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Multiple Internal Hernias: A Complication of Laparoscopic Roux-en-Y Gastric Bypass

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ABSTRACT

Introduction: Internal hernias are the most common cause of small bowel obstruction following laparoscopic Roux-en-Y gastric bypass surgery (LRYGBP) with four distinct types. Herein, we report the clinical course of a patient with two independent hernias at the Petersen’s space and a rarer subtype at the jejunojejunal window. A high index of suspicion for less common subtypes of internal hernias and the possibility of multiple, simultaneous internal hernias is critical.

Case Description: We describe the case of a 52-year-old female with a history of LRYGBP who presented with abdominal pain and emesis due to an internal hernia at Peterson’s defect, requiring subsequent laparoscopic repair. On postoperative day three, the patient presented again with recurrent abdominal pain and emesis. Repeat exploratory laparoscopy found a separate internal hernia involving the jejunojejunal window with the previously repaired Petersen’s defect intact.

Discussion: This case illustrates a unique scenario of a patient post-LRYGBP with multiple internal hernias at the Peterson’s space and the less common jejunojejunal

window, which was missed during the index surgery. Failure to identify simultaneous hernias may result in additional invasive intervention and further morbidity.

Conclusion: Multiple less-common variants of internal hernias may present simultaneously following LRYGBP.

Key Words: Roux-en-Y, Laparoscopic surgery, Gastric Bypass, Hernia, Surgical complications.

INTRODUCTION

The Roux-en-Y gastric bypass is one of the most effective and popular methods for weight loss in morbidly obese patients.¹ Compared to an open approach, laparoscopic surgery has gained traction for its favorable shorter hospital stays and decreased complications such as infection, incisional hernia, and mortality.² However, laparoscopic bariatric surgery has been associated with an increased incidence of internal hernias, explained partially by the decreased formