ORIGINAL RESEARCH PAPER

Medical – Radio Diagnosis

# SPLENIC ARTERY PSEUDOANEURYSM - VASCULAR COMPLICATION OF PANCREATITIS IN A FEMALE

KEY WORDS:
Pseudoaneurysm, Splenic Artery, Yin Yang Sign, Sonography.

**Dr. Revin** Senior Resident, Dept. of Radio diagnosis, PGIMS, Rohtak.

**Dr. Priya Singh*** Junior Resident, Dept. of Obstetrics and Gynaecology, PGIMS, Rohtak. *Corresponding Author

ABSTRACT

Pancreatitis is one of the common abdominal pathologies having a variable type of presentation. Vascular complications are rare, but severe in nature having high mortality and morbidity rates. Ultrasound coupled with computer tomography helps in fast and accurate diagnosis of these vascular complications like pseudo aneurysms, aneurysms, and thrombosis of peri pancreatic arteries. We are presenting a case report of a pseudo aneurysm of the splenic artery.

## BACKGROUND

Acute pancreatitis is one of the common abdominal pathologies having an incidence of 10 to 100 cases per 100,000 population worldwide with varying types of presentation ranging from self-limiting abdominal pain to high mortality and morbidity due to organ failure. The major risk factors leading to pancreatitis include gall stones and alcohol consumption others being trauma, drugs, and infections. [1],[2] The revised Atlanta classification (2012) has classified acute pancreatitis based on local, systemic complications and organ failure as mild, moderately severe, and severe types of pancreatitis. One of the dreaded local complications of pancreatitis is the vascular complications occurring with a frequency of 1.2-14%, with a greater incidence seen in chronic pancreatitis (7-10%) than in acute pancreatitis (1-6%). The two main types of vascular complications are splenic vein thrombosis (more common) and pseudo aneurysm of (in order of decreasing frequency) the splenic, gastroduodenal, and pancreaticoduodenal arteries. [3],[4] The common symptoms of pseudoaneurysm of splenic artery are abdominal pain, hematemesis, melena, flank pain, and chest pain. Hemorrhage from a pseudo aneurysm can be found in the pseudo cyst, stomach, pancreatic duct, peritoneal cavity, or retro peritoneum making the patient highly hemodynamically unstable at presentation and having high rates of morbidity and mortality. [5] The mortality rate due to hemorrhages directly related to the pancreas is up to 50%. [2] Clinical diagnosis in these patients is highly difficult due to the varied range of symptoms and hence ultrasound coupled with contrast-enhanced CT imaging helps in accurate diagnosing of such an entity.

## CASE PRESENTATION

An 33 yrs. old alcoholic female patient with a known history of pancreatitis came to the emergency department with a history of severe abdominal pain and hematemesis for the last 7 days. On clinical examination, the patient was afebrile and had distension and tenderness of the abdomen. Lab investigation suggested raised lipase (500IU/L) and amylase (1100IU/L) levels. The patient was then referred to the department of Radio diagnosis, the first line of investigation conducted was an ultrasound which revealed.

The pancreas appeared atrophic with multiple parenchymal calcifications in the head region. (Figure 1) and there is e/o a Well-defined, heterogeneous round to oval lesion in the region of splenic hilum, having an eccentric hypo echoic lumen, with surrounding thrombus. On color Doppler, the lumen showed a characteristic yin yang sign indicating bidirectional flow due to the swirling of blood within the false aneurysm. (Figure 2, 3). This was followed by contrast-enhanced CT of the abdomen for further correlation which was revealed. The pancreas is atrophic with a prominent main pancreatic duct and a calcific focus of 3.5 mm size noted at the head of the pancreas. The splenic artery appeared Dilated with a well-defined round lesion of size 5.4 x 4.5 cm abutting the splenic artery in the tail region of the pancreas. The Lesion shows the eccentric hyper dense area of 3.2 x 2.4 cm with a density similar to arterial contrast s/o partially thrombosed pseudo aneurysm of the splenic artery. Other extra pancreatic findings were enlarged spleen with multiple peri - portal, peri - splenic, peripancreatic, mesenteric collaterals, and ascites.

