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Ruptured Pseudoaneurysm of the Gastroduodenal Artery Revealed by Massive Digestive Hemorrhage: Haemostasias by Embolization

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Abstract **Case Report**

Gastroduodenal artery pseudoaneurysm is a rare vascular complication, often asymptomatic. However, if the aneurysm ruptures, the prognosis is poor with mortality rates reaching 40%. We report the case of a 30-year-old patient, who underwent surgery for insulinoma and received pancreatic nodule enucleation. Within one month postoperatively, she experienced massive gastrointestinal bleeding characterized by hematemesis and rectal bleeding, with stable hemodynamics, along with diffuse abdominal pain exacerbated in the epigastric region. Endoscopy revealed erythematous and pseudo-nodular pangastritis with active bleeding through the papilla. An emergency abdominal angio-scan revealed a pseudoaneurysm of the gastroduodenal artery in intimate contact with the duodenal wall (D2), associated with multiple peri-pancreatic collections. Vascular embolization was proposed and consisted of excluding the aneurysm, yielding favorable postoperative outcomes.

Keywords: Pseudoaneurysm, gastroduodenal artery, hematemesis, Angioscan, embolization.

INTRODUCTION

Pseudoaneurysms of the gastroduodenal artery are rare, accounting for less than 1.5% of all splanchnic artery aneurysms. Rupture is their most common mode of presentation, exacerbating prognosis and increasing mortality. Endovascular management of gastroduodenal artery aneurysms has become a frequently reported practice in the literature, appearing to offer numerous advantages over surgery, which in extreme cases may result in pancreatectomies with or without splenectomies. To our knowledge, there are few observations in the literature illustrating the practical feasibility of endovascular treatment by embolization of ruptured gastroduodenal artery pseudoaneurysms with anatomical variations at the origin of this artery. We report a case of a ruptured pseudoaneurysm of the gastroduodenal artery complicated by fulminant and massive gastrointestinal bleeding in a 30-year-old patient, successfully treated urgently with arterial embolization.

OBSERVATION

We report the case of a 30-year-old female who underwent surgery for insulinoma, including enucleation of the pancreatic nodule and dissection of visceral vessels: superior mesenteric vein, splenic artery, and pancreaticoduodenal artery. One month postoperatively, the patient presented with massive gastrointestinal bleeding characterized by hematemesis and rectal bleeding, along with stable hemodynamics and diffuse abdominal pain, predominantly in the epigastric region. Laboratory tests revealed hypochromic microcytic anemia (Hb: 7.7 g/dL) with normal lipase levels. On clinical examination, the patient exhibited cutaneous-mucosal pallor and diffuse abdominal tenderness, particularly in the epigastric region. An upper gastrointestinal endoscopy revealed erythematous and pseudo-nodular pangastritis with active bleeding through the papilla. Further assessment with abdominal angioscan (Figure 1) was necessary, revealing a saccular nodular formation adjacent to the pancreatic head with enhancement similar to that of the aorta, appearing to be continuous with the gastroduodenal artery, suggestive of a pseudoaneurysm, which intimately contacted the posterior wall of D1, measuring 10x9x8.3 mm. Multiple heterogeneous collections were visible in the perigastric, peripancreatic, and omental cavity, along with significant infiltration of mesenteric fat. Emergency vascular embolization was proposed and performed, successfully excluding the aneurysm with favorable postoperative results (Figure 2). Control abdominal

angioscan (Figure 1e) on post-embolization day 1 showed complete exclusion of the gastroduodenal artery pseudoaneurysm without active leakage.

