

# Approach to splenic artery pseudoaneurysm: A rare sequelae of acute pancreatitis.

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## Abstract

Splenic artery pseudoaneurysm is a rare and life-threatening sequela of acute pancreatitis. Its utmost important to detect it early to avoid complications. This study aimed at early diagnosis of splenic artery complications after acute pancreatitis and interventional methods to avoid fatal sequelae of aneurysmal rupture. Three cases were seen in S. S. Hospital Davangere. Informed consent was obtained from all the patients. All the cases were in the different age groups of 20-70 years. Two out of the three cases were alcohol induced. One was a female, which was due to gallstones. They had come for complaints of pain abdomen. CECT was accepted as a gold standard for the diagnosis of Splenic artery complications. All patients were subjected to Tri-phasic CT abdomen and it was noticed that they all had pseudo aneurysms. Luckily none of them had bleeding at the time of presentations. They were referred to a higher centre for further management. Pseudoaneurysms need to be treated with open surgical approach or an endovascular (stents or embolization). Recently newer methods include injections of thrombin into the pseudoaneurysm. If these rupture, the mortality rate is 25%.

**Key words:** Severe acute pancreatitis; Splenic artery pseudoaneurysm; Tri-phasic contrast-enhanced computed tomography ; Endovascular treatment.

## Introduction:

Acute pancreatitis is one of the most common abdominal conditions. One of the uncommon sequelae of acute pancreatitis is a splenic artery pseudo aneurysm. Splenic artery pseudo aneurysm is the most common peripheral aneurysm. It can also cause upper gastrointestinal bleeding, known as hemosuccus pancreaticus<sup>[1]</sup>. It is a rare entity, with a prevalence of less than 1%, but it is the most frequent (approximately 60% of the cases) among visceral artery aneurysms<sup>[2]</sup>. Its diagnosis is often difficult due to its nonspecific symptomatology and picked up when an abdominal scan is done for some other pathology. The splenic artery is the most commonly affected artery with pseudoaneurysm, followed by the hepatic artery, celiac artery, and more rarely other visceral arteries<sup>[3]</sup>. Here we have 3 cases and who have been admitted for pancreatitis and showing splenic artery pseudo aneurysm.

## Case Report :

### Case1 :

A 65-year-old female patient came with complaints of pain and distension of the abdomen. Diagnosed to have a chronic liver disease with acute on chronic pancreatitis. The patient is a known case of cholelithiasis. CECT abdomen was done for the patient and was found to have a pseudoaneurysm of the splenic artery measuring 3.5X3.5 cms.

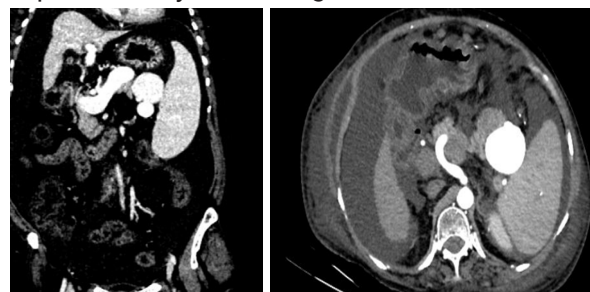


Figure 1: Arterial phase of CECT abdomen coronal and axial section images: arrow showing the pseudoaneurysm.

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**Case 2 :**

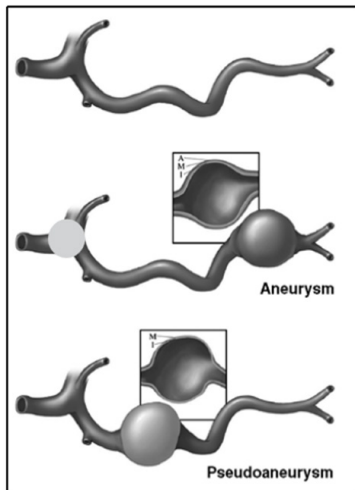
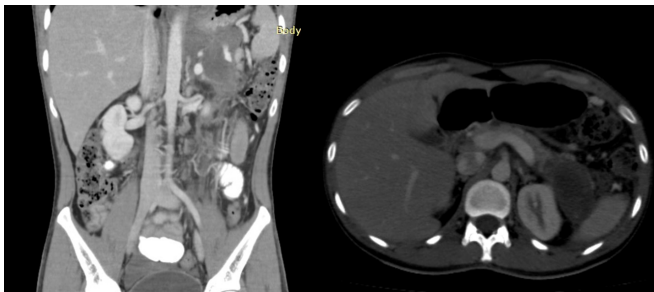
A 27-year-old male patient came with complaints of pain abdomen and vomiting. The patient was a chronic alcoholic and has a history of acute pancreatitis in the past. CECT abdomen was done for the patient and a splenic artery aneurysm of size 2.5 X 2.5 cms.



