

CASE REPORT

Pancreatic Pseudoaneurysm of the Superior Mesenteric Artery Complicated with Obstructive Jaundice. A Case Report

Adrian Săftoiu, Sevastița Iordache, Tudorel Ciurea, Daniela Dumitrescu, Mihai Popescu, Zoia Stoica

Department of Gastroenterology and Department of Radiology and Medical Imaging, University of Medicine and Pharmacy Craiova. Craiova, Dolj, România

ABSTRACT

Context Pancreatic pseudoaneurysm rupture is a rare complication of chronic pancreatitis, with severe prognosis and high mortality. Angiography is usually required for confirmation of the diagnosis, but transabdominal ultrasound and CT angiography are useful noninvasive diagnostic methods.

Case report We present the case of a 66-year-old patient with a large pancreatic pseudoaneurysm of the superior mesenteric artery complicated with obstructive jaundice. Transabdominal ultrasound with color and power Doppler showed a large pancreatic head pseudoaneurysm that communicated directly to the superior mesenteric artery. Presence of a spinning blood flow inside the pseudoaneurysm was visualized by color Doppler, with evidence of bidirectional flow in the pseudoaneurysm neck that was showed by Doppler spectral analysis. The contrast-enhanced helical computer tomography with multiplanar sagittal and the 3D reconstruction of coronal images confirmed the communication of the pseudoaneurysm with the superior mesenteric artery. The patient was scheduled for selective angiography and embolization. However, clinical evolution was rapidly deteriorating, with collapse, hemorrhagic shock and massive hemorrhage.

The patient was operated on and subsequently died despite three days of intensive care, due to disseminated intravascular coagulation and multiorgan failure.

Conclusion Non invasive imaging methods consisting of transabdominal ultrasound with color Doppler and contrast-enhanced computer tomography with sagittal reconstruction of coronal images were very useful in the establishment of the diagnosis of pancreatic pseudoaneurysm of the superior mesenteric artery complicated with cholestatic jaundice. However, these imaging methods do not obviate the need for diagnostic and therapeutic angiography, eventually followed by surgical intervention in cases of recurrent bleeding or hemodynamic unstable patients.

INTRODUCTION

Pancreatic pseudoaneurysm is a rare complication of chronic pancreatitis, with an uncertain evolution and severe prognosis [1]. The rupture of the pseudoaneurysm has a high mortality rate variable from 12.5% in treated patients to more than 90% in untreated patients. Although, it is a rare complication occurring in less than 10% of cases, it should be considered in the patients with chronic pancreatitis, with recurrent pain and upper

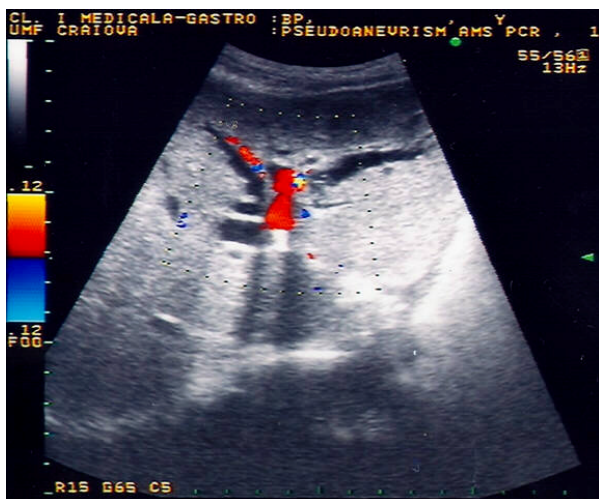


Figure 1. Transabdominal ultrasound with color Doppler, in a transverse section at the level of the left liver lobe and hilum. Dilatation of the intrahepatic bile ducts.

gastrointestinal bleeding [1, 2]. Angiography is usually required for confirmation of the diagnosis, but transabdominal ultrasound and CT angiography are useful noninvasive diagnostic methods [3, 4].

