CASE REPORT

Pseudoaneurysm of the gastroduodenal artery: an unusual cause for hyperamylasaemia

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SUMMARY

A 79-year-old man was admitted electively for investigation of weight loss. While he was an inpatient, he developed severe epigastric pain and an initial blood test revealed an acutely raised amylase (>2000) and deranged liver function tests. A contrast CT angiography showed a large haematoma adjacent to the duodenum, spreading in the retroperitoneal space, arising from a 2 cm bleeding pseudoaneurysm in the region of the gastroduodenal artery. Due to his underlying comorbidities, he was deemed unfit for surgical repair and he had coil embolisation with successful haemostasis. The gastroduodenal artery aneurysms are rare and constitute 1.5% of all visceral artery aneurysms. They can be an incidental finding or they can present with haemorrhagic shock, abdominal pain and rarely with obstructive jaundice or hyperamylasaemia. The diagnosis is usually made with an angiography. Variable treatment options are available depending on the patient's fitness and haemodynamic stability.

BACKGROUND

Visceral aneurysms are most commonly seen in splenic and renal arteries, while gastroduodenal artery aneurysm (GDA) is only 1.5% of all of them.¹ GDA can either be a true aneurysm or a pseudoaneurysm. The aetiological factors are not well defined. True aneurysms are mainly caused by hypertension and atherosclerosis,² whereas pseudoaneurysm by abdominal trauma, such as pancreatic surgery³ and abdominal inflammation, most commonly pancreatitis.^{4 5} They usually present acutely with haemorrhagic shock due to aneurysm rupture. The rupture can either be intraluminal (in the duodenum) or peritoneal. The second most common presentation is epigastric pain. They can be an incidental finding in less than 10% of cases.⁶ Occasionally, they can present with gastric outlet obstruction, compressive symptoms, jaundice,⁷ biliary⁸ or pancreatic intraductal haemorrhage^{9 10} and as a palpable mass.⁶ The mortality can reach up to 40% in ruptured cases.¹¹ The gold standard of diagnosis is angiography followed by CT contrast¹² and ultrasonography (USS) of the upper abdomen. A plain abdominal film may show calcification in the aneurysm sac.¹³ The management is dependent on the haemodynamic stability of the patient, the patient's overall status, the anatomy and the expertise of the treating centre.¹⁴ Endovascular therapy with coil embolisation with

or without stent placement is gaining ground and considered now first-line treatment, due to reduced morbidity and mortality when compared with open surgery.^{15–17} Less commonly thrombin injection can be utilised.^{18 19} In patients in whom the endovascular treatment has failed or occasionally haemodynamically unstable with perforated aneurysm, a surgical approach is preferred.²⁰

CASE PRESENTATION

A 79-year-old man with a background of bio-prosthetic aortic and mitral valve repair (AVR and MVR), previous extensive aortic dissection from just distally of the aortic valve to the right iliac artery, followed by aortic root replacement, a redo of his AVR, an embolic stroke with no residual neurological deficit, paroxysmal atrial fibrillation on warfarin and monoclonal gammopathy of undetermined significance, was admitted electively for investigation of weight loss, renal function deterioration and anaemia. While he was an inpatient, he developed severe epigastric pain and nausea. The initial blood tests showed an alkaline phosphatase (ALP) of 316, alanine aminotransferase (ALT) 70, bilirubin 38, amylase 2337 (56), haemoglobin 85 (80), prothrombin time (PT) 17.2 (in brackets shown the results of the previous day). He also had normal liver function tests previously. At that stage, the working diagnosis was acute pancreatitis and an USS of the abdomen was requested. The following day, he underwent a prearranged CT abdomen to rule out malignancy as a cause of his admission symptoms. The scan showed a large retroperitoneal haematoma adjacent to the second part of duodenum (D2), which also extended to the right psoas muscle. An urgent CT angiography confirmed a 2 cm bleeding pseudoaneurysm in the region of the GDA as the cause of the retroperitoneal haematoma (figures 1 and 2). It also showed a further hepatic artery pseudoaneurysm and an unchanged aortic dissection with no signs of aortic rupture. There was no evidence of acute pancreatitis on the scan. Later the same day, his haemoglobin dropped to 60 g/dL and he became haemodynamically shocked. He was not deemed fit for a surgical intervention due to the underlying comorbidities and following volume resuscitation and coagulation correction, he underwent a coil embolisation with successful haemostasis (figures 3 and 4). He had no recurrent bleeding. The warfarin was stopped after assessing risks and benefits.

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Figure 1 Axial plane of non-contrast abdominal CT scan. Thin arrow: common bile duct. Dash arrow: gastroduodenal artery pseudoaneurysm. Thick arrow: retroperitoneal haematoma. Note the close proximity of the common bile duct with the gastroduodenal artery pseudoaneurysm.

