IMAGING AND INTERVENTION

CASE REPORT IMAGING AND INTERVENTION 2022;1(3):79-81
DOI: 10.5152/iai.2022.21031

Superior Epigastric Artery Pseudoaneurysm Post Percutaneous Radiologic Gastrostomy in a Patient with Prominent Winslow's Pathway

Irfan Masood[1], Obadah Ezzeldin[1], Hasan Khan[1], Sam Postma[2], Alexander Shestopalov[1]

[1]*Department of Interventional Radiology, The University of Texas Medical Branch, Galveston, Texas*
[2]*The University of Texas Medical Faculty of Medicine, Galveston, Texas*

Abstract

Percutaneous radiologic gastrostomy is a common procedure performed by interventional radiologists for patients needing nutritional support or gastric decompression. Major bleeding is an uncommon complication of the procedure, occurring in less than 2% of cases. Bleeding related to a pseudoaneurysm of the superior epigastric artery is a rare entity with a few reported cases in the literature. A wide range of treatment options are available, but it requires timely diagnosis and intervention to avoid hemorrhagic shock and associated morbidity and mortality.

Keywords: Gastrostomy, pseudoaneurysm, superior epigastric artery, Winslow's pathway

Introduction

Gastrostomy involves the creation of an artificial external opening into the stomach, which can be performed surgically, endoscopically, or percutaneously. The main indications for gastrostomy placement are long-term nutritional support and gastric decompression. Bleeding is an uncommon complication of the procedure with variable onset of presentation. Herein, we report a case of bleeding post percutaneous radiologic gastrostomy (PRG) tube placement due to a large pseudoaneurysm of the left superior epigastric artery in a patient with prominent Winslow's pathway from chronic aortoiliac occlusive disease.

Case Presentation

A 72-year-old male with a history of newly diagnosed squamous cell carcinoma (SSC) of the base of the tongue presented to interventional radiology (IR) as an inpatient consult for percutaneous gastrostomy tube placement for long-term nutritional support. He underwent technically successful fluoroscopy-guided placement of a 16-french gastrostomy tube with gastropexy using 3 T-fasteners (Avanos Medical, Alpharetta, Ga, USA). The immediate post-procedure period was significant for a small amount (<50 mL) of slow bleeding around the gastrostomy site without down-trending hemoglobin or hemodynamic instability. This resolved after a period of 12 hours since the initial placement and was attributed to the patient being on aspirin and clopidogrel for his comorbidities of hypertension and prior strokes. The patient was then discharged 3 days after the procedure. He presented 2-weeks later in the emergency department with swelling and bleeding around the gastrostomy site. His hemoglobin was 8.1 mg/dL from a baseline of 10.7 mg/dL with associated shortness of breath. A multi-phase computed tomography of the abdomen and pelvis was obtained, which showed abdominal wall hematoma at the site of the gastrostomy tube with a large pseudoaneurysm in the region of the left superior epigastric artery (Figure 1). The gastrostomy tube and the balloon were in the appropriate positions.

The patient was brought to the IR suite for an emergent angiogram and embolization of the bleeding source under moderate sedation. The arteriograms were performed via left radial artery access with selective catheterization of the left internal mammary artery using a 5-french angled catheter with subselective catheterization of the left superior epigastric artery using a 2.4-french microcatheter system. Arteriograms demonstrated a large pseudoaneurysm at the gastrostomy tube site measuring 1.7 × 1.5 cm with an arterial feeder from the left superior epigastric artery (Figure 2). This was successfully embolized using 2-mm hydrogel-coated, detachable metallic microcoils (Azure CX, 0.018", Terumo, Somerset, NJ, USA) with a repeat arteriogram showing complete cessation of antegrade flow into the pseudoaneurysm sac (Figure 3). Following embolization, the patient had an uneventful recovery period with no more bleeding episodes and was discharged without any complications.

Cite this article as: *Masood I, Ezzeldin O, Khan H, Postma S, Shestopalov A. Superior epigastric artery pseudoaneurysm post percutaneous radiologic gastrostomy in a patient with prominent winslow's pathway. Imaging Interv. 2022;1(3):79-81.*

Corresponding author: Irfan Masood, email: irmasood@utmb.edu

Received: December 30, 2021 **Accepted**: March 14, 2022

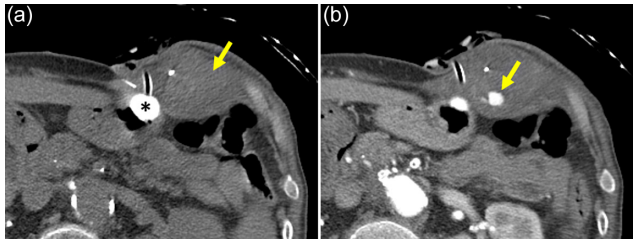

Figure 1. Axial non-enhanced (A) and contrast-enhanced (B) images of the upper abdomen show a gastrostomy tube with the balloon of the tube (black asterisk) appropriately located within the gastric lumen. Left abdominal wall hematoma is present (yellow arrow in "A") with a focal arterially enhancing outpouching measuring 1.7 × 1.5 cm in the region of the superior epigastric artery, consistent with a pseudoaneurysm.