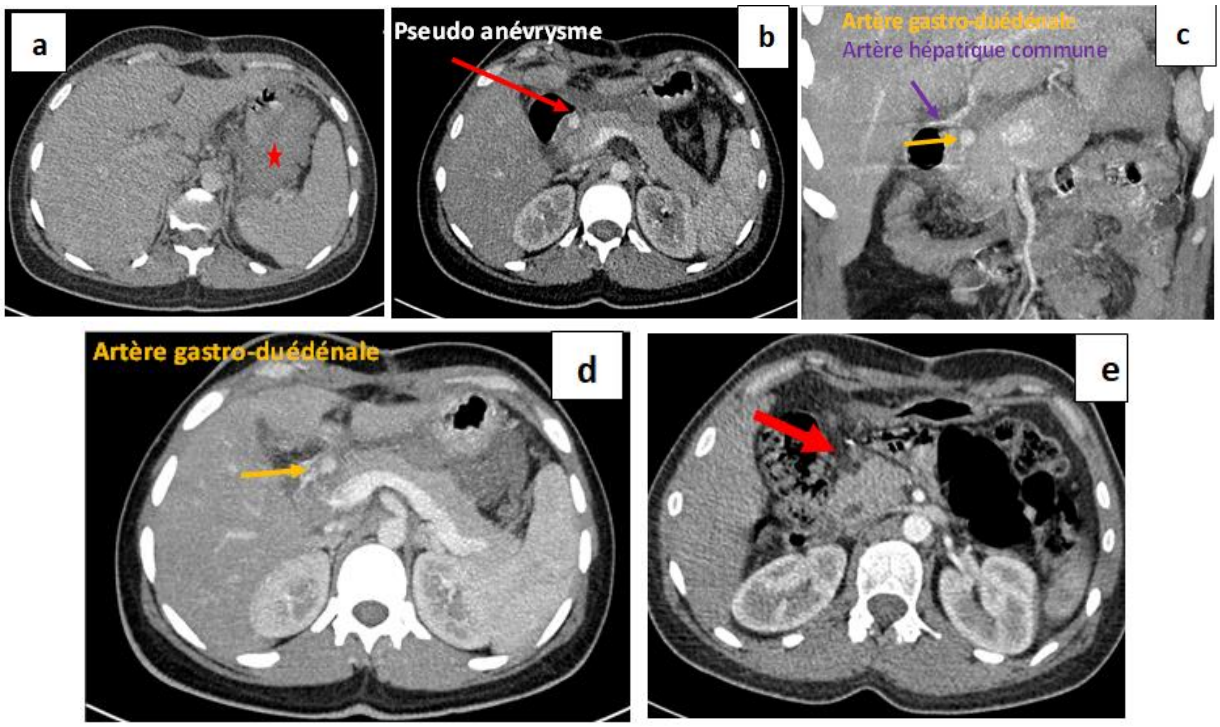

Figure 1: Abdominal angioscan in axial and coronal sections with MIP acquisition:

- **Figures b, c, d**: Nodular saccular formation opposite the pancreatic head (yellow arrow), arising from the common hepatic artery (red arrow) with a similar enhancement to that of the aorta in relation to a pseudoaneurysm of the gastroduodenal artery and comes into intimate contact with the duodenal wall of D1.
- **Figure a**: Multiple heterogeneous collections visible perigastrically and peripancreatically (star), associated with infiltration of neighbouring mesenteric fat.
- **Figure e:** One month later**:** total exclusion of pseudoaneurysm after embolization.