OUTCOME AND FOLLOW-UP

This patient was discharged having made good recovery and he remained haemodynamically stable. Unfortunately, 1 year later, he was readmitted with chest pain and suddenly passed away.

Figure 2 Coronal plane of non-contrast abdominal CT scan. Thin arrow: common bile duct. Dash arrow: gastroduodenal artery pseudoaneurysm. Thick arrow: retroperitoneal haematoma. Note the close proximity of the common bile duct with the gastroduodenal artery pseudoaneurysm.

Figure 3 Pre-coil embolisation. Dash arrow: gastroduodenal artery with contrast. Thin arrow: bleeding point from the gastroduodenal artery pseudoaneurysm. Contrast is seen outside the vessel.

A postmortem revealed a ruptured aortic aneurysm as cause of his death.

DISCUSSION

Gastroduodenal artery (pseudo)aneurysm is a rare cause of intra-abdominal bleeding. The pathophysiology of the pseudoaneurysm formation in this case was not clear, but it is likely related to his extensive vascular background and atheromatous

Figure 4 Post-coil embolisation. Dash arrow: coil deployed in the gastroduodenal artery. Thin arrow: the bleeding has stopped as no contrast is seen outside the vessel.

disease. The interesting part of this case is not only the bleeding gastroduodenal pseudoaneurysm, which it is by itself a rarity, but also the presentation with epigastric pain, hyperamylasaemia and obstructive jaundice. Whereas there are several cases of GDA bleeding aneurysm presenting with obstructive jaundice^{7 21 22} or gastrointestinal haemorrhage from either direct intraluminal bleeding of the aneurysm in the duodenum² or indirectly intraductal bleeding inside the common bile duct⁸ or pancreatic duct, a condition called haemosuccus pancreaticus^{9 10} or both,²³ there is very limited bibliography of GDA cases presenting with hyperamylasaemia.²⁴ The biochemical results can be explained by two mechanisms. First, intraductal bleeding from a pseudoaneurysm can predispose to clot formation and partial or complete obstruction, which results in transient bilirubinaemia or hyperamylasaemia. Second, an aneurysm or a sealed haematoma is possible to cause extrinsic common bile duct^{21 25} and main pancreatic duct pressure due to the close anatomical proximity between the GDA and the pancreatobiliary draining system, which could then explain the raised amylase, alkaline phosphatase and bilirubin. In this case, the raised amylase is more likely explained by extraluminal bleeding and external duct compression from the retroperitoneal haematoma rather than intraductal bleeding which would someone expect to present with features of gastrointestinal haemorrhage, such as melaena or haematochezia. Once the condition was treated, the liver function and amylase levels normalised. An USS of the abdomen during the acute phase did not show evidence of gallstone disease. A serum vascular screen was not suggestive of vasculitis. An old CT abdomen did not show evidence of previous chronic pancreatitis, which could explain otherwise the raised amylase or GDA formation.

In summary, this is the case of a 79-year-old male who presented with hyperamylasaemia and mild jaundice secondary to external compression of the distal pancreatobiliary draining system from a retroperitoneal haematoma following haemorrhage from a pseudoaneurysm of the gastroduodenal artery. He

was managed successfully with coil embolisation of the bleeding vessel.

