Internal Hernia as a Late Complication of Roux-en-Y Gastric Bypass Procedure

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Introduction

As the prevalence of obesity continues to rise, so does the popularity of bariatric surgery. Previously the Roux-en-Y gastric bypass was the most common bariatric procedure, but now falls second to the gastric sleeve. It remains a relevant procedure, however, accounting for 17% of bariatric procedures in 2018. Due to its prevalence, it is important that the radiologist be familiar with the procedure and its complications such as leak, obstruction, stricture, or, as in this case, internal herniation through a mesenteric defect. Internal hernias are more commonly associated with the laparoscopic approach versus open. This is likely due to fewer adhesions created to secure the bowel, allowing more freedom for herniation and potential volvulus formation. It is imperative that the surgeon close all mesenteric defects created during the procedure to decrease the risk of this dire complication.

Case Presentation

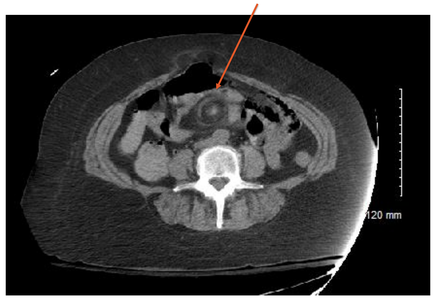
48 year old female with past medical history of peptic ulcer disease and Roux-en-Y Gastric Bypass presented to the ED with dizziness, abdominal pain, and frank blood per rectum of one day duration. She states symptoms began at the grocery store where she began to feel light headed and dizzy. When she returned home from the store she had to lay down on the couch because she was so dizzy. Later that evening she noted darker colored stool than usual. On subsequent BM she noticed frank bright red blood in the toilet. She again noted severe dizziness at that time. She dialed 911 and noted an additional episode of BRB per rectum en route to the hospital.

She has a history of small bowel AVMs status post ablation and duodenal ulceration via EGD in 2014. Pt admitted to drinking 5 beers yesterday, states she is a non-smoker and denies recreation drugs. Review of systems positive for lightheadedness, chills, abdominal pain, and rectal bleeding.

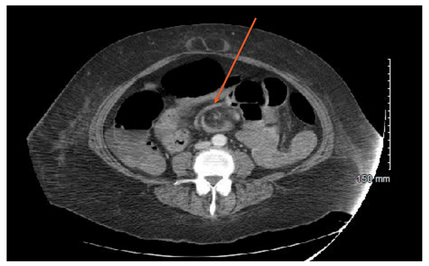
Initial CT scan is shown to the right with noted findings. Pt continued to have intermittent severe abdominal pain and episodes of BRB per rectum. Hemoglobin had dropped to a low of 6.3 requiring multiple units of PRBCs. Stat GI consult was placed. GI perfrmed deep EGD and colonoscopy but they did not show any significant pathology. However, visualization was limited due to her previous bariatric surgery. Pt continued to experience similar episodes and stat CT abdomen and pelvis with contrast was obtained. This subsequent CT is also shown to the right with noted findings.

General Surgery was consulted to evaluate the patient and elected to perform exploratory laparotomy due to patient condition. Significant findings in operative note are as follows: “the bowel associated with the Roux-en-Y anastomosis was quite twisted to almost 360 degrees, and also appeared to be compromised by mesenteric herniation, likely secondary to previous surgery. The area involved with this volvulus appeared to be boggy, but did not appear to be dusky. We could not undo the internal hernias without resecting bowel and made the decision to resect the Roux-en-Y anastomosis as this was the likely source of the bleeding given its boggy appearance and its twisting position”.

Imaging



Initial CT Abdomen + Pelvis:
Nonspecific hazy appearance of the lower abdominal small bowel mesentery ("misty mesentery"). While this could represent mesenteric panniculitis, the differential for a "misty mesentery" is broad including edema, hemorrhage, lymphedema, inflammation, and neoplasia.



Subsequent CT with contrast:
Increasing hyperdensity and swirling pattern in the mid abdomen involving the mesentery in that region with tapering of peripheral branches of the SMA in the region. The increasing density suggest hemorrhage to an area of infarction possibility of intermittent obstruction in that region is raised.

Discussion

Transmesenteric internal hernia (TIH) remains a difficult diagnosis to make pre-operatively due to the non-specific symptoms reported, the complex post-procedure anatomy, and lack of definitive radiological signs. TIHs typically occur over one month after the procedure, but can present much later. Patients usually complain of intermittent abdominal cramping and nausea. However, transmesenteric hernias have a high rate of developing volvulus, with a reported incidence approximately 30%. Should this occur and the bowel become strangulated, the situation may quickly escalate from the intermittent abdominal discomfort to symptoms such as GI bleeding, sepsis, perforation and peritonitis.

Radiologists are often not provided clinical presentation or prior surgical history to aid in diagnosis. Therefore, it is imperative that the radiologist is comfortable with the Roux-en-Y gastric bypass and the complex post-procedure anatomy. The surgeon staples a portion of the fundus, creating a small gastric pouch that is no longer attached to the remaining stomach or duodenum. Approximately 25-50cm distal to the ligament of Treitz, the surgeon separates the jejunum, and the distal end of this separation becomes the “Roux limb”. The Roux limb is brought, either anteriorly or posteriorly to the transverse colon, to the newly created gastric pouch and a gastrojejunal anastomosis is formed. The proximal portion of the jejunal separation is then anastomosed to the distal jejunum. This procedure leads to weight loss because the small gastric pouch induces early satiety.

Discussion continued

Internal hernias are more common with the Roux-en-Y gastric bypass if the Roux limb is brought posteriorly to the transverse colon (i.e. the retrocolic approach). This is because it requires creation of a mesenteric defect for the jejunum to pass through in route to the stomach. Although riskier, it is often the path of choice because of the greater length of jejunum required to pass with anteriorly to the transverse colon (i.e. the antecolic approach). There are three potential sites that internal hernias form following RYGBP including the jejuno-jejunal anastomosis site, Peterson’s space (area between the Roux limb and the transverse mesocolon), and at the transverse mesocolon defect created with the retrocolic approach. The most common site of herniation is at the transverse mesocolon defect.

CT scan remains the gold standard imaging for diagnosis of internal herniation. There have been many non-specific radiologic signs observed on CT that correlate with transmesenteric hernias. These include swirling of the mesentery, small bowel obstruction, distal tubular mesenteric fat with surrounding bowel loops, clustering of small bowel loops in the periphery, and small bowel found posterior to the superior mesenteric artery. In our case, increased attenuation of mesenteric fat was observed, also known as the “misty mesentery” sign. To our knowledge, no previous studies have yet documented the association of “misty mesentery” with internal herniation. However, currently the best radiologic indicator of TIH is the mesenteric swirl sign, which represents complete rotation of the mesentery, specifically the rotation of the superior mesenteric vein around the superior mesenteric artery. The sensitivity and specificity of mesenteric swirling is 86-89% and 86-90%, respectively.

Radiologists must be able to recognize the mesenteric swirl sign on CT and be familiar with all other associated CT signs of internal hernia. The importance of obtaining surgical history and current patient presentation cannot be overemphasized. Lastly, there should be a low threshold for surgical exploration in any patient presenting with abdominal symptoms following a Roux-en-Y gastric bypass surgery who are found to have mesenteric swirling on CT scan

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