further evaluated by computer tomographic (CT) angiogram; which revealed a pseudoaneurysm in the SMA just distal to the inferior pancreaticoduodenal branch.
The patient was taken for percutaneous angiography [Figure 1] and intervention. Through right femoral artery access, the celiac artery was engaged with 7F renal double curve guide (Merit Medical/OEM, USA) and angiogram was done. SMA was entered with a Terumo wire (Terumo Corporation, Japan) and 5F Yashiro catheter (Terumo Corporation, Japan). The SMA branch involving the pseudoaneurysm was wired with stabilizer plus 0.014 inch guide wire with Progreat 2.5F microcatheter support (Terumo Corporation, Japan). A Graftmaster covered stent (Abbot Vascular, USA) of size 4 × 16 mm was deployed with total exclusion of the pseudoaneurysm. Poststenting blood flow was good with no leak into aneurysm [Figure 2]. She improved symptomatically and was continued on antibiotics for her infective endocarditis. Since the patient had infective endocarditis, she was referred to a cardiologist for further management of infective endocarditis.

**Case report-2**

A 40-year-old male who was a chronic alcoholic for more than 20 years presented with complaints of melaena for 1 month and abdominal pain for 3 days. He did not have any other comorbidity. On examination, he was conscious oriented with a pulse rate of 86/min and blood pressure of 110/70 mm of Hg. He was pale and icteric. The abdominal examination did not reveal any mass or free fluid. Per rectal examination revealed melaena. Nasogastric tube was inserted, which revealed fresh blood.

Investigation showed a hemoglobin of 4.3 g/dl and platelet count of 180,000/mm³. Liver function test showed a total bilirubin 2.5 mg/dl and alkaline phosphatase of 202 IU/l. Prothrombin time was 21 s. He was transfused four units of packed red blood cell and four units of fresh frozen plasma. Ultrasound abdomen showed dilated portal vein with multiple collaterals. Pancreas was showing features of acute on chronic pancreatitis. Ultrasound also revealed a pseudoaneurysm of size 3 cm × 2 cm in the coeliac axis. The main pancreatic duct was irregular, dilated with calcification. CT angiogram identified a pseudoaneurysm of size 3.7 cm × 2 cm arising from gastroduodenal artery (GDA).

The patient was planned for percutaneous angiogram and intervention. Through right femoral artery access, celiac artery was engaged with 6F Judkins right catheter (Merit Medical/OEM, USA) and angiogram was done, which showed a pseudoaneurysm at the bifurcation of GDA and main hepatic artery [Figure 3]. GDA was wired with 4F cobra catheter (Merit Medical/OEM, USA) and Galeo guide wire (Biotronik, Germany). Fluency Plus 7 × 20 mm covered stent (BARD PV, USA) was deployed into the pseudoaneurysm. Poststenting blood flow was good in the common hepatic artery, and there was no
leak into aneurysm [Figure 4]. The patient received two more units packed red blood cells. He was discharged 5 days after stenting with an advice to come for follow-up but was lost in the follow-up.

**Case report-3**

A 46-year-old male who is a chronic alcoholic and smoker for more than 15 years presented to our hospital with complaints of pain abdomen for 2 days. He also gave a history of hematemesis of four to five episodes, 1 week before, containing altered blood. On examination, he was conscious and oriented. He was pale, his pulse rate was 108/min, and his blood pressure was 130/70 mm of Hg. Abdomen examination revealed mild distension. There was no melaena on per rectal examination.

Investigation revealed hemoglobin of 3 g/dl, platelet count was 239,000/mm³. Serum amylase was 118 mg/dl, and alkaline phosphatase was 720 IU/l. The rest of the biochemical investigations was within normal limits. Three units of packed red blood cells and five units of fresh frozen plasma were transfused. Ultrasound abdomen showed a 3 cm × 1.8 cm pseudoaneurysm arising from splenic artery. There was evidence of pancreatitis. CT abdomen revealed a pseudoaneurysm arising near the origin of splenic artery, of size 3 cm × 2.5 cm. Pancreas head showed ill-defined calcification. The main pancreatic duct was dilated. Evidence of portal vein thrombosis was present.