After confirming the diagnosis of splenic artery pseudoaneurysm the patient underwent an endovascular management procedure, where the splenic artery aneurysm was embolised with 3rd generation detachable Guglielmi coils using the sandwich technique.

## DISCUSSION

### DIFFERENTIAL DIAGNOSIS

The major differential diagnosis of pseudoaneurysm is true aneurysm which differs in clinical presentation, pathophysiology, and imaging. In a true aneurysm all three layers, Tunica adventitia, media, and intima are affected whereas in pseudoaneurysm only the Tunica media and intima are affected. Patients of pseudoaneurysm of splenic artery almost always are symptomatic, having a much higher risk of mortality due to rupture of aneurysm compared to true aneurysms. [6] The various etiological factors leading to true aneurysm of splenic artery are hypertension, liver transplantation, portal hypertension, Cirrhosis and pregnancy whereas pseudoaneurysm is caused by pancreatitis, trauma, iatrogenic and postoperative causes, and, rarely, peptic ulcer disease. The incidence of pseudoaneurysm is more common in females compared to males by four times. [7,8]

On grayscale, a patent pseudo aneurysm appears as an anechoic rounded or ovoid structure. a similar appearance is seen in other fluid collections, including cysts, seromas, or hematomas can have this appearance hence, color Doppler imaging is used to confirm the presence of blood flow within the pseudo aneurysm which shows the characteristical Ying Yang sign, indicating the to and fro movement of blood across the neck of the aneurysm. When present, thrombus in the pseudo aneurysm appears mildly echogenic or hypoechoic without flow; it may be mural or centrally fill a portion of the pseudo aneurysm lumen. Turbulent blood flow in the pseudoaneurysm is illustrated by interchangeable coloring appearance, either in red or blue color. A "to-and-fro" pattern at the neck of the lesion is confirmatory of a pseudo aneurysm. [9]

The basic pathophysiology behind pseudoaneurysm is

vessel wall injury in cases of severe pancreatic inflammation and necrosis due to the local spread of exocrine proteolytic and lipolytic enzyme-rich fluids. These fluids cause weakening and electrolytic erosions of the vessel wall, which may result in the formation of a pseudo aneurysm. These can be associated with active bleeding or can contain hematoma (if the pseudo aneurysm becomes thrombosed), or can lead to frank intraperitoneal hemorrhage (if the pseudo aneurysm ruptures).[4]

Ultrasonography (US) is a widely used, noninvasive imaging modality for the investigation of vascular diseases. The main advantage of US imaging is it is cheap, readily available, non-ionizing in nature, and has a sensitivity and specificity of 94% and 97% respectively.[10,11]

Various treatment methods are known for the management of splenic artery pseudoaneurysms like bipolar surgical ligation, aneurysmectomy, and interventional percutaneous embolization or stenting. Surgical management is associated with high mortality rates, especially when pseudoaneurysm is associated with pancreatitis (16%). In today's time and age, the most popular mode of managing cases of pseudo and true aneurysms of the splenic artery is by packing the aneurysmal sac with embolic agents like 3rd generation detachable Guglielmi coils or stent-grafts using the sandwich technique, where a balloon catheter is inflated across the neck of the aneurysm to keep the coils in their place.[12]

To conclude USG, Doppler and CECT abdomen are excellent modalities for early and accurate diagnosis of pseudoaneurysm, helping clinicians manage the vascular complications of pancreatitis.

**Figure 1. Solid Arrow- Eccentric Thrombus in the Psuedoaneurysmal Lumen, Arrow Head- Patent Lumen of the Pseudoaneurysm)**

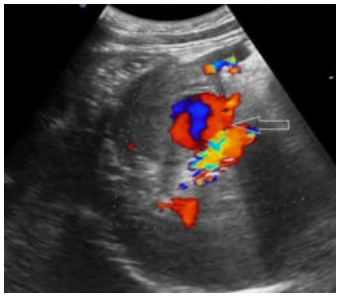
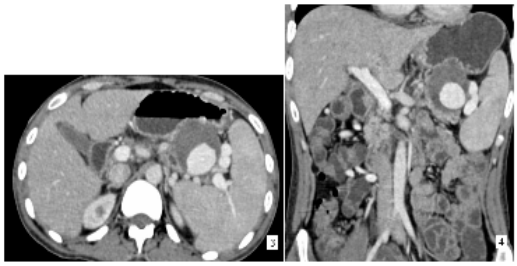


**Figure 2. Classical Yin Yang Sign Depicting to and fro Movement of Blood in the Pseudoaneurysm**



**Figures 3, 4. Dilated Splenic Artery Noted at the Splenic Hilum Showing Eccentric Hypo Echoic Thrombus and Central Contrast Filling s/o Pseudoaneurysm with Partial Thrombosis**

## REFERENCES


[1] Thoeni RF. The revised Atlanta classification of acute pancreatitis: its importance for the radiologist and its effect on treatment. Radiology. 2012 Mar;262(3):751-64.

[2] G□uszek S, Nawacki □, Matykiewicz J, Kot M, Kuchinka J. Severe vascular complications of acute pancreatitis. Polish Journal of Surgery. 2015 Oct 1;87(10):485-90.

[3] Foster BR, Jensen KK, Bakis G, Shaaban AM, Coakley FV. Revised Atlanta classification for acute pancreatitis: a pictorial essay. Radiographics. 2016 May;36(3):675-87.

[4] Barge JU, Lopera JE. Vascular complications of pancreatitis: role of interventional therapy. Korean journal of radiology. 2012 Feb 1;13(Suppl 1):S45-55.

[5] Chia C, Pandya GJ, Kamalesh A, Shelat VG. Splenic artery pseudoaneurysm masquerading as a pancreatic cyst—a diagnostic challenge. International surgery. 2015 Jun;100(6):1069-71.

[6] Agrawal GA, Johnson PT, Fishman EK. Splenic artery aneurysms and pseudoaneurysms: clinical distinctions and CT appearances. American Journal of Roentgenology. 2007 Apr;188(4):992-9.

[7] Abbas MA, Stone WM, Fowl RJ, Gloviczki P, Oldenburg WA, Pairolero PC, Hallett JW, Bower TC, Panneton JM, Cherry KJ. Splenic artery aneurysms: two decades experience at Mayo clinic. Annals of vascular surgery. 2002 Jul 1;16(4):442-9.

[8] Tessier DJ, Stone WM, Fowl RJ, Abbas MA, Andrews JC, Bower TC, Gloviczki P. Clinical features and management of splenic artery pseudoaneurysm: case series and cumulative review of literature. Journal of vascular surgery. 2003 Nov 1;38(5):969-74.

[9] Mahmoud MZ, Al-Saadi M, Abuderman A, Alzimami KS, Alkhorayef M, Almagli B, Sulieman A. " To-and-fro" waveform in the diagnosis of arterial pseudoaneurysms. World journal of radiology. 2015 May 28;7(5):89.

[10] Tessier DJ, Stone WM, Fowl RJ, Abbas MA, Andrews JC, Bower TC, Gloviczki P. Clinical features and management of splenic artery pseudoaneurysm: case series and cumulative review of literature. Journal of vascular surgery. 2003 Nov 1;38(5):969-74.

[11] Morgan R, Belli AM. Current treatment methods for postcatheterization pseudoaneurysms. Journal of Vascular and Interventional Radiology. 2003 Jun 1;14(6):697-710.

[12] Madoff DC, Denys A, Wallace MJ, Murthy R, Gupta S, Pillsbury EP, Ahrar K, Bessoud B, Hicks ME. Splenic arterial interventions: anatomy, indications, technical considerations, and potential complications. Radiographics. 2005 Oct;25(suppl_1):S191-211.