We present the case of a 66-year-old patient with a large pancreatic pseudoaneurysm of the superior mesenteric artery complicated with obstructive jaundice. Furthermore, we carefully reviewed the previously published MEDLINE reports concerning the diagnosis and treatment of pancreatic pseudoaneurysm, as well as the references of selected papers.

CASE REPORT

A 66-year-old male presented in the Emergency Department for upper abdominal pain, which appeared in the past two months, precipitated by fat and alcohol consumption. The pain became gradually more severe and then permanent, and did not decrease after usual analgesic treatment. Subsequently, progressive jaundice slowly appeared, and intensified in the last two weeks. Two days before admission he presented an episode of melena, with a negative naso-gastric aspirate. The patient used to smoke (1 pack of cigarettes per day) and to consume alcohol (at least 50 g daily).

Clinical examination showed a pale and jaundiced, cachectic patient, with normal

heart sounds (80 bpm) and blood pressure (110/70 mmHg). The patient complained of pain in the upper epigastric region, enhanced by palpation. A mass was palpated in the epigastric region, with audible noise over it. The liver margin was tender, round, 5 cm below the costal rib, with a smooth liver surface. Spleen was not felt. A rectal examination disclosed melena.

Biological tests indicated: low hemoglobin (5.4 and 8.7 g/dL; reference range: 12-14 g/dL), high leukocytes (9,600 mm⁻³; reference range: 4,000-9,000 mm⁻³), high thrombocytes (490,000 mm⁻³; reference range: 150,000-400,000 mm⁻³), high serum glucose (132, 148, 162, and 190 mg/dL; reference range: 75-115 mg/dL), presence of glycosuria, high alanine aminotransferase (138 IU/L; reference range: 0-50 IU/L), high aspartate aminotransferase (187 IU/L; reference range: 0-50 IU/L), high gamma glutamyl transpeptidase (376 IU/L; reference range: 0-55 IU/L), high total bilirubin (34 mg/dL; reference range: 0.2-1.1 mg/dL). Other biological tests (including serum and urinary amylase, as well as serum/urinary lipase) were within reference limits.

Transabdominal ultrasound showed a homogenous, enlarged liver, with dilated intrahepatic bile ducts (Figure 1), a distended gallbladder with sludge and a 6 mm stone, a



Figure 2. Gray-scale ultrasound showing a large pseudocyst in the pancreatic head with spinning spontaneous contrast inside visualized on tissue harmonic imaging (see videoclip of Movie 1 [www.joplink.net/prev/200501/02_v1.avi]).

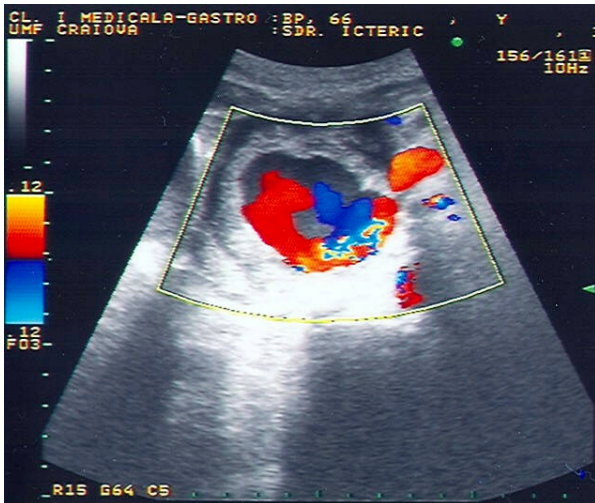


Figure 3. Color Doppler imaging showed spinning blood flow inside the pseudoaneurysm, with turbulent flow in the lower-right part. (see videoclip of Movie 2 [www.joplink.net/prev/200501/02_v2.avi]).

large common bile duct of 9 mm with distal obstruction at the level of the intrapancreatic terminal bile duct. The portal system was normal, as well as the spleen (10 cm in the longest diameter). The pancreas was enlarged, inhomogeneous, with diffuse calcifications, a dilated Wirsung at the level of body of the pancreas, and a pseudocystic structure of 7 cm at the level of the pancreatic head with a distinct wall (Figure 2 and Videoclip 1 [www.joplink.net/prev/200501/02_v1.avi]). The pseudocyst had hypoechoic content with spinning spontaneous contrast inside, visualized on tissue harmonic imaging mode.

