Diagnosis and embolization of a ruptured aneurysm of the posterior pancreaticoduodenal artery due to stenosis of the celiac trunk

Recurrent episodes of epigastric pain and dizziness lasting for some weeks. Neurological examination and non-enhanced CT scan of the head were within normal limits. An ultrasonographic investigation evidenced a large fluid collection at the upper right abdominal quadrant. Past history was unremarkable.

A non-enhanced and dynamic CT of the abdomen evidenced a hyperattenuating paraduodenal fluid collection extending downward, consistent with a hematoma. In the arterial phase CT scans showed a tight stenosis of the celiac trunk compressed by the median arcuate ligament of the diaphragm (Fig. 1a) as well as a tiny accumulation of the contrast medium dorsally to the uncinate process of the pancreas, consistent with an aneurysm of the posterior pancreaticoduodenal artery (PDA) (Fig. 1b). The fluid collection exhibited an enhancing rim on venous phase (Fig. 1c). A prompt arteriography confirmed the diagnosis of a small aneurysm of the posterior PDA (Fig. 2a, b), which was excluded with coaxial catheterisation and microcoils embolisation of the PDA through both the superior mesenteric artery and the gastroduodenal artery (Fig. 2c-e). Neither immediate nor late complication occurred. A CT-arteriography confirmed the exclusion of the aneurysm one week later (Fig. 3a, b).

Visceral artery aneurysms accounts for less than 1% of all aneurysm; among them approximately 2% of cases involve the pancreaticoduodenal arteries (PDAs). According to pathophysiology, aneurysms of PDA can be distinguished in false aneurysms due to pancreatitis, trauma, infection, and true aneurysms, which are associated with long-standing stenosis or occlusion of the celiac trunk in most of cases. PDAs and the dorsal pancreatic artery serve as main collateral pathways between the celiac trunk and the superior mesenteric artery. When stenosis or occlusion of the celiac trunk occurs, PDAs enlarge and a single aneurysm or multiple aneurysms can develop at the
site of a presumed weakness of the arterial wall; nevertheless, histological abnormalities, especially atherosclerosis or dysplasia, are not always visible on resected aneurysms. However, not all subjects with stenosis or occlusion of the celiac trunk develop an aneurysm of the PDA; interestingly stenosis or occlusion of the superior mesenteric artery do not seem to be associated with PDA aneurysms.

True aneurysms of PDAs can be asymptomatic and incidentally discovered, but they are often diagnosed when the aneurysm ruptures. Typical clinical presentation includes sudden onset of abdominal pain and signs of hypovolaemia. Bleeding is usually retroperitoneal and self-limiting in many cases, but a life-threatening haemorrhage can occur. Risk of rupture does not correlate with the size of PDA aneurysms. Diagnosis can be easily achieved with multidetector CT, also in case of tiny aneurysms; multiplanar reformations can help in depicting vascular anatomy for therapeutical planning. In case of a ruptured PDA aneurysm, a paraduodenal fluid collection is also appreciable.

Although spontaneous healing has been reported, transcatheter embolisation should be considered the treatment of choice in ruptured as well as non-ruptured PDA aneurysms. Although coil packing of the aneurysm should be preferred to preserve collaterals, this cannot be always feasible. Embolisation of the PDA can be successfully performed in case of true aneurysms associated with stenosis or occlusion of the celiac trunk without an increasing risk of duodenal ischemia or abdominal angina at long term follow up. Recurrent bleeding is theoretically possible but it does not seem clinically relevant. The role of celiac revascularisation is not wholly defined, but disappearance of aneurysms of the PDA after stenting or surgical bypass has been reported in anecdotal cases. Surgery should be considered only in patients in whom an adverse arterial anatomy prevents a selective embolisation.

**Differential Diagnosis List:** Ruptured aneurysm of the posterior pancreaticoduodenal artery, Pancreatic pseudocyst, Pancreatic pseudoaneurysm

**Final Diagnosis:** Ruptured aneurysm of the posterior pancreaticoduodenal artery

**References:**


Description: Axial CT scans in the arterial phase demonstrate the celiac trunk lying below and compressed by the median arcuate ligament of the diaphragm and... Origin:
Description: ...a small aneurysm posterior to uncinate process of the pancreas. Origin:
Description: Coronal reformation (venous phase) shows the paraduodenal fluid collection exhibiting an enhancing rim. Origin:
Description: Superior mesenteric arteriography well evidences the aneurysm of the posterior pancreaticoduodenal artery. Origin:
Description: Selective catheterisation of the posterior inferior pancreaticoduodenal artery. Origin:
Description: Post-embolisation arteriography of the posterior-inferior pancreaticoduodenal artery.
Origin:
**Description:** Post-embolisation arteriography of the posterior superior pancreaticoduodenal artery.

**Origin:**
Description: CT arteriography demonstrates the exclusion of the aneurysm of the posterior pancreaticoduodenal artery. Origin:
Description: The anterior pancreaticoduodenal arcade is patent as well as anastomotic branches to the posterior pancreaticoduodenal arcade. Origin:
Description: CT arteriography movie Origin: