

Imaging Features of Splenic Artery Pseudoaneurysm - An Unusual Complication of Acute on Chronic Pancreatitis: Radiological Review

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Abstract: Pseudoaneurysm formation in a visceral artery is a relatively rare event complicating chronic pancreatitis. Pancreatic pseudoaneurysm develops either due to autodigestion of vascular system by pancreatic enzymes or pseudocyst eroding a visceral artery. Splenic artery is most commonly affected vessel. It may rupture into gastro-intestinal tract or peritoneal cavity or retroperitoneum or pancreatic duct. We report here a case of a 45-year-old chronic alcoholic male who presented with upper abdominal pain. Radiological imaging revealed features of chronic pancreatitis, pseudocyst formation and a large splenic artery pseudoaneurysm.

Keywords: Pancreatic pseudocyst, chronic pancreatitis, Pseudoaneurysm

INTRODUCTION

Pseudoaneurysm formation is a relatively rare event complicating chronic pancreatitis. Pancreatic pseudocysts develop in 5% to 15% of cases of acute pancreatitis and in 20% to 40% of cases of chronic pancreatitis [1]. Pancreatitis with a secondary pseudocyst formation is the most common cause of pancreatic pseudoaneurysm. A giant pseudoaneurysm is defined as a pseudo-aneurysm greater than, 5 cm in size. In the literature, size has ranged from 5-18 cm [2]. Acute hemorrhage from pancreatic pseudocysts and ruptured pseudoaneurysms are one of the most fatal complications of pancreatitis. The transformation of a pseudocyst into a pseudoaneurysm can occur either by auto digestion of the vascular system due to the action of the pancreatic enzymes or a large pseudocyst that may erode a visceral artery [3]. We report here a case of giant pseudoaneurysm of the splenic artery in a patient of chronic pancreatitis.

CASE REPORT

A 45 year old male patient presented with complaints of pain in abdomen since 2 months. The pain was localized to epigastric region and associated with several episodes of vomiting and loss of appetite since 15 days. Patient also complained of intermittent fever. The patient was a chronic alcoholic since past 20 years. Clinical examination revealed a palpable mass in epigastric region on per abdominal examination, with mild tenderness. It was pulsatile in nature. Serum amylase and lipase levels were elevated. Other routine biochemical and hematological investigations were within normal range.

Transabdominal ultrasound showed a well-defined hypoechoic lesion measuring approx. 5.5 x 4.6

cms in transverse and antero-posterior dimensions respectively noted in relation to pancreatic head causing extrinsic compression over portal vein confluence and distal splenic vein. Its central portion appeared anechoic measuring approx. 2 X 1.7 cms showing pulsations on real time (Figure 1,2). On color Doppler interrogation, the central anechoic portion showed arterial flow (Figure 3A,B). Peripheral hypoechoic portion (about 2.8cms thickness) represent thrombus. A hypoechoic lesion was also seen in the spleen representing a splenic infarct. A well-defined anechoic pseudocyst measuring approx 7.3 x 6.3 cm was noted in left subdiaphragmatic region, measuring approx 4 x 2.8 cm in left hepatic lobe, 1.5x 1.2 cm noted in caudate lobe, measuring approx 5.3 x4.3 cm noted lateral to left crus of diaphragm.



Fig-1: B-Mode Ultrasonography (sagittal oblique and transverse section in epigastric region) reveal well defined mixed echoic solid lesion with anechoic centre in relation to pancreatic head. On real time sonography the anechoic central portion was pulsatile.

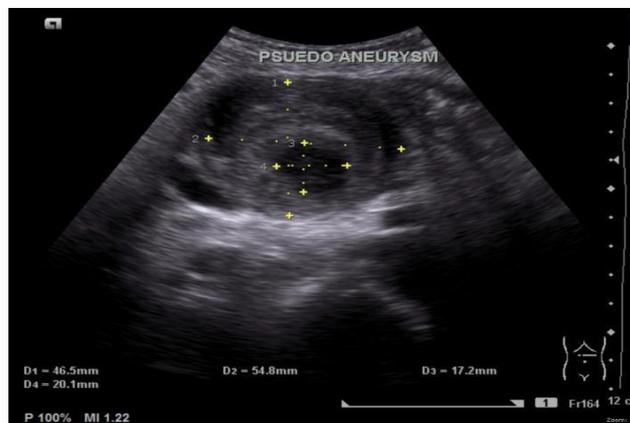


Fig-2: B-Mode Ultrasonography (transverse section in epigastric region) reveal well defined mixed echoic peripheral solid portion representing hematoma/ thrombus and anechoic central portion representing pseudoaneurysm in relation to pancreatic head. On real time sonography the anechoic central portion was pulsatile.