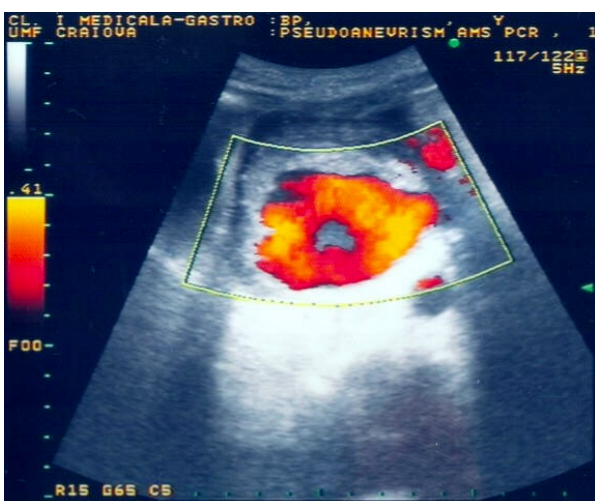


Figure 4. Power Doppler imaging showed spinning blood flow, with low velocity flow in the center of the pseudoaneurysm that determines the absence of power Doppler signals.

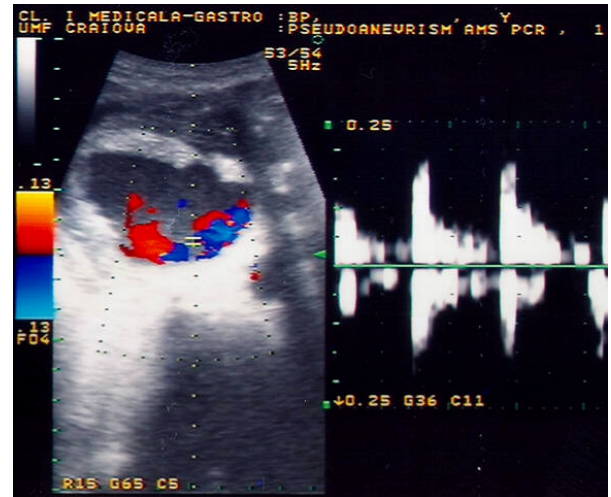


Figure 5. Turbulent flow on color Doppler imaging with evidence of bidirectional pulsatile flow visualized on Doppler spectral analysis. (see videoclip of Movie 3 [www.joplink.net/prev/200501/02_v3.avi]).

Spinning turbulent blood flow was visualized by color Doppler imaging with the characteristic “to-and-fro” pattern (Figure 3 and Videoclip 2 [www.joplink.net/prev/200501/02_v2.avi]). Power Doppler also showed spinning blood flow with the absence of power Doppler signals in the center of the pseudoaneurysm, determined by low velocity flow (Figure 4). Bidirectional pulsatile flow was evident on Doppler spectral analysis, as turbulent spinning blood causes spectral sample volume to receive signals simultaneously from two different directions (Figure 5 and Videoclip 3 [www.joplink.net/prev/200501/02_v3.avi]). The pseudocyst was communicating directly to the superior mesenteric artery, with a turbulent flow at this level, establishing the diagnosis of a pancreatic pseudoaneurysm (Figure 6).

An upper digestive endoscopy showed an extrinsic compression at the level of the second duodenum, without any active bleeding. No blood or clots were noticed in the stomach, duodenal bulb or the second duodenum.