**Figure 2: Arterial phase of CECT abdomen coronal and axial section images: arrow showing the pseudoaneurysm.**

**Case 3 :**

A 46-year-old male patient, a chronic alcoholic, came with complaints of pain abdomen and vomiting was diagnosed as acute on chronic pancreatitis and CECT Abdomen after 48 hours showed a splenic artery pseudo aneurysm.



**Figure 3: Arterial phase of CECT abdomen coronal and axial section images: arrow showing the pseudoaneurysm.**

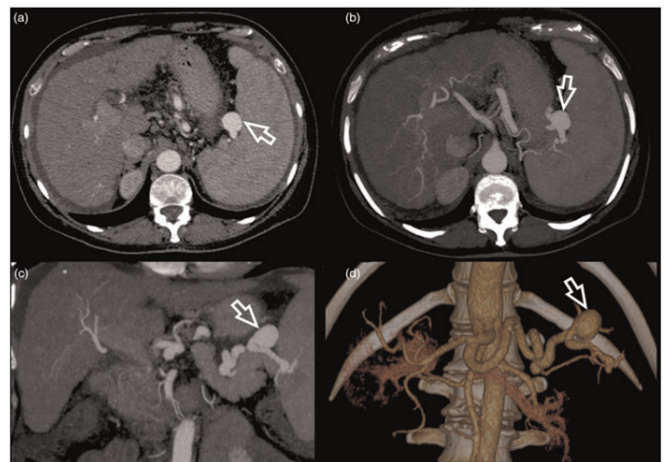
**Discussion:**

Splenic artery pseudo aneurysm is one of the most common pseudoaneurysms. Pseudo aneurysms, also known as false aneurysms, are abnormal outpouchings from the wall or the arteries limited by tunica adventitia unlike a true aneurysm, which contains all the three layers. Pseudoaneurysms are localized arterial disruptions caused by blunt or penetrating trauma, vascular interventions or anastomotic disruptions.

In true aneurysm, wall is composed of intima (I), media (M), and adventitia (A); in comparison, pseudoaneurysm wall contains only intima and media. In setting of pancreatitis, splenic artery pseudoaneurysm may result from weakening of wall by pancreatic enzymes<sup>[4]</sup>.

**Types of pseudo aneurysms:** those that result from a perforation of an artery by traumatic or iatrogenic injuries and those that result from rupture of a surgical vascular anastomosis<sup>[5]</sup>.

One of the most common causes of pseudoaneurysms is pancreatitis. This is due to the proteolytic enzymes released, as well as elastin. These directly destroy the arterial wall and lead to the formation of a pseudoaneurysm. Some authors have also reported the cause of the pseudoaneurysm being a long-standing pseudocyst which causes compression of the arterial wall and ischemia<sup>[5]</sup>. Other causes include trauma (blunt and penetrating), and post anastomosis (after orthotic liver transplantation). Compared to splenic artery aneurysms, pseudoaneurysms are rare. Most of them have a mean diameter of 4.8 cms<sup>[5]</sup>.