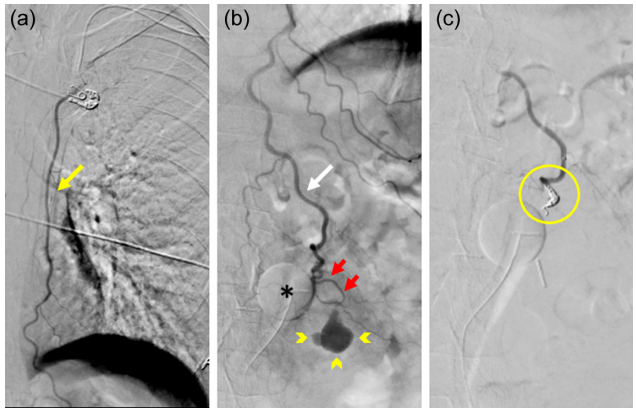

Figure 2. Intra-procedure angiographic images (A–C) show arteriograms by selective catheter placement in the left internal mammary artery (yellow arrow in "A") with opacification of the left superior epigastric artery (white arrow in "B"). A large pseudoaneurysm measuring 1.7 × 1.5 cm (arrowheads in "B") was noted with an arterial feeder (red arrows in "B") from the left superior epigastric artery. Post-coil embolization arteriogram (C) shows successful embolization of the arterial feeder with complete cessation of the antegrade flow.

Discussion

Major hemorrhage requiring additional intervention and transfusion after PRG is uncommon, occurring in less than 2% of cases.[1,2] The most common arterial source for major bleeding is the gastroepiploic artery[3] with other potential arterial sources being the left gastric artery,[4] celiac trunk, superior mesenteric artery, and the abdominal aorta. One common technique for performing PRG includes insufflation of the stomach via a nasogastric tube to achieve adequate gastric distention followed by placement of gastropexy. Gastropexy involves fluoroscopy-guided placement of 2-4 T-fasteners into the stomach which secures the anterior wall of the stomach to the anterior abdominal wall. A T-fastener consists of a metal bar positioned within the tip of an introducer needle, with a protruding absorbable suture alongside the needle. These fasteners are typically inserted fluoroscopically in a trajectory that avoids gastric vasculature along the lesser and greater curves as well as avoiding through-and-through puncture of the gastric lumen. The main risk for arterial injury is during gastropexy; however, infectious causes of pseudoaneurysm of the epigastric arteries have also been reported after gastrostomy.[5] In our case, the etiology of the pseudoaneurysm was likely inadvertent injury to the superior epigastric artery during gastropexy placement.

The superior epigastric artery is one of the terminal branches of the internal mammary (thoracic) artery, with the other terminal branch being the musculophrenic artery. Superior epigastric artery pseudoaneurysm following PRG is a rare entity with only a few reported cases in the literature.[1,5] Although the case reported by Fujita et al[5] does not specify whether the pseudoaneurysm was from the superior epigastric artery or the inferior epigastric artery, given the location of the pseudoaneurysm, it is assumed that the source is likely from the superior epigastric artery. In the presented case, a major risk factor for the described complication was larger than expected epigastric arteries as compensatory hypertrophy given severe aortoiliac atherosclerotic disease (Figure 2) in a well-described Winslow's pathway of collateral circulation supplying the lower extremities. This pathway arises from the subclavian arteries extending through the internal mammary arteries, superior epigastric arteries, and inferior epigastric arteries to the iliac or femoral arteries.[6]

Management options for major bleeding include supportive measures such as intravenous fluid resuscitation and blood transfusion, endoscopic intervention, endovascular intervention, percutaneous intervention, and surgery. In the reported cases by Fujita et al[5] and Grange et al,[1] the pseudoaneurysms

