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Case Report

Acute upper gastrointestinal hemorrhage from a pseudoaneurysm of an unusual superior polar artery of the spleen

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ABSTRACT

Splenic artery (SA) aneurysm and pseudoaneurysm are rare pathologies and uncommon causes of massive upper gastrointestinal (GI) bleeding. They represent the third most common intra-abdominal aneurysms. Variations in the origin of SA are relatively common and asymptomatic. However, the presence of an accessory SA that is symptomatic is quite atypical. In this report, we describe the case of a 73-year-old female who presented with massive upper GI bleeding caused by a pseudoaneurysm of a superior polar artery with an unusual anatomic origin. The patient was successfully treated endovascularly with transarterial coil embolization. Early diagnosis and interventional management are crucial for patient's survival; hence, it must be kept in mind as possible etiology of life-threatening GI bleeding to reduce morbidity and mortality.

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Introduction

Acute upper gastrointestinal (GI) bleeding is a potentially life-threatening emergency that remains a common cause of hospitalization—most cases being attributed to peptic ulcer disease or gastric and esophageal varices. Although rare, aneurysm of the splenic artery (SA) has been described as a cause of acute upper GI hemorrhage that, when diagnosed, represents a potential fatal event given the risk of massive bleeding due to rupture [1]. SA aneurysm is the most common intra-abdominal splanchnic aneurysm and the third most common intra-abdominal aneurysm following those

involving the aorta and iliac vessels [1,2]. Variations in the origin of SA are common. However, anatomic variation in its branching pattern is relatively rare [3]. Knowledge of these anatomic variations to successfully approach surgical or interventional planning and awareness of this entity as a potential GI bleeding etiology is crucial.

The SA is the largest branch of the celiac trunk that courses along the superior border of the pancreas. Near the splenic hilum, it gives 2-3 terminal branches that further divides into 4-6 segmental intrasplenic branches [4,5]. Rare accessory arteries have, however, been documented.

A superior polar artery (SPA) as an anatomic vascular variant usually arises from the main SA. It generally arises

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approximately 2–3 cm from the splenic hilum with an average length of 3.9 cm and supplies the upper pole of the spleen directly without passing through the hilum [5].

Similar to the case described by Baidwan et al. [5], in this report we present an uncommon variant of the SPA that measured approximately 8-cm long, originating at approximately 6 cm from the splenic hilum. More interestingly, it presented with a pseudoaneurysm, which ruptured causing massive upper GI bleeding.

Few cases of upper GI bleeding related to ruptured accessory SA aneurysms have been described [4]. To our knowledge, this would be the third report in the medical literature describing massive upper GI bleeding caused by a pseudoaneurysm of an accessory SA to the upper pole of the spleen; the first arising from an SPA successfully treated with transarterial coil embolization.

Case description

A 73-year-old female with no history of cirrhosis, but with a positive history of ischemic cardiomyopathy, congestive heart failure, type 2 diabetes mellitus, and atrial fibrillation, on warfarin (Coumadin, 3.5 mg daily) was admitted to our institution for nausea, shortness of breath, chest pain, and hematemesis. No melena, fever, or lower extremity edema was present. The patient reported vomiting up large amounts of dark red blood, with clots, 3 hours earlier resulting in calling an ambulance. While in transit, she had another episode in which she vomited an additional liter of dark red blood. Upon arrival at the emergency department (ED) at 7:16 PM (day 1), she was found to have weak peripheral pulses, tachycardia (123 bpm), and hypotension (82/54 mmHg). Physical examination revealed mild epigastric tenderness with a soft, nondistended abdomen and hyperactive bowel sounds.

Laboratory data demonstrated mild anemia with a hemoglobin (9.3 g/dL) and hematocrit (27.2%), as well as slightly elevated prothrombin time (20.6 seconds) and international normalized ratio (1.8). White blood cell count ($7.4 \times 10^9/L$) and platelet count ($226 \times 10^9/L$) were within normal range. Creatine kinase-muscle/brain (CK-MB) (6.6 ng/mL) and troponin (1.630 ng/mL) were elevated.

In spite of additional transfusion with 2 units of packed red blood cells, the patient's hemoglobin remained mildly low (9.3 g/dL). Intermittent bloody output through the nasogastric tube was noted. The patient was, therefore, referred to Interventional Radiology for emergent visceral angiography with intervention.

Procedures

Esophagogastroduodenoscopy

In the ED, the patient was given intravenous boluses of a large volume of fluid (3 L of normal saline) and transfused with 2 units of packed red blood cells (p-RBCs). Following nasogastric (NG) tube placement, the patient underwent esophagogas-

troduodenoscopy (EGD) the following morning (day 2) at 10:47 AM, which demonstrated a small vessel in the distal esophagus with stigmata of recent bleeding. It was injected with 2 mL of epinephrine (1:10,000) and clipped. Although a small amount of thrombus was found in the gastric fundus, there was no source of bleeding identified on EGD. Additionally, the duodenum was normal. Toward the end of the endoscopic evaluation the patient became increasingly tachycardic (135 bpm) and hypotensive (systolic blood pressure < 65 mmHg). The procedure was terminated and the patient was admitted to the cardiac intensive care unit.

Visceral angiography with embolization (11:44 AM)

Under moderate sedation and with local anesthesia, right femoral arterial access was obtained percutaneously. Digital subtraction angiography of the descending aorta was performed using a 5-Fr pigtail catheter (Soft-Vu Omni Flush, AngioDynamics, Latham, New York); it demonstrated a small pseudoaneurysm (6 mm) at the gastric fundus arising from an SPA originating from the proximal segment of the main SA at 6–7 cm from the splenic hilum and approximately 8-cm long, coursing toward the gastric fundus (Fig. 1A). The celiac trunk was catheterized with a 5-Fr reverse-curve catheter (SIM-1, Cordis, Miami Lakes, Florida). Intra-gastric contrast extravasation from the pseudoaneurysm was identified in the distal segment of this artery and demonstrated curvilinear appearance as it pooled in the gastric rugae, mimicking the appearance of a vein (Fig. 1B). A 2.4-Fr coaxial microcatheter system (PROGREAT, Terumo, Tokyo, Japan) was used to catheterize the superior polar branch of the SA, and a microcoil (Nester Embolization Coil, Cook Medical, Bloomington, Indiana) was deployed. A final angiogram demonstrated complete occlusion of the target artery with no opacification of pseudoaneurysm or extravasation of contrast (Fig. 1C). Total procedure time was 1 hour and 30 minutes.

Over the course of several days, following the procedure, the patient's condition improved and her hemoglobin stabilized without further transfusion. The patient was discharged 7 days after the procedure and no recurrent symptoms were reported at 4-month follow-up.

Discussion

GI bleeding due to rupture of a SA aneurysm is a very uncommon, potentially fatal vascular complication that poses diagnostic and therapeutic challenges. A quick diagnosis and treatment is imperative because of its association with high morbidity and mortality rates [6].

SA aneurysms are the third most common intra-abdominal aneurysm behind aneurysm of the aorta and iliac arteries. The majority (60%) is solitary and <2 cm in diameter, and 75% are found in the distal third of the SA incidentally. Twenty percent are located in the middle third [7].

The SA represents the largest branch of the celiac trunk, running along the superior aspect of the pancreas before reaching the splenic hilum through the splenorenal ligament. Studies on the origin variation of the SA are multiple.

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