Helical computer tomography showed the enlarged liver with dilated intrahepatic bile ducts and a distended gallbladder with a 6 mm stone inside. The pancreas was enlarged, with diffuse calcifications and a dilated Wirsung. A round-oval hypodense structure of 7 cm was identified at the level of the

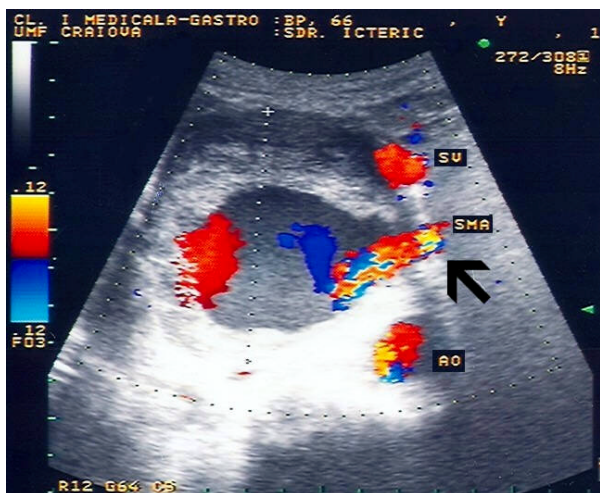


Figure 6. Communication between the superior mesenteric artery (SMA, arrow) and the pseudoaneurysm, with turbulent flow visualized on color Doppler imaging. The aorta (AO) and splenic vein (SV) are also clearly visible.

pancreatic head with a central zone which enhanced homogeneously with contrast substance during the arterial phase (Figure 7). Sagittal midline reconstruction of the coronal images indicated a clear communication with the superior mesenteric artery, visible on contrast enhanced images (Figure 8).

The patient was scheduled for a selective angiography and embolization. However, clinical evolution was rapidly deteriorating, with collapse, hemorrhagic shock and massive hemorrhage. The patient was operated on and subsequently died despite three days of intensive care, due to disseminated intravascular coagulation and multiorgan failure.

DISCUSSION

Vascular complications of chronic pancreatitis are well-known, but the real prevalence is not well established, most of the authors reporting figures of less than 10% [1]. However, the evolution of these complications is very unpredictable and the prognosis is severe [1, 2]. The mortality rate varies from 12.5% in treated patients to more than 90% in untreated patients.

The transformation of a pseudocyst into a vascular structure (a pancreatic pseudoaneurysm) is explained by two



Figure 7. Contrast enhanced helical CT during the arterial phase showed a round-oval hypodense structure with a central zone that enhanced homogeneously with contrast substance during the arterial phase.

mechanisms: the autodigestion of the vascular system due to the action of the pancreatic enzymes or a large pseudocyst that erodes a visceral artery [1]. The most common arteries involved described in the literature are the splenic artery in 30-50% of the cases [5], the gastro-duodenal artery in 10-15% of the cases [6], the pancreatico-duodenal artery in 10% of the cases [7], as well as other arteries like the superior mesenteric artery [8], the hepatic artery [9], the celiac trunk [10], the left gastric artery [11], etc.

The diagnosis is suggested by the presence of the clinical signs of chronic pancreatitis (recurrent pain, weight loss, diabetes), unexplained anemia, obscure upper gastrointestinal bleeding, pulsatile palpable upper abdominal mass, accompanied by murmur or tactile fremitus. Pseudoaneurysms may bleed into the gastrointestinal tract,



Figure 8. Sagittal midline reconstruction of the coronal images indicated a clear communication of the pseudoaneurysm with the superior mesenteric artery (arrow), visible on contrast enhanced images during the arterial phase.

