

## CASE REPORT

# The endovascular management of a 3.5-cm gastroduodenal artery aneurysm presenting with gastritis and recurrent pancreatitis

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## ABSTRACT

Visceral artery aneurysms (VAAs) are a rare entity. Within this subset of aneurysms, gastroduodenal artery (GDA) aneurysms represent an even more rare occurrence. We present a case report of treating GDA aneurysm on semi-elective basis followed by literature review of the clinical presentation and mainstream treatment modalities. GO is a 65-year-old male, with 6-month history of recurrent epigastric pain. He was found to have acute pancreatitis and an adjacent 3.5-cm GDA aneurysm. After conservative treatment of pancreatitis, the aneurysm was treated with coil embolization of the sac and GDA. Most VAAs are asymptomatic; GDA aneurysms tend to present clinically with epigastric pain or pancreatitis. In addition, together with pancreaticoduodenal aneurysms, GDA aneurysms warrant immediate intervention once diagnosed. Open surgical options for VAAs include aneurysm resection with or without revascularization (i.e., bypass), aneurysm ligation, or end-organ resection (i.e., splenectomy). Endovascular repair involves coil embolization with or without stent placement. While endovascular modality continues to be the first choice for stable elective VAA patients, modality of treatment for ruptured VAA or unstable patients will vary according to the patient's overall status, operator's experience, and institute capacity.

**Key words:** Endovascular coiling, gastroduodenal artery, recurrent pancreatitis, symptomatic visceral aneurysm, visceral aneurysm

## INTRODUCTION

Visceral artery aneurysms (VAAs) are rare entity with estimated incidence between 0.01% and 2%.<sup>[1]</sup> Splenic artery aneurysms represent the most common variant with an estimated incidence of 60%. This is followed by aneurysms of the hepatic artery (20%); superior mesenteric artery (6%); celiac artery (4%); gastric and gastroepiploic arteries (4%); jejunal, ileal, and colic arteries (3%); pancreaticoduodenal and pancreatic arteries (2%); gastroduodenal artery (GDA) (1.5%); and inferior mesenteric artery with <1%.<sup>[2]</sup>

Unlike most VAAs, GDA aneurysms tend to be symptomatic. The most common symptom is vague epigastric pain that radiates to the back. However, 60% of GDA aneurysms

coexist with pancreatitis, which complicates the presentation.<sup>[3]</sup>

Up to 60% of pancreaticoduodenal and GDA aneurysms present with rupture;<sup>[4]</sup> thus, those aneurysms should be repaired promptly irrespective of the aneurysm size.<sup>[5]</sup> The modality of treatment has been shifting within the last decade. There is tendency now to reserve open surgical approach for unstable patients and/or freely ruptured aneurysms. Endovascular approach is gaining more momentum with success rate between 78% and 97%.<sup>[6]</sup>

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## CASE REPORT

GO is a 65-year-old male, with no significant medical history, who presented with worsening fluctuating epigastric pain for 6 months. His examination was remarkable for mild epigastric tenderness with no signs of peritonitis. Laboratory values were only significant for amylase of 196 U/L and lipase of 384 U/L.

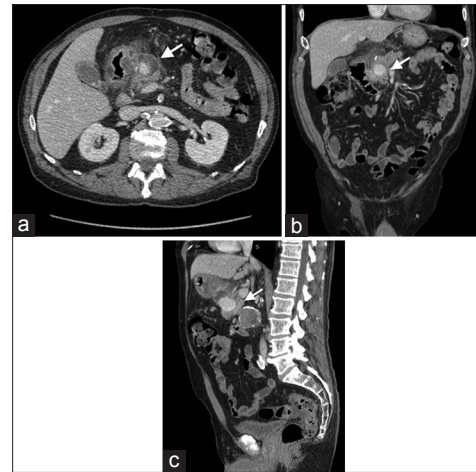
A computed tomography (CT) scan of abdomen and pelvis showed a 3.2-cm aneurysm of the GDA, a 4.8-cm infrarenal abdominal aortic aneurysm and diffuse fat stranding around the posterior wall of the stomach with mural inflammatory thickening [Figure 1].

He was admitted for conservative treatment of mild pancreatitis. Within 36 h, his abdominal pain resolved and his amylase and lipase levels returned to normal. On hospital day 3, esophagogastroduodenoscopy confirmed the presence of pulsating mass compressing the duodenal bulb with no ulcers or active bleeding. On hospital day 5, the patient was brought to the hybrid room for a mesenteric angiogram. A 6-French sheath was placed in the left femoral artery. The patient was systematically heparinized with 100  $\mu$ /kg intravenous (IV) heparin. Using a 6-French RDC™ guiding catheter (Boston Scientific, Marlborough, MA, USA), the celiac trunk was selectively catheterized. A glide catheter was advanced into the common hepatic artery over 0.035 glide wire. Subsequently, a PX SLIM™ microcatheter (Penumbra, Alameda, CA, USA) was used to cannulate the GDA aneurysm over a 0.014 wire [Figure 2]. Multiple 10  $\times$  35 Ruby® detachable coils (Penumbra, Alameda, CA, USA) were deployed within the aneurysm sac. After that, multiple 3  $\times$  5 Ruby® detachable coils (Penumbra, Alameda, CA, USA) were deployed in the GDA proximal and distal to the aneurysm. A completion angiogram showed no flow in the aneurysm sac [Figure 3].