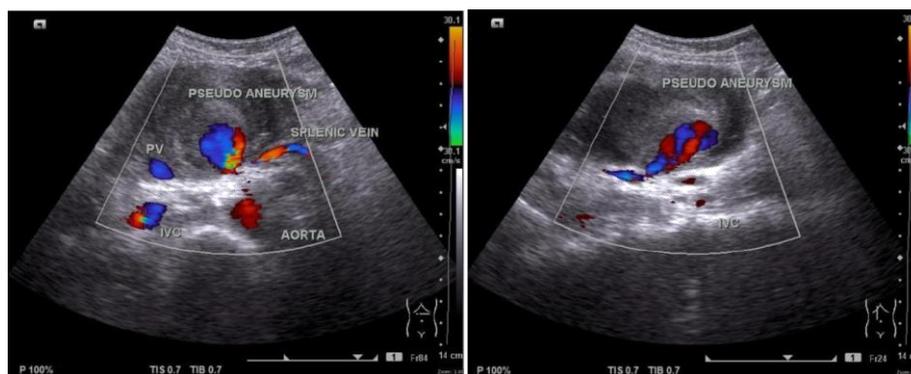


Fig-3:A and 3B: Color Doppler Ultrasonography (transverse and sagittal sections) confirmed pseudoaneurysm as evident from to and fro flow in central anechoic portion.

This was followed by contrast enhanced CT scan of abdomen. Pancreatic head appeared bulky. No pancreatic ductal dilatation noted. Tiny speck of calcification was noted in dorsal portion of pancreatic head. Mild blurring of peri-pancreatic fat planes noted. A large well defined solid lesion measuring approx. 7.4 x 5.4 cms in transverse and antero-posterior dimensions

respectively was noted in relation to pancreatic head causing extrinsic compression over portal vein confluence and distal splenic vein (Figure 4). Its central portion measuring approx 2.4 X 1 cm (Figure 5A, B, C). It was causing extrinsic compression on posterior wall of distal body and antrum of stomach too.

Also, a well-defined hypodense pseudocyst measuring approx 7.3 x 6.3 cm was noted in left sub diaphragmatic region, measuring approx 4 x 2.8 cm in left hepatic lobe, 1.5x 1.2 cm noted in caudate lobe, measuring approx 5.3 x4.3 cm noted lateral to left crus of diaphragm. Peripheral broad based non-enhancing lesion (CT value 30-40 HU) in spleen was noted

suggestive of an infarct. A diagnosis of pseudoaneurysm with peripheral hematoma/thrombus - either from pancreatic branch of splenic artery (most likely) or gastroduodenal or superior pancreaticoduodenal artery was made complicating acute on chronic pancreatitis with multiple pseudocysts.

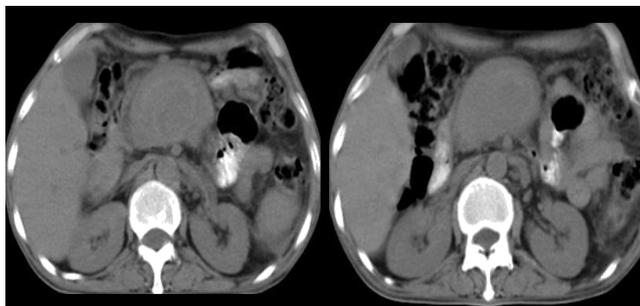


Fig-4: Plain axial CT abdomen in epigastric region showed well defined mixed density lesion in relation to pancreatic head

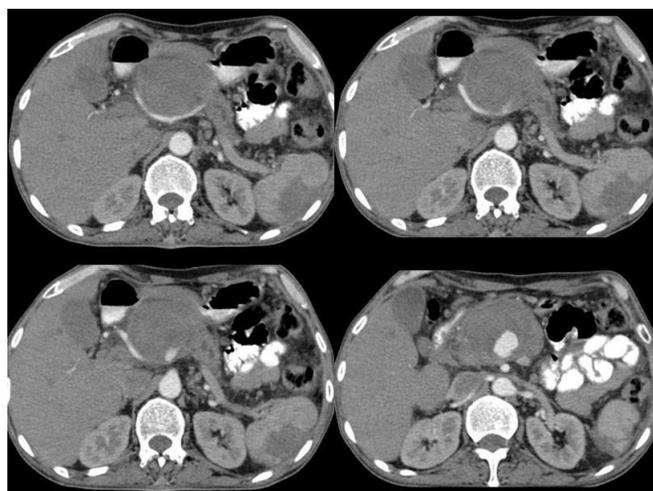


Fig- 5A: Contrast enhanced serial axial CT abdomen in epigastric region (arterial phase) showed mass effect on common hepatic artery and splenic artery with pseudoaneurysm arising from proximal portion of inferior portion of splenic artery with peripheral mixed density thrombus/hematoma

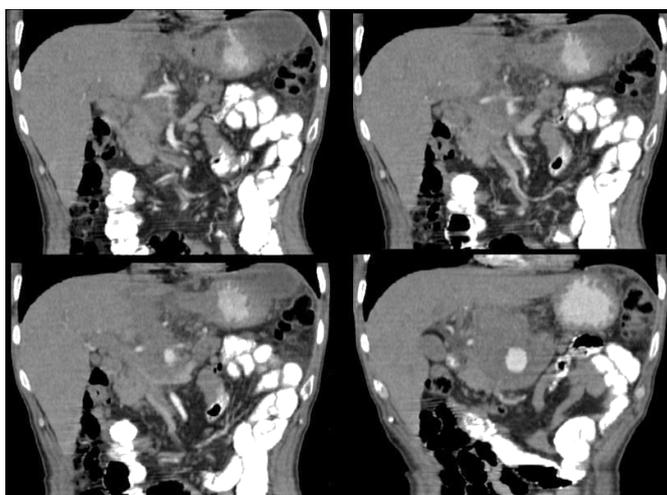


Fig-5B: Contrast enhanced serial coronal CT abdomen (arterial phase) showed mass effect on common hepatic artery and splenic artery with pseudoaneurysm arising from proximal portion of inferior portion of splenic artery with peripheral mixed density thrombus/hematoma.

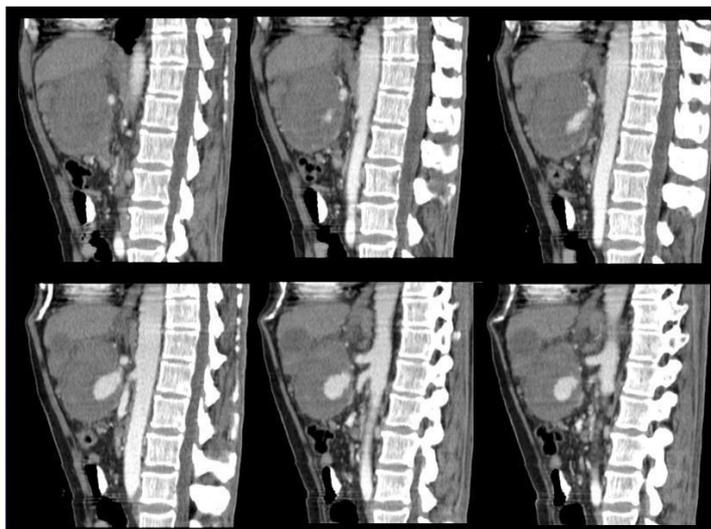


Fig-5C: Contrast enhanced serial sagittal CT abdomen (arterial phase) showed mass effect on common hepatic artery and splenic artery with pseudoaneurysm arising from proximal portion of inferior portion of splenic artery with peripheral mixed density thrombus/hematoma.

DISCUSSION

Incidence of pancreatic pseudocysts is 5% to 15% of cases of acute pancreatitis and in 20% to 40% of cases of chronic pancreatitis. The natural history of pseudoaneurysm complicating chronic pancreatitis is unknown. Acute hemorrhage developing from pancreatic pseudocyst and ruptured pseudoaneurysm is a fatal complication. Pseudoaneurysm can rupture into the gastrointestinal tract, peritoneal cavity, retro peritoneum or pancreatic duct. Among them, the gastrointestinal tract is the most frequently affected. Arterial pseudoaneurysms are not uncommon with acute or chronic pancreatitis, more often with chronic pancreatitis, especially if pseudocysts are present [4].

Vascular complications in acute and chronic pancreatitis are less than 10% [1]. Evolution of these complications is very unpredictable and prognosis is severe. Mortality rate ranges from 12.5% in treated patients to more than 90% in untreated patients [5].

It is called pseudoaneurysm as dilatation does not affect all layers of the vessel wall. It may occur in pancreatitis without pseudocyst or abscess formation. Development of pancreatic pseudoaneurysm can occur due to two mechanisms- A) the auto digestion of the vascular system due to the action of the pancreatic enzymes B) a large pseudocyst that erodes a visceral artery [4]. If the inflammatory process causes partial digestion of arterial wall with loss of elastic tissue, focal dilatation of artery causing true or false aneurysm can occur. It can occur due to incorporation of artery within wall of pseudocyst with digestion of arterial wall. Artery ruptures into pseudocyst converting to pseudoaneurysm. Gray scale USG shows anechoic mass with posterior acoustic enhancement with hyperechoic or mixed echoic margins. Differentiation from pancreatic pseudocyst is many times not possible unless pulsatile mass is seen. Color Doppler confirms vascular

nature of mass by detecting blood flow in pseudoaneurysm [6].

