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GASTRO CURBSIDE CONSULT: A Rare Cause of Life-Threatening Upper Gastrointestinal Bleeding

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GASTRO CURBSIDE CONSULT: A Rare Cause of Life-Threatening Upper Gastrointestinal Bleeding**Short Title: A Rare Cause of Upper Gastrointestinal Bleeding****Authors:**Howard Guo¹ MD, Jesse Stach² MD, Paul J. Belletrutti¹ MD**Affiliations:**¹ Division of Gastroenterology and Hepatology, Department of Medicine, University of Calgary, Calgary, Alberta, Canada² Department of Medicine, Section of Gastroenterology and General Internal Medicine, Medicine Hat Regional Hospital, Medicine Hat, Alberta, Canada**Manuscript Word Count:** 838 total (261 in Question; 577 in Answer)**Figures:** 8**Keywords:** bleeding; gastrointestinal; pseudoaneurysm; superior mesenteric artery**Study Funding:** None**Grant Support:** None**Writing Support:** None**Disclosures and Conflicts of Interest:****HG** has no relevant conflicts of interest to declare.**JS** has no relevant conflicts of interest to declare.**PB** has no relevant conflicts of interest to declare.**Author Contributions:**

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QUESTION

A 66-year-old woman presented to hospital with large volume hematemesis and melena. Her past medical history was significant for an episode of native valve infective endocarditis secondary to a skin infection four years prior, with an associated embolic stroke of the left middle cerebral artery. Her daily medications included Aspirin and Atorvastatin. She denied any intake of other non-steroidal anti-inflammatory drugs (NSAIDs). She had no prior history of peptic ulcer disease or liver disease. On arrival to the hospital, the patient's blood pressure was 90/60mmHg, with a heart rate of 140 beats per minute (BPM). The patient's abdomen was soft, non-tender, with no organomegaly or stigmata of chronic liver disease appreciated. Her initial hemoglobin level was 42g/L. Her international normalized ratio (INR) was 1.2, and her blood urea nitrogen (BUN) levels were elevated at 17.5mmol/L. Liver enzymes and liver function tests were within normal limits. She was resuscitated in the emergency department and the Gastroenterology service was consulted for an emergent esophagogastroduodenoscopy (EGD). During the EGD, in the third portion of the duodenum, a 4cm solid-appearing subepithelial lesion with central umbilication and an apparent visible vessel was identified (Figure A). Upon inspection of the lesion, the umbilicated area spontaneously began spurting blood (Figures B and C). Hemostatic powder (Hemospray) was immediately applied to the lesion for hemostasis, and a hemoclip was placed adjacent to the lesion for localization. Following completion of the EGD, a computerized tomography (CT) scan of the abdomen was performed 5 hours later (Figures D and E).

What is the most likely explanation for her gastrointestinal bleeding?

ANSWER

Superior Mesenteric Artery (SMA) Pseudoaneurysm

A. Establishing the diagnosis

The differential diagnosis of duodenal hemorrhage includes duodenal ulcers, varices, arteriovenous malformations, Dieulafoy lesions, and tumors¹. In our case, the patient's CT revealed a 3.9 x 2.1 cm pseudoaneurysm arising from the superior mesenteric artery (SMA) impressing upon the duodenum, consistent with a SMA pseudoaneurysm. SMA pseudoaneurysms are a rare yet life-threatening cause of GI bleeding. Endoscopically, they resemble solid subepithelial masses, such as GI stromal tumor, nerve sheath tumor, or a lipoma, which may lead to inappropriate attempts to biopsy the lesion or apply direct endoscopic therapy. Prompt diagnosis with imaging, such as CT angiography, is paramount with a view to definitive treatment of the pseudoaneurysm via endovascular methods.

B. Review

Visceral artery pseudoaneurysms (VAPAs) are rare vascular diseases, with an estimated incidence of 0.2%². VAPAs affect the celiac artery, superior mesenteric artery, and inferior mesenteric artery, along with their branches³. Among VAPAs, SMA pseudoaneurysms are the rarest types, with an estimated incidence of 0.01% within the general population⁴. Ruptures of VAPAs are clinical emergencies, and have been associated with mortality rates of 25%-75% depending on the size and location of the lesion⁵. Up to 89% of VAPAs are symptomatic at presentation, with the most common symptoms being gastrointestinal bleeding, hemobilia, and abdominal pain⁶.

The most common etiologies of VAPAs include pancreatitis, abdominal trauma, and iatrogenic lesions secondary to laparoscopic or percutaneous interventions². Infective endocarditis has also been reported

as a rare etiology of VAPAs⁷. It is possible that our patient's history of infective endocarditis was the etiology of SMA pseudoaneurysm formation.

Traditionally, visceral angiography has been the gold standard diagnostic test for VAPAs, as it both delineates the arterial anatomy and allows for therapeutic intervention⁸. More recently, CT angiography has emerged as a more widely available imaging modality used in the diagnosis of VAPAs, with a reported sensitivity of 100%⁹.

Treatment strategies of VAPAs can be broadly separated into two categories: endovascular and surgical. Endovascular management methods include coils, microcoils, vascular plugs, covered stents, and liquid embolic agents³. Endovascular embolization is most effective when a site of bleeding can be endoscopically prelocalized either anatomically or by using a hemoclip¹⁰. In comparison, surgical management options include aneurysmectomy with ligation, end-to-end anastomosis, and bypass grafting. Although surgery remains a safe and effective treatment option, it tends to now be selected only when endovascular treatment is too difficult to perform³.

C. Patient Outcome

8 hours after identification of the SMA pseudoaneurysm on CT abdomen, the patient underwent transcatheter arterial embolization of the SMA pseudoaneurysm (Figure F depicts the SMA pseudoaneurysm on fluoroscopy, alongside the endoscopically placed hemoclip), during which two Nester coils were deployed to the ileocolic outflow vessel (Figure G). A covered endovascular stent was also deployed across the culprit distal jejunal artery branch to exclude the pseudoaneurysm (Figure H). The patient was transferred to the intensive care unit following the procedure for ongoing observation and resuscitation. In total, she received 12 units of packed red blood cells (pRBCs), 4 units of platelets,

and 1 unit of fresh frozen plasma during her resuscitation. Following the embolization, the patient demonstrated hemodynamically stable vital signs. Two days afterward, her diet was advanced to a regular diet. She was subsequently transferred to the general medicine ward, and was discharged from hospital one week later. She was followed-up by the general internal medicine service as an outpatient 1 month later, with no ongoing bleeding and a stable HGB level.

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