biliopancreatic duct, peritoneal cavity or retroperitoneum, the rupture of the vascular structure being associated to life threatening hemorrhage and a grim prognosis. The so-called syndrome of “*hemosuccus pancreaticus*” is described in the literature, as consisting of wirsungorrhagy, sometimes associated with colicative pain and jaundice [12, 13, 14]. Only a few cases of pancreatic pseudoaneurysms associated with cholestatic jaundice are being described in the literature [15, 16, 17, 18]. Most of these pseudoaneurysms originate into the gastroduodenal or pancreatoduodenal arteries which are closely related to the bile duct. To the best of our knowledge, this is the first case of a large pancreatic pseudoaneurysm of the superior mesenteric artery that is complicated by extrahepatic cholestasis: compression of the common bile duct, enlarged gallbladder and dilated intrahepatic bile ducts, with subsequent appearance of jaundice.

Angiography is usually required for confirmation of the diagnosis, but transabdominal ultrasound and CT angiography are useful noninvasive diagnostic methods [3, 4]. Angiography was not possible in our case, but it was easily replaced by transabdominal ultrasound with Doppler examinations and contrast-enhanced computer tomography with multiplanar and 3D reconstruction during the arterial phase. Both transabdominal ultrasound and contrast-enhanced CT, clearly showed the site of communication as originating from the superior mesenteric artery. Furthermore, ultrasound was very helpful because it clearly established the site of obstruction of the bile duct as being at the level of the intrapancreatic terminal region. Tissue harmonic imaging showed spontaneous contrast spinning inside, preventing the mismatch with a simple pancreatic pseudocyst, even if color Doppler would not have been available. The use of color Doppler in triplex mode, with color flow imaging and pulsed Doppler spectral analysis established the diagnosis of pancreatic pseudoaneurysm and supported the differential diagnosis with simple pancreatic cystic structures.

Different methods are described for the treatment of superior mesenteric artery pseudoaneurysm, including transcatheter arterial embolization [7, 8, 19], as well as placement of covered or self-expandable stents [20]. Ultrasound-guided percutaneous injection of pancreatic pseudoaneurysm with thrombin was recently proposed as an effective treatment of visceral arterial pseudoaneurysm [21]. Surgical intervention is usually reserved for recurrent hemorrhage after selective angiographic embolization or in emergency cases with hemodynamic instability [22]. The optimal choice of treatment remains to be established, but embolization seems to be the method of choice, because it clearly establishes the localization and it has decreased invasiveness, with low morbidity and mortality. Some authors still prefer surgery with ligation of the feeding artery, especially in cases of pancreatic pseudoaneurysm with obstructive jaundice, because embolization with thrombosis of the pseudoaneurysm does not solve the mass effect which causes the symptoms [18]. However, successful remission of obstructive jaundice following treatment of pancreatic pseudoaneurysms by embolization was reported in several cases [16, 17].

Although selective angiography seems to be the diagnostic and therapeutic procedure of choice for the confirmation of the origin of the pancreatic pseudoaneurysm and for the closure of the superior mesenteric artery aneurysm by placing a stent, this was not possible in our patient due to the rapid deterioration of clinical status (with hemodynamic instability and hemorrhagic shock). Furthermore, emergency surgical intervention had an unfavorable outcome with ensuing death after three days of intensive care treatment.

The present case emphasizes the current management of the pancreatic pseudoaneurysms which consists of therapeutic angiography as method of first choice, followed by surgical treatment in cases of failure or hemodynamic unstable patients. Non-invasive imaging methods like

transabdominal ultrasound with color Doppler and contrast-enhanced helical CT with sagittal multiplanar reconstruction of coronal images are very useful in the establishment of the diagnosis in critically ill patients, before selective angiography or surgical intervention.

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Correspondence

Adrian Săftoiu
Division of Gastroenterology
Department of Internal Medicine
University of Medicine and Pharmacy Craiova
str. Horia nr. 11
Craiova, Dolj
200490 România
Phone: +40-744.823.355
Fax: +40-251.534.596
E-mail: adry@umfcv.ro

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