The rate of pseudoaneurysm formation in pancreatitis is 4% to 17%. Splenic artery because of its proximity to pancreas 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 [7].

Zahlan *et al.* reported a case in which a pseudocyst of the pancreatic tail ruptured into the wall of the stomach and mimicking a non-bleeding gastric tumor [8]. Clinical presentation of pseudoaneurysm ranges from asymptomatic to acute hemodynamic collapse secondary to massive bleeding. Rupture into a pseudocyst typically causes sudden-onset abdominal pain because the bleeding is confined to an enclosed space, which typically leads to expansion of the pseudocyst. If there is sudden pain relief, then rupture of the pseudocyst following its expansion after being filled with blood, should be suspected. These cases should be managed on emergency basis as patients might be bleeding internally [4].

It is suspected in cases of acute/ chronic pancreatitis (recurrent gastric pain), weight loss, unexplained anaemia, upper GIT bleeding, pulsatile upper abdominal mass accompanied by murmur or tactile fremitus. Pseudoaneurysms may rupture into the gastrointestinal tract, biliopancreatic duct, peritoneal cavity or retroperitoneum, causing life threatening hemorrhage and high mortality. Hemosuccus pancreaticus" is a syndrome which consists of wirsungorrhagy associated with colicky pain and jaundice. Pancreatic pseudoaneurysms from gastroduodenal or pancreatico-duodenal arteries are closely

related to the common bile duct with resultant jaundice [5].

Gastrointestinal bleeding in chronic pancreatitis occurs due 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%. Mortality of a treated rupture of pseudoaneurysm ranges from 12-57%, or as high as 90-100% in untreated cases [7].

Diagnostic techniques used are color-duplex ultrasound scans, MDCT and angiography. Ultrasound is advantageous as it is readily available, affordable with no need for contrast material [4]. The use of color Doppler in triplex mode, with color flow imaging and pulsed Doppler spectral analysis helps in confirming the diagnosis of pancreatic pseudoaneurysm and differentiating it from a pseudocyst [5]. Doppler analysis is difficult in obese individuals especially in deeply localized lesions, in patients with marked probe tenderness and in patients with marked aortic pulsations [6]. CT scan is diagnostic of pseudoaneurysm which shows a well-defined mass with hyperdense center showing marked contrast enhancement in arterial phase with less dense periphery corresponding to mural clot and fibrous wall and aids in detection of smaller pseudoaneurysms. MDCT with contrast shows enhancement of lumen aiding detection of smaller pseudoaneurysm [4]. Contrast-enhanced multidetector CT angiography is a fast, noninvasive first line diagnostic modality for localizing the site of pseudoaneurysm, especially in cases of acute arterial bleeding. It helps in differentiating true from pseudoaneurysms and allows for endovascular treatment planning before invasive angiography to ensure a one-step treatment option in unstable patient. Magnetic resonance angiography is useful in cases of contrast media anaphylaxis & renal failure. It has shown equal sensitivity and specificity as CT angiography. However, availability, time duration taken, high cost are limiting its use in detecting pseudoaneurysms [7]. Angiography, however, remains the gold standard in confirming diagnosis, exact location of aneurysm and the procedure of choice for imaging pseudoaneurysms. However, it is invasive [4].

Therapeutic options available are transcatheter arterial embolization, as well as placement of covered or self-expandable stents, surgical ligation of pseudoaneurysm with or without pancreatic resection and ultrasound-guided percutaneous injection of pancreatic pseudoaneurysm with thrombin. Surgical intervention is indicated in emergency cases with haemodynamic instability and in cases of recurrent hemorrhage after selective angiographic embolization. Optimal treatment options are yet to be established. However, embolization is the method of choice, as it clearly establishes the localization and it is less

invasive, with low morbidity and mortality. Surgical options with ligation of the feeding artery in cases of pancreatic pseudoaneurysm with obstructive jaundice, because embolization with thrombosis of the pseudoaneurysm does not solve the mass effect which causes jaundice. The surgical options are advantageous as embolization fails to address the underlying pancreatitis. However, multiple studies have stated that angiographic embolization in the management of the bleeding pseudoaneurysms is efficacious [4,5].

CONCLUSION

Pseudoaneurysm formation in a case of acute or chronic pancreatitis arising from visceral artery is a rare event. It must be identified at an early stage to avoid complications like rupture into gastro-intestinal tract or peritoneal cavity or retroperitoneum or pancreatic duct. USG with Color Doppler, Contrast Enhanced CT abdomen are diagnostic.

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