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REFERENCES

- Røkke O, Søndena K, Amundsen S, *et al.* The diagnosis and management of splanchnic artery aneurysms. *Scand J Gastroenterol* 1996;31:737–43.
- Shawky MS, Tan J, French R. Gastroduodenal artery aneurysm: a case report and concise review of literature. *Ann Vasc Dis* 2015;8:331–3.
- Loveček M, Havlík R, Köcher M, *et al.* Pseudoaneurysm of the gastroduodenal artery following pancreatoduodenectomy. Stenting for hemorrhage. *Wideochir Inne Tech Maloinwazyjne* 2014;9:297–301.
- Barge JU, Lopera JE. Vascular complications of pancreatitis: role of interventional therapy. *Korean J Radiol* 2012;13(Suppl 1):S45–S55.
- Volpi MA, Voliovici E, Pinato F, *et al.* Pseudoaneurysm of the gastroduodenal artery secondary to chronic pancreatitis. *Ann Vasc Surg* 2010;24:1136.e7–1136.e11.
- Habib N, Hassan S, Abdou R, *et al.* Gastroduodenal artery aneurysm, diagnosis, clinical presentation and management: a concise review. *Ann Surg Innov Res* 2013;7:4.
- Konstantakos AK, Coogan SM, Husni EA, *et al.* Aneurysm of the gastroduodenal artery: an unusual cause of obstructive jaundice. *Am Surg* 2000;66:695–8.
- Fodor M, Fodor L, Ciuce C, *et al.* Gastroduodenal artery pseudoaneurysm ruptured in the common bile duct. *Acta Chir Belg* 2010;110:103–5.
- Kumar B. *Hemosuccus pancreaticus due to rupture of a gastroduodenal artery pseudoaneurysm*: MD. Hospital Physician, 2007.
- Matsumoto I, Ueda T, Ajiki T, *et al.* [A case of successful treatment with transcatheter arterial embolization for a ruptured aneurysm of the gastroduodenal artery presenting with a hemosuccus pancreaticus]. *Nihon Shokakibyo Gakkai Zasshi* 2006;103:1397–402.
- Lee PC, Rhee RY, Gordon RY, *et al.* Management of splenic artery aneurysms: the significance of portal and essential hypertension. *J Am Coll Surg* 1999;189:483–90.
- Yeh TS, Jan YY, Jeng LB, *et al.* Massive extra-enteric gastrointestinal hemorrhage secondary to splanchnic artery aneurysms. *Hepatogastroenterology* 1997;44:1152–6.
- Deterling RA. Aneurysm of the visceral arteries. *J Cardiovasc Surg* 1971;12:309–22.
- Björck M, Koelemay M, Acosta S, *et al.* Management of the diseases of mesenteric arteries and veins. *Clinical practice guidelines of the European Society of Vascular Surgery*, 2017.
- Corey MR, Ergul EA, Cambria RP, *et al.* The presentation and management of aneurysms of the pancreaticoduodenal arcade. *J Vasc Surg* 2016;64:1734–40.
- Tulsyan N, Kashyap VS, Greenberg RK, *et al.* The endovascular management of visceral artery aneurysms and pseudoaneurysms. *J Vasc Surg* 2007;45:276–83.
- Yen YT, Lai HW, Lin CH, *et al.* Endovascular salvage for contained rupture of gastroduodenal artery aneurysm presented with obstructive jaundice. *Ann Vasc Surg* 2015;29:1017.e1–1017.e5.
- Barbiero G, Battistel M, Susac A, *et al.* Percutaneous thrombin embolization of a pancreaticoduodenal artery pseudoaneurysm after failing of the endovascular treatment. *World J Radiol* 2014;6:629–35.
- Geoghegan T, Tuite D, McAuley G, *et al.* Percutaneous thrombin injection for the treatment of a post-pancreatitis pseudoaneurysm of the gastroduodenal artery. *Eur Radiol* 2004;14:2144–5.
- Pulli R, Dorigo W, Troisi N, *et al.* Surgical treatment of visceral artery aneurysms: a 25-year experience. *J Vasc Surg* 2008;48:334–42.
- Yin T, Wan Z, Chen H, *et al.* Obstructive jaundice caused by pancreaticoduodenal artery aneurysms associated with celiac axis stenosis: case report and review of the literature. *Ann Vasc Surg* 2015;29:1016.e1–1016.e6.
- Chase CW, Layman TS, Barker DE, *et al.* Traumatic abdominal aortic pseudoaneurysm causing biliary obstruction: a case report and review of the literature. *J Vasc Surg* 1997;25:936–40.
- Bohl JL, Dossett LA, Grau AM, *et al.* Gastroduodenal artery pseudoaneurysm associated with hemosuccus pancreaticus and obstructive jaundice. *J Gastrointest Surg* 2007;11:1752–4.
- Jovanović M, Colović R, Grubov N, *et al.* [Pseudoaneurysm of gastroduodenal artery due to duodenal ulcer causing jaundice and interstitial pancreatitis but not bleeding]. *Srp Arh Celok Lek* 2004;132:108–11.
- Mazziotti S, Blandino A, Gaeta M, *et al.* Hepatic artery aneurysm, an unusual cause of obstructive jaundice: MR cholangiography findings. *Abdom Imaging* 2003;28:835–7.

Learning points

- Gastroduodenal artery (pseudo)-aneurysm is a rare cause of visceral arteries haemorrhage with most common aetiological causes of gastroduodenal artery aneurysm (GDA) formation being atherosclerosis, hypertension, topical trauma (usually from surgery near the origin of vessels) or inflammation (pancreatitis, vasculitis).
- Following bleeding from a GDA pseudoaneurysm, hyperamylasaemia or obstructive jaundice can occur by either extrinsic pressure of the pancreatobiliary draining system from a haematoma or intrinsic pressure from internal haemorrhage inside the biliary or pancreatic duct.
- Deranged amylase and/or raised liver function tests can mask the diagnosis and may prompt search for other more common differential diagnosis. The key diagnostic finding is the haemodynamic instability and the deranged pancreatobiliary biochemistry.
- The gold standard of diagnosis is angiography with sensitivity up to 100%.
- Treatment is based on local availability and patient's overall condition with endovascular techniques looking more attractive due to reduced mortality and morbidity when compared with surgery.

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