**Figure 4: Schematic diagram of normal splenic artery, splenic artery aneurysm, and pseudoaneurysm**

**Multi Detector CT Angiography (MDCTA)** is the method of choice for the diagnosis, treatment planning, and follow-up of most diseases of the abdominal arteries, including the aorta, visceral arteries, and splenic artery. Thus, digital subtraction angiography has recently been replaced by CT

angiography. Following the introduction of MDCTA technology patients can now be imaged quickly during the arterial phase with exquisite spatial resolution. It helps to assess the location, size of the SAA, and also reveal ruptured aneurysms, intra-abdominal hemorrhage, and associated underlying diseases. When there is intra-abdominal haemorrhage, the origin of active extravasation of the contrast material should be identified. The differential diagnoses of intra-abdominal hemorrhage include traumatic solid visceral or mesenteric injuries, intra-abdominal tumor bleeding, abdominal aortic aneurysm rupture, and visceral aneurysm rupture. However, all the parameters needed for endovascular treatment can be obtained by MDCTA by measuring the **size of the neck of the aneurysm**, the caliber of the artery immediately before and after the aneurysm and the length of the covered stent<sup>[5]</sup>.

#### MDCTA postprocessing techniques:

With the advances in the technology multidetector-row CT, with advances in computer hardware, software and display technology, has facilitated post processing techniques i.e. three-dimensional (3D) image reconstruction. Based on the figure, curved planar reconstruction(CPR)(a), maximum intensity projection (MIP)(b/c), and volume rendering (VR)(d) are the three most commonly used 3D reconstruction techniques<sup>[5]</sup>.

#### CT Appearance and Pitfalls:

Splenic artery aneurysms can appear well defined and homogeneous enhancement on contrast-enhanced CT. In addition, mural thrombus and peripheral calcification may be present. **Three-dimensional rendering** improves evaluation of the splenic artery, readily distinguishing tortuous vessel from aneurysm. A pitfall on axial images is misinterpreting an aneurysm as a solid pancreatic neoplasm. Because Islet cell tumors of the pancreas can be markedly hyperattenuating in the arterial phase and an unruptured splenic artery aneurysm may mimic one of these hypervascular masses. Using axial images and even on multiplanar reformations in some cases, an aneurysm located in pancreatic tissue can appear as a small, round hyperattenuating mass. 3D renderings show the relationship of aneurysm to the splenic artery.

On CT, splenic artery pseudoaneurysms have been identified in pseudocysts, appearing as focal areas of enhancement in the low-density intracystic fluid<sup>[4]</sup>. Peripancreatic pseudoaneurysms may show increased attenuation on unenhanced scans, and the perfused portion will enhance strongly after contrast infusion<sup>[4]</sup>.

This enhancing component may be surrounded by thrombus or hematoma.

#### Treatment:

Not all splenic aneurysms need to be repaired. Indications are symptomatic patients (left upper quadrant pain, epigastric, back pain), female gender, planning to conceive, portal hypertension, planned liver transplant, a pseudoaneurysm of any size and a aneurysm more than 2.5 CMS<sup>[5]</sup>. Rupture is rare but if it occurs, the mortality is 25%.

Management can be managed by interventional radiological techniques (arterial stent or percutaneous angiographic embolization) or by surgery (operative occlusion, resection or arterial bypass). Historically, open surgical excision of the aneurysm, with or without splenectomy, is the conventional treatment and is both efficient and durable. Endovascular treatment (such as transcatheter embolization, placement of a covered stent graft) to exclude the aneurysm is an emerging therapy for SAA and other visceral aneurysms, with constantly improving results. These minimally-invasive endoluminal techniques may offer a distinct advantage over conventional repair. Transcatheter embolization is associated with significantly lower morbidity and mortality compared to surgical procedures<sup>[6,7]</sup>. While selecting the occlusion site, care should be taken to preserve blood flow to the gastric, omental, pancreatic vessels.<sup>[8]</sup>

Percutaneous needle placement followed by administration of thrombin directly into the aneurysm has also been successfully used to treat splenic artery aneurysms when trans catheter embolization is not possible or has failed. Endovascular treatment offers the potential benefit of maintaining splenic perfusion while excluding the aneurysm, thereby eliminating the risk of rupture or infarction.<sup>[9]</sup>

#### Conclusion:

Splenic artery pseudo aneurysm is a rare phenomenon. They are often missed in poor scanning protocols, early cases and patients with delayed presentation. Thus, a dedicated Tri-phasic CT abdomen is to be subjected in the setting of acute severe pancreatitis and a follow-up scan for early diagnosis of splenic artery pseudoaneurysm and needs to be treated as they have high mortality due to possibility of rupture.

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