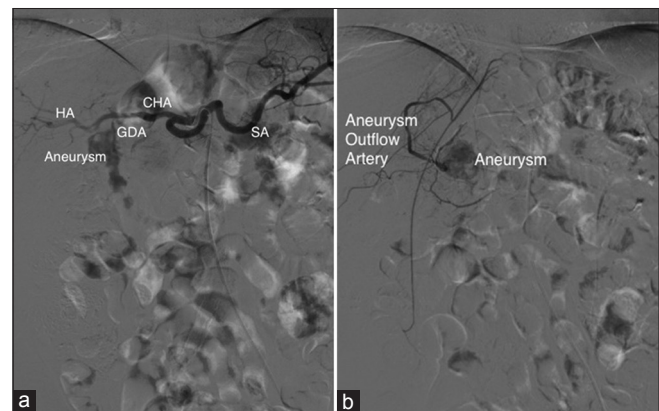
The patient had an uneventful hospital postprocedure course. He was seen in the clinic 2 weeks and then 6 months later and he had no abdominal complaints. We would continue to monitor his infrarenal abdominal aneurysm with routine annual abdominal duplex.

## DISCUSSION

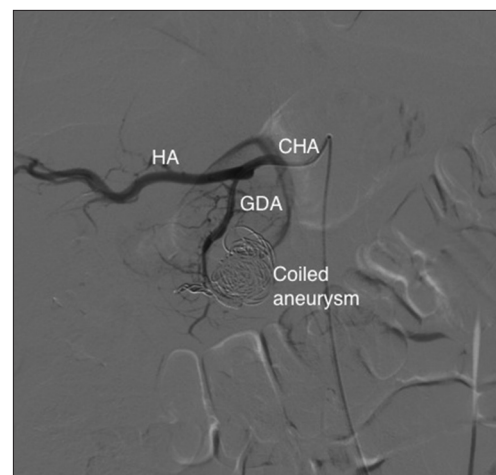
Visceral arteries aneurysms (VAAs) are rare entity in general. With few exceptions, most guidelines advice intervention for any VAA larger than 2-cm.<sup>[7]</sup> GDA and PDA aneurysms, however, warrant an intervention as soon as they are discovered.



**Figure 1:** Abdomen and pelvis computed tomography scan with intravenous contrast. The gastroduodenal artery aneurysm (white arrow) abutting the posterior stomach wall with significant fat stranding. (a) Cross-section plane, (b) Coronal plane, (c) Sagittal plane



**Figure 2:** Mesenteric angiogram, precouiling. (a) Selective catheterization of the celiac artery. Note the gastroduodenal artery filling the aneurysm. (b) selective catheterization of the gastroduodenal artery. CHA: Common hepatic artery, GDA: Gastroduodenal artery, HA: Hepatic artery, SA: Splenic artery



**Figure 3:** Mesenteric angiogram, postcoiling. Selective catheterization of the Common Hepatic artery. Note absence of flow in the coiled gastroduodenal artery aneurysm. CHA: Common Hepatic Artery, GDA: Gastroduodenal artery, HA: Hepatic artery

Methods of intervention varied according to the location, presentation, and hemodynamics of the patient. Open surgical repair has traditionally been the first-line therapy, but with recent advancement in endovascular equipment and techniques, less invasive methods have been described. Pulli *et al.* reported 25 years of experience treating visceral arteries aneurysms surgically.<sup>[8]</sup> The 10-year survival was 79.5% with an estimated 10-year, aneurysm-related, complication-free survival rate of 75.2%. With the exception of 2 cases, most of their 55 cases were done for asymptomatic VAA on an elective basis. Only one case was completed through an endovascular approach. Another series presented 22 patients treated surgically and 7 patients treated with endovascular coiling. Of the seven patients, three failed the endovascular coiling and had to be repaired surgically at a later date.<sup>[1]</sup>

Sessa *et al.* reported their experience in treating VAA between 1975 and 2002.<sup>[5]</sup> The first observation drawn is the relatively more aggressive utilization of endovascular approach than what was commonly accepted at that time. The second observation is the nature of complications that occurred after open versus endovascular approach and in ruptured versus elective repairs. In the elective nonruptured VAA, the morbidity rate is 12% in an open surgery approach. Two of those cases were thrombosed aortohepatic bypass with no subsequent hepatic ischemia. The morbidity rate in the endovascular approach is 18%. Those complications were mostly limited infarction of the spleens. As for the ruptured VAA, it is noted that the mortality rate rose to 50% in the pancreaticoduodenal aneurysms and 33% in the celiac artery aneurysms. The morbidity rate fared similarly at 46% and 50% in the surgical and endovascular approach, respectively. In the open surgical group, fistula formation was the most notable complication, second by ischemic changes in the gallbladder/biliary tree and left colon in common hepatic artery and inferior mesenteric artery aneurysms, respectively. In the endovascular group, the most interesting complication was a duodenal stenosis after embolization of ruptured pancreaticoduodenal artery aneurysm.

Tulsyan *et al.* reported the Cleveland Clinic experience of VAA endovascular repair.<sup>[9]</sup> Of 48 (48%) patients, 22 had it on an emergent or urgent basis for ruptured/unstable and symptomatic aneurysms, respectively. Perioperative

mortality is 8%, all of which happened in the emergent/urgent cases. Complete aneurysm exclusion was confirmed with appropriate imaging in 97% of patients. Six patients of the total treated numbers had splenic infarct signs on follow-up imaging with no long-term clinical consequences. Interestingly, there was no incidence of bowel or hepatic ischemia postembolization.

## CONCLUSION

Endovascular coiling is the first-line therapy for stable elective VAA patients. For ruptured VAA or unstable patients, modality of treatment will depend on the expertise of the operator, patient comorbidities, and institute capacity.

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### Conflicts of interest

There are no conflicts of interest.

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