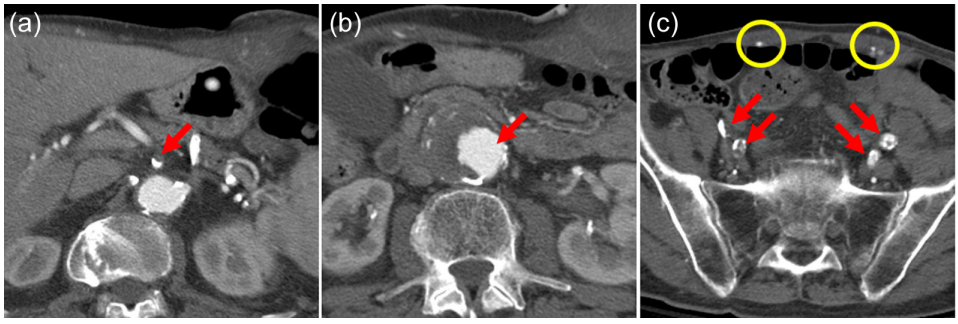

Figure 3. Axial contrast-enhanced images of abdomen and pelvis (A–C) show severe atherosclerotic disease with chronic occlusion of the superior mesenteric artery (arrow in "A") with infra-renal abdominal aortic aneurysm (arrow in "B") as well as chronic occlusions of the right external and internal iliac arteries and severe narrowing of the left external and internal iliac arteries (arrows in "C"). In addition, prominent inferior epigastric arteries (yellow circles in "C") are seen as part of Winslow's pathway.

were successfully treated percutaneously by direct ultrasound-guided puncture of the sac with a 21-gauge needle and 22-gauge needle, respectively. This was followed by injection of a mixture of 0.4-0.5 mL of N-butyl cyanoacrylate (NBCA) (Glubran 2, GEM Srl, Viareggio, Italy) and ethiodized oil (Lipiodol, Villepinte, Guerbet, France) in a 1 : 1 ratio. In our case, however, we treated the pseudoaneurysm endovascularly by direct catheterization of the arterial feeder and its subsequent coil embolization using metallic coils. Compared to the endovascular approach, the percutaneous approach has the advantage of reducing radiation exposure as well as the amount of iodinated contrast.

In conclusion, this case underlines the importance of knowledge and awareness of collateral circulation in patients with the aortoiliac occlusive disease who require percutaneous interventions to avoid arterial injury along the known bypass conduits. A pre-procedure color Doppler ultrasound of the upper abdomen can be considered to identify and mark the superior epigastric artery prior to the start of the procedure.

Informed Consent: Written informed consent was obtained the patient who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – I.M., O.E., S.P., H.K., A.S.; Design – I.M., O.E., S.P., H.K., A.S.; Supervision – I.M., A.S.; Materials – I.M., O.E., S.P., H.K., A.S.; Data Collection and/or Processing – I.M., O.E., S.P., H.K.; Analysis and/or Interpretation – I.M., O.E., S.P., H.K., A.S.; Literature Review – I.M.; Writing – I.M.; Critical Review – I.M., A.S.

Declaration of Interests: The authors declare that they have no competing interest.

Funding: This study received no funding.

References

1. Grange R, Chevalier-Meilland C, Le Roy B, Grange S. Delayed superior epigastric artery pseudoaneurysm following percutaneous radiologic gastrostomy: treatment by percutaneous embolization with N-butyl cyanoacrylate. *Radiol Case Rep*. 2021;16(6):1459-1462. [CrossRef]
2. Seo N, Shin JH, Ko GY, et al. Incidence and management of bleeding complications following percutaneous radiologic gastrostomy. *Korean J Radiol*. 2012;13(2):174-181. [CrossRef]
3. Covarrubias DA, O'Connor OJ, McDermott S, Arellano RS. Radiologic percutaneous gastrostomy: review of potential complications and approach to managing the unexpected outcome. *AJR Am J Roentgenol*. 2013;200(4):921-931. [CrossRef]
4. de Baere T, Chapot R, Kuoch V, et al. Percutaneous gastrostomy with fluoroscopic guidance: single-center experience in 500 consecutive cancer patients. *Radiology*. 1999;210(3):651-654. [CrossRef]
5. Fujita T, Tanabe M, Iida E, Matsunaga N, Ito K. Successful percutaneous treatment for massive hemorrhage due to infectious pseudoaneurysm in the abdominal wall after percutaneous endoscopic gastrostomy: a case report. *BMC Res Notes*. 2014;7:354. [CrossRef]
6. Cheng AK, Wong SC, Wong WP, Li YL, Cheung SCW. Winslow's pathway. *Abdom Radiol (NY)*. 2019;44(1):370-371. [CrossRef]