Under local anesthesia, the right femoral artery was cannulated and celiac artery angiogram was done with 6F Judkins right (Merit Medical/OEM, USA) 3.5 mm curve. A 3 cm × 2.2 cm pseudoaneurysm was noted near splenic artery ostium [Figure 5]. Target vessel reached with a terumo wire and 4F head hunter catheter (Terumo Corporation, Japan) which was exchanged for 0.35 Amplatz wire over which 7F cook sheath was placed in the splenic artery. A 10/12 PDA (Lifetech Corporation, Hongkong, China) device was deployed distally in the splenic artery and 10/14 Amplatzer vascular plug II (St Jude Medical, USA) was deployed near splenic artery ostium resulting in successful closure of the pseudoaneurysm [Figure 6]. Postprocedure patient’s vitals were stable. The patient was started on oral feeds after 24 h. The patient was discharged after 5 days with an advice to come for regular follow-up but was lost in the follow-up.

**DISCUSSION**

Visceral artery pseudoaneurysm is uncommon. In a retrospective review, Tessier DJ found only 37 cases over a period of 18 years. Ten of these involved the splenic artery.⁶ Apart from splenic artery, gastroduodenal and pancreaticoduodenal arteries appear to be other arteries
commonly involved.\textsuperscript{[7]} In this case series, over a period of 2 years, three patients presented with pseudoaneurysm involving SMA, GDA, and splenic artery. In the reported patient with SMA pseudoaneurysm, echocardiogram was showing vegetation in the mitral valve, hence this could be of mycotic in origin. The other two patients had pancreatitis, which was the cause for the pseudoaneurysm.

Patients with pseudoaneurysm often present with pain abdomen or will have bleeding in the gastrointestinal tract or peritoneum, or they may present with anemia. It may be asymptomatic also. Presentation of splenic artery pseudoaneurysm can vary from an incidental finding to acute hemodynamic collapse,\textsuperscript{[8]} hemorrhagic manifestations being the most common. Hemorrhage in the pancreatic duct can cause hemosuccus pancreaticus. In case of GDA aneurysm, gastrointestinal hemorrhage secondary to rupture is the most common presentation.\textsuperscript{[9]}

Ultrasound and contrast enhanced CT are the initial investigations done to establish the diagnosis. However, these investigations may miss a small pseudoaneurysm.\textsuperscript{[6]} The gold standard diagnostic test is visceral angiography since it is both diagnostic and therapeutic.\textsuperscript{[10]} The decision to perform surgical or endovascular intervention is based on the anatomical suitability and patient comorbidity. Open repair is often associated with a postoperative complication such as chest infection, ileus, pancreatitis, and wound infection. Endovascular procedure confer the ability to perform the procedure under local anesthetic with fewer complications and shorter hospital stay.\textsuperscript{[10,11]} The potential risks of surgical repair of the pseudoaneurysm were considered to be high for these patients, therefore mesenteric angiography was undertaken with a view for endovascular management.

In endovascular procedures, embolization is done using coils, cyanoacrylate, or thrombin. Thrombin risks occlusion of all or part of the vascular territory if the pseudoaneurysm has a short, wide neck. Placement of a stent-graft provides an opportunity to exclude the aneurysm without loss of the main vessel lumen. Reported complications for endovascular stent-graft include migration, aneurysm recurrence, and arterial disruption, contrast nephropathy, pain, fever, distal emboli, and access site hematoma.\textsuperscript{[10]} There is no consensus about the follow-up. A protocol similar to abdominal aortic aneurysm can be used, that is, CT angiogram at 1 month, 6 months, and annually, thereafter, for 5 years.\textsuperscript{[12]} Postoperative antibiotic therapy for 6 weeks is recommended for mycotic aneurysm.\textsuperscript{[13]} To prevent early stent occlusion and distal embolization, a combination therapy aspirin with clopidogrel can be used.\textsuperscript{[14]}

In the largest series of pseudoaneurysm of visceral arteries from India,\textsuperscript{[15]} seven patients with splenic artery pseudoaneurysm were managed by embolization. Transcatheter embolization was successful in five patients. In one patient, transcatheter embolization was incomplete and hence had to be operated. Another patient, after successful embolization had to undergo surgery for an associated pseudocyst of pancreas.

CONCLUSION

The goal of treatment in visceral artery pseudoaneurysm is to exclude the pseudoaneurysm from the circulation while ideally preserving the distal blood flow.\textsuperscript{[16]} This could be achieved in a case of pseudoaneurysm of SMA and GDA with percutaneously placed prosthetic stent-grafts. The splenic artery aneurysm was embolized using vascular plug and PDA device successfully, thus avoiding surgical treatment.

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Conflicts of interest
There are no conflicts of interest.

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