Postoperative ulcer disease continues to be a long-term concern in patients who undergo Roux-en-Y gastric bypass (RYGB). The true incidence of this complication is difficult to determine and varies depending on follow-up. Literature has described incidence ranging between 0.6% to 25%. Though the causes of marginal ulcers in these patients is often multifactorial, the most consistent risk factors appear to be recurrent use of nonsteroidal anti-inflammatory drugs, tobacco abuse, and Helicobacter pylori infection.

Diabetes mellitus has also been described as a risk factor because of microangiopathic disease that predisposes the patient to ischemia and ulcer formation.

Patients often present with nonspecific symptoms such as epigastric pain, dysphagia, nausea, and vomiting. The majority of marginal ulcer disease cases are treated medically with proton pump inhibitors, sucralfate, and patient counseling. Medical management is successful in approximately 68% of patients.

In cases involving significant gastric pouch or marginal ulcer bleeding, standard endoscopic hemostatic techniques are the first line of therapy. Angiographic hemostasis techniques have also been utilized. We report 2 cases of RYGB patients who had catastrophic bleeding events from marginal ulcer and gastric pouch ulcer erosion into the proximal splenic artery where endoscopic therapy failed and urgent surgical intervention was necessary due to patient instability.

Case Descriptions

Patient A

Patient A is a 52-year-old woman with metastatic cholangioadenocarcinoma on palliative chemotherapy who presented to our emergency department (ED) with sharp epigastric pain and bright red hematemesis for several hours. She had a past surgical history of RYGB. The malignancy was discovered incidentally following the RYGB 1 year before her presentation to our facility. She had developed chronic anemia, attributed to malignancy and/or chemotherapy, which was being treated with serial transfusions. The patient stated that she had chronic nausea since the discovery of her malignancy but very little vomiting prior to that day.
In the ED, she was tachycardic and mildly hypotensive. Her hemoglobin was 6.7 grams per deciliter, which was below her baseline of 8.0 grams per deciliter measured 3 days prior. She received 2 units of packed red blood cells (pRBC) and was admitted to the intensive care unit (ICU). Gastroenterology performed an esophagogastroduodenoscopy (EGD) that revealed bleeding from a marginal ulcer at the gastrojejunal anastomosis.

Twenty-four hours later, the patient collapsed following an episode of frank hematemesis in the restroom. A code blue was called and the patient was resuscitated with endotracheal intubation, fluid boluses, pRBC transfusion, and pressor support. The patient’s instability required emergent transfer to the operating room (OR).

The first operation was an exploratory laparotomy that revealed perforation of the gastric pouch adjacent to the left lobe of the liver with a dark blood clot. The clot was gently removed, and active arterial bleeding was noted from the splenic artery. Direct pressure failed to provide adequate control of bleeding, and the Veith maneuver was employed.

The Veith maneuver is a technique for obtaining supraceliac aortic control. The lesser omentum is divided, and the stomach and distal esophagus are retracted to the left. Blunt, manual dissection around the gastroesophageal junction allowed it to be encircled with a Penrose drain and retracted laterally, which exposes the supraceliac aorta just below the diaphragmatic hiatus and allows for control with a clamp or direct pressure.

Arterial bleeding was then controlled; oversewing of the splenic artery followed. This operation was followed by delayed reconstruction with gastric pouch resection and esophageojjunostomy. Distal enteral feeding access and delayed abdominal wall closure were performed as well. Following closure, the patient developed a perihepatic abscess, which was managed uneventfully with placement of a drain by interventional radiology (IR). Patient A was discharged to a rehabilitation facility after a 1-month stay in our hospital.

Patient B
Patient B is a 53-year-old woman who presented as a referral from Gastroenterology for recurrent epigastric pain, refractory gastroesophageal reflux disease, dysphagia, and surgical history of RYGB 22 years prior to presentation. She stated that she previously used cocaine and smoked cigarettes, but did not currently use any drugs or tobacco products. The patient had maintained a 100-pound weight loss for nearly 20 years before developing an increase in hunger with mild dysphagia to solids. EGD revealed marginal ulcers, which were treated with proton pump inhibitors and sucralfate. The patient returned to prebypass weight within 2 years.