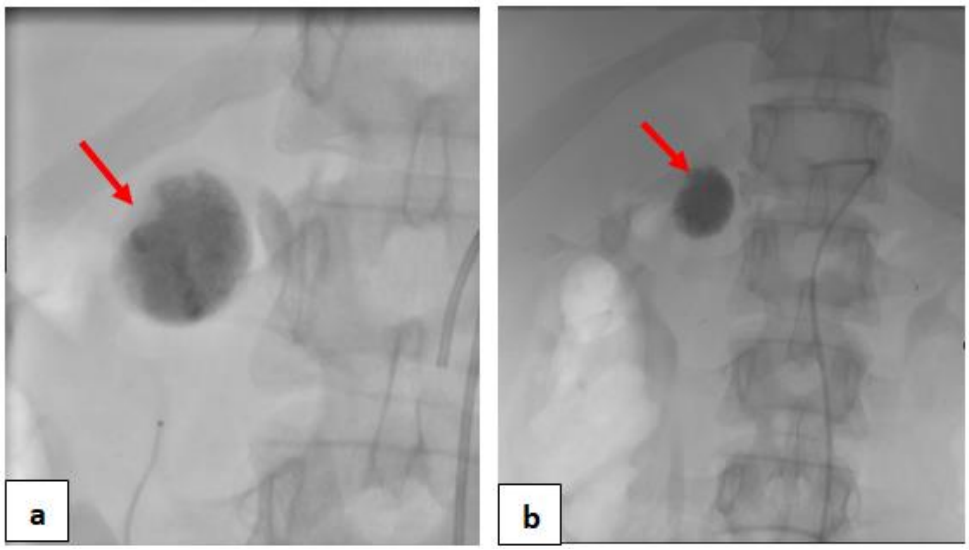

Figure 2: Arteriography: a: before embolization, b: after embolization
Reduction in size of gastroduodenal aneurysm (arrow)

DISCUSSION

Although considered rare, visceral aneurysms are sometimes revealed by severe complications, mainly ruptures, which have mortality rates ranging from 20 to 70%, depending on the site. Gastroduodenal artery aneurysms often occur in an inflammatory context,

frequently attributed to enzymatic action in acute or chronic pancreatitis. The activity of inflammatory mediators and pancreatic enzymes leads to vessel wall destruction, resulting in pseudoaneurysm formation in the majority of cases. Other associated factors include cholangitis, trauma, celiac trunk stenosis, or iatrogenic causes. Various conditions such as alcohol abuse, previous cholecystectomy, congenital variations, Marfan syndrome, polyarteritis nodosa, fibromuscular dysplasia, and liver cirrhosis have also been described. Unruptured aneurysms may present with vague and nonspecific symptoms such as pulsatile abdominal mass and atypical abdominal pain, often incidentally discovered during aortic or pancreatic exploration. Clinical presentation following rupture depends on the type of rupture. Intra-peritoneal rupture presents with acute abdomen and severe hemodynamic instability, while extraperitoneal rupture presents with arterial hypotension and initially stable hemodynamics with vague abdominal pain. Rupture of gastroduodenal artery aneurysms presents dramatically, often as the initial manifestation in 50 to 60% of cases. The diameter of the aneurysm appears to have little influence on rupture incidence; small aneurysms may also rupture. Certain pathogenic forms directly contribute to rupture, such as erosive action of pancreatic enzymes in acute and chronic pancreatitis, and the effect of inflammatory inducers. Three-dimensional abdominal angioscan is an excellent diagnostic tool, offering rapid and positive diagnosis of aneurysms by identifying the responsible artery and detecting signs of associated pancreatitis while providing detailed morphological information to guide therapeutic strategies. Although angiography was previously widely used, advancements in endovascular therapy have reinstated its importance as a diagnostic and therapeutic tool. Surgical treatment was traditionally considered inevitable for gastroduodenal artery aneurysms, either as the primary choice or as a complement to endovascular treatment. This involves ligating the gastroduodenal artery and complete aneurysm resection, representing the most commonly practiced technique in the literature. Embolization offers the advantages of a minimally invasive procedure, performed under local anesthesia, with reduced postoperative risks compared to emergency surgery. It allows for primary and rapid hemostasis in ruptured aneurysms, facilitating stabilization for subsequent surgical intervention. However, endovascular treatment is not without risks, including organ perforation, difficulty in selective arterial catheterization, and embolization failure due to catheterization impossibility or large aneurysm size.

CONCLUSION

This case highlights that although rare, gastrointestinal bleeding can reveal a ruptured gastroduodenal artery aneurysm. Open surgery remains the treatment of choice in cases of hemodynamic instability or unfavorable anatomy for vascular catheterization. Embolization is increasingly used for visceral aneurysms, reserved for uncomplicated cases with favorable anatomy, avoiding the risks of extensive surgical dissection and limiting organ resection for hemostasis.

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