

Single Case

Treatment of Gastrointestinal Bleeding in the Biliopancreatic Limb with Embolization in a Patient with Duodenal Switch Anatomy

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Keywords

Duodenal switch · Gastrointestinal bleeding · Embolization

Abstract

Introduction: Biliopancreatic diversion with duodenal switch (BPD/DS) is an uncommon type of bariatric surgery that can rarely lead to bleeding in the biliopancreatic limb. The altered anatomy poses significant diagnostic and therapeutic challenges. **Case Presentation:** We present an unusual case of a woman status post-BPD/DS nearly a decade ago who presented with gastrointestinal bleeding in the duodenum of the biliopancreatic limb, a rare phenomenon given the unique surgery. **Conclusion:** We illustrate a promising minimally invasive option of successfully treating the bleeding by interventional radiology (IR) embolization as an alternative to more invasive and challenging options of balloon-assisted enteroscopy, lumen-apposing metal stent placement and surgical intraoperative enteroscopy.

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Introduction

There has been a rise in bariatric surgery over the last decade in the USA. One of the least common of which is biliopancreatic diversion with duodenal switch (BPD/DS) (shown in Fig. 1a). Despite high success in weight loss, the patient may experience increased surgical and metabolic complications. Patients with BPD/DS uncommonly experience gastrointestinal

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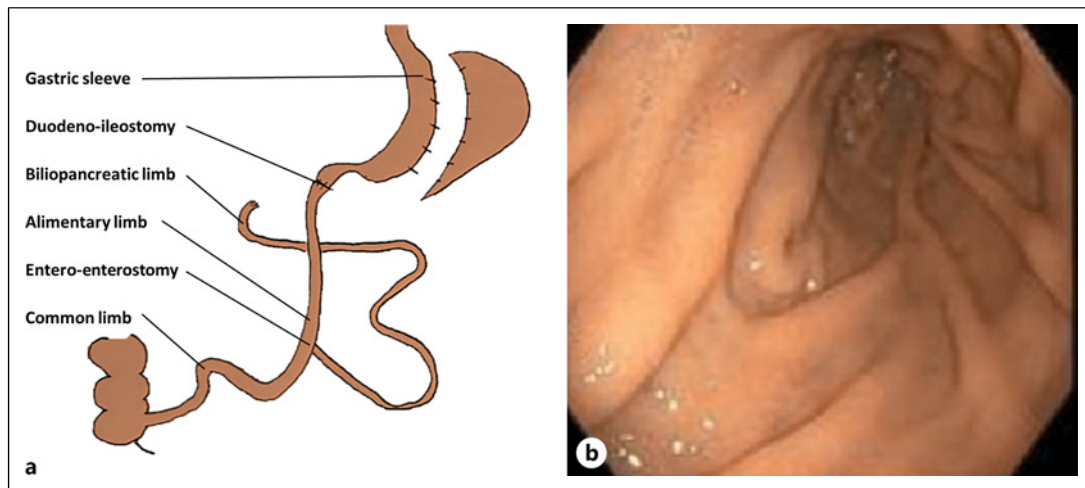


Fig. 1. **a** Biliopancreatic diversion with duodenal switch (BPD-DS). **b** Previous sleeve gastrectomy consistent with history of duodenal switch.

bleeding (GIB) that occurs in the biliopancreatic limb. The limb can be difficult to access endoscopically. We present a rare case of a woman status post BPD/DS nearly a decade ago presenting with melena, found to have active arterial bleed in the duodenum of the biliopancreatic limb that was successfully treated by interventional radiology (IR) embolization, thereby illustrating a successful minimally invasive option beyond balloon-assisted enteroscopy, lumen-apposing metal stent (LAMS) placement and surgical intraoperative enteroscopy.

Case Report

A 60-year-old female with a medical history of obesity status post-BPD/DS (9 years ago), prior GIB, and iron deficiency anemia presented with a 2-week history of fatigue, left lower quadrant pain, melena with one episode of hematochezia. She had no known history of *Helicobacter pylori* infection, tobacco use, and nonsteroidal anti-inflammatory drug therapy. Three years ago, she experienced melena and hematochezia. She underwent evaluation with an upper endoscopy revealing evidence of prior gastric surgery, normal afferent/efferent limbs without evidence of active bleeding, and a colonoscopy revealing a 2 mm benign cecal polyp and a 1 mm benign polyp in the descending colon that were both removed. She was treated with IV iron infusions.

On physical examination, she was afebrile, heart rate of 107 beats per minute, and blood pressure of 119/61 mm Hg. Abdominal examination was significant for a soft, non-tender abdomen, and a rectal examination showing medium hemorrhoids and trace black stool hemoccult positive. Laboratory studies revealed a white blood cell count of 15×10^9 cells/L, hemoglobin 10 g/dL (hemoglobin 12.5 2 years prior), platelet count 341×10^9 /L, blood urea nitrogen 32 mg/dL, creatinine 0.8 mg/dL, and normal liver enzymes, coagulation profile, lipase, and lactate. Abdominal and pelvic computed tomography (CT) angiography and nuclear medicine tagged red blood scan were negative for active bleeding. She underwent an upper endoscopy that showed evidence of prior duodenal switch without active bleeding and a colonoscopy that showed blood-tinged fluid with small clots throughout including the distal terminal ileum though no source could be identified, concerning for small bowel bleeding.

She was transferred to a tertiary care center where an upper endoscopy and small bowel video capsule endoscopy identified no source for bleeding (shown in Fig. 1b). CT enterography (institutional small bowel GIB protocol) 3 days later showed GIB in the duodenum (shown in Fig. 2). That same day, she underwent an angiography by IR that showed active arterial bleeding in the second portion of the duodenum from a superior pancreaticoduodenal artery. The bleeding vessel was cannulated with a microcatheter and embolized with microcoils, which stopped the bleeding. Following coil embolization of the proximal right gastroepiploic artery, the gastroduodenal artery was embolized with Gelfoam slurry in order to limit collateral flow to the area of bleeding (shown in Fig. 3). Post-embolization, her GIB resolved and hemoglobin remained stable. She was discharged 2 days later. She was closely followed post-discharge and there has been no recurrent GIB 2 years later.

Discussion

The growing obesity epidemic over the last decade in the USA has led to an increase of bariatric surgery. In 2019, a total of 256,000 bariatric surgeries were performed, which included 59% sleeve gastrectomy, 18% gastric bypass, and 1% biliopancreatic diversion with duodenal switch (BPD/DS) [1]. BPD/DS is usually performed on patients with BMI >50, which results in greater weight loss compared to other types of bariatric surgeries [2]. However, BPD/DS has become less popular due to the increased rate of complications stemming from high technical difficulty and malabsorptive related complications [2–5].

Postoperative bleeding in patients who underwent bariatric surgery has an incidence of 1–4% [6, 7]. Bleeding can either be intraluminal or extraluminal with most bleeding sources originating at the staple line or anastomosis. For patients with the rare BPD/DS surgery, a 2013 study reported the rate of bleeding of 1,000 patients was approximately 0.5% [3]. GIB occurring in the biliopancreatic limb, which typically consists of the duodenum and jejunum, can pose a significant challenge given endoscopic difficulty of reaching the region, especially if the bleeding occurs close to the duodenal stump which renders access nearly impossible using conventional endoscopies. Alternative options can also be challenging because balloon-assisted enteroscopy is limited by the need to traverse both the alimentary limb and the long length of the pancreaticobiliary limb as well as the need for retrograde access, and surgical intraoperative enteroscopy requires small bowel access. Two recent case reports describe the use of a LAMS to facilitate ERCP in evaluating the biliary tree in a patient with duodenal switch anatomy [8, 9].

To our knowledge, there is only 1 case series published recently in 2021 that reports specifically on GIB in the duodenum of the biliopancreatic limb in patients with a history of duodenal switch [10]. This study reported 3 cases with GIB leading to shock due to pseudoaneurysm of gastroduodenal artery that was successfully embolized by IR, all of whom bled within 2–3 weeks of the operation [10]. Another 2015 case report showed duodenal stump blowout leading to intra-abdominal (not intraluminal) hemorrhage, resulting in hemoperitoneum that was treated with reoperation [11]. Our patient underwent conventional upper and lower endoscopies and small bowel video capsule that did not reveal active bleeding, ultimately had a CT enterography and angiogram by IR that showed active bleeding in the duodenum leading to successful embolization of the superior pancreaticoduodenal and gastroduodenal arteries.

In conclusion, we present a rare case of a woman with obesity status post biliopancreatic diversion with duodenal switch nearly a decade ago, found to have active arterial bleeding in the duodenum of the biliopancreatic limb that is not related to pseudoaneurysm, and is successfully treated by IR embolization. This suggests that CT enterography and angiogram could be offered as the next diagnostic test (possibly even prior to video capsule endoscopy) if upper and lower endoscopies are not successful at locating the bleeding source. If a source of bleeding is localized

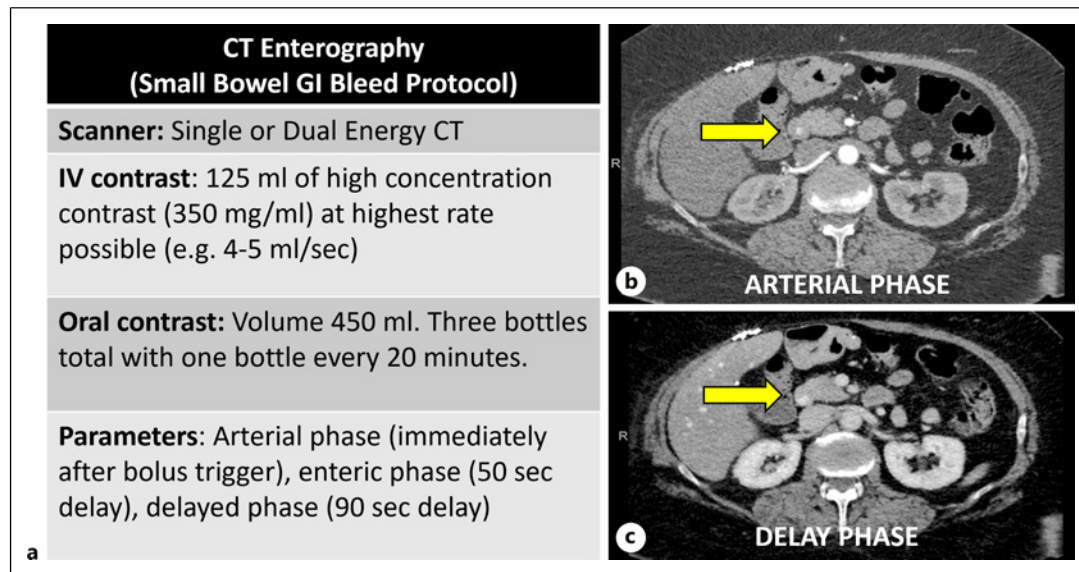


Fig. 2. **a** CT enterography with specialized small bowel GI bleed protocol designed by TJUH. **b, c** GI bleed in the duodenum visualized as a blush in the duodenal lumen on both the arterial and delay phase of CT enterography with small bowel GI bleed protocol. CT, computerized tomography; TJUH, Thomas Jefferson University Hospital.



Fig. 3. **a** Pre-embolization selective arteriography with microcatheter in gastroduodenal artery (*) (GDA) showing no active bleeding. **b** Active contrast extravasation (arrow) from superior pancreaticoduodenal artery branch at site of bleeding. **c** Post-microcoil embolization of the superior pancreaticoduodenal artery, selective GDA arteriogram demonstrates no further bleeding.

on imaging, arteriogram with IR embolization is a promising minimally invasive alternative to balloon-assisted enteroscopy, LAMS placement, and surgical intraoperative enteroscopy that can be used to evaluate and treat GIB from the biliopancreatic limb in patients who underwent BPS/DS. The CARE Checklist has been completed by the authors for this case report, attached as online supplementary material (for all online suppl. material, see <https://doi.org/10.1159/000536095>).

Statement of Ethics

Ethical approval is not required for this case report in accordance with local or national guidelines. Written informed consent was obtained from the patient for publication of the details of their medical case and any accompanying images.

Conflict of Interest Statement

The authors of this case report have no conflicts of interest to declare with regard to the publication of this case report.

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Author Contributions

Alice Pang wrote the manuscript and revised it for intellectual content. Robert Coben and Robert Adamo contributed substantially to the manuscript and revised the manuscript for intellectual content.

Data Availability Statement

All data generated or analyzed during this study are included in this article and its online supplementary material. Further inquiries can be directed to the corresponding author.

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