She was taken to the OR for laparoscopic excision of 2 large gastro-gastric fistulas, lysis of adhesions, and gastrostomy tube placement. She developed fever and tachycardia postoperatively, and upper gastrointestinal series confirmed a lateral gastric pouch leak. She was taken to the OR a second time for EGD and esophageal stent placement. The patient was discharged from the hospital after a 39-day stay complicated by recurrent fever, vomiting, and abdominal pain with multiple endoscopies for repositioning of the stent.

She returned to the hospital multiple times over the next 6 months for fever, vomiting, and abdominal pain—all managed nonoperatively. Eventually, the esophageal stent was removed endoscopically due to intractable abdominal pain and vomiting. Laparoscopic cholecystectomy was also performed after HIDA (hepatobiliary) scan revealed chronic cholecystitis. The patient was discharged but presented to the ED 3 weeks later with epigastric pain radiating to the back, lightheadedness, diarrhea, and 6 episodes of hematemesis in 24 hours. The patient was admitted to the surgery inpatient service, but she soon began vomiting bright red blood and was transferred to the surgical ICU. The patient received 1 unit of pRBC after becoming tachycardic and hypotensive. IR was contacted for management of the upper gastrointestinal bleed, but patient load precluded transfer to the IR suite.

The patient was then taken to the OR for exploratory laparotomy where dense subhepatic adhesions to the gastric pouch were noted. Due to concern for marginal ulcer erosion into the proximal splenic artery, pressure was applied to the celiac trunk. Arterial pulsations were noted at the posterior aspect of the gastric pouch, but visualization of the bleeding site was difficult due to the liver adhesions. A partial left heptectomy was performed and a gastroscope was employed for better visualization of the bleeding vessel. This vessel, which was identified as the splenic artery, was oversewn for control of the hemorrhage.

The patient underwent a total of 5 operative procedures as she required additional second-look operations for a bile leak that healed conservatively. A partial colectomy was required followed by reconstruction with gastric pouch resection and esophageojjunostomy. A leak at the esophageojjunostomy was successfully treated with a fully covered self-expanding metal stent. Patient B was dis-
charged to a rehabilitation facility after a 1-month stay in our hospital.

Both patients survived despite massive transfusion requirements and prolonged hospitalization. Additionally, they both retained their spleens though Patient B suffered multiple splenic infarcts and was consequently immunized.

Discussion
As illustrated in the above cases, splenic artery erosion from marginal ulcers can precipitate severe gastrointestinal bleeding and lead to instability and life-threatening shock. Bariatric complications increase with patient age and time elapsed since the initial operation. Patients with complications often present acutely and are therefore treated by nonbariatric surgeons.

Commonly reported diagnoses include anastomotic leak, pulmonary embolism, internal hernia, small bowel obstruction, gastric band slippage or restriction, biliary disease, perforated ulcer with or without vessel erosion, and gastric outlet obstruction. Late complications include pouch enlargement, band erosion, gastric remnant syndrome, anastomotic stenosis, dumping syndrome, gastroesophageal reflux, and vitamin deficiencies. The majority of these complications do not progress to critical levels, and minimally invasive techniques are appropriate in most cases.

Despite multiple reports of gastric ulcer perforation following RYGB, there are few case reports detailing arterial erosion. Sidani et al describe a case in which the patient developed gross hematemia following RYGB. During exploratory laparotomy, the spleen appeared dusky and was excised allowing for angiographic embolization of the splenic artery. The authors proposed consideration of preoperative embolization to allow a safer surgical repair of the RYGB.

Bleeding marginal ulcers can be treated surgically with either open or laparoscopic procedures with identification and ligation of bleeding vessels. Sasse et al recount 7 individual case presentations of perforated marginal ulcer. Six required open or laparoscopic exploration with oversewing and omental patch. The seventh patient expired intraoperatively from multiple organ failure. Patients presenting without severe bleeding who maintain hemodynamic stability can be treated endoscopically while those presenting en extremis will typically require surgical intervention.

Conclusion
Although rare, massive upper gastrointestinal bleeding from ulcer erosion into the proximal splenic artery may require urgent and specific surgical therapy. Strong consideration should be given to interventional radiographic angiography for recurrent or initial severe upper gastrointestinal bleeds in RYGB patients. Our institution has established this protocol in light of the cases described above. Operative intervention, including the Veith maneuver for supraceliac aortic control, may be necessary if angiography fails or is not readily available. The bariatric and acute care surgeon should have a working knowledge of approaches to this particular life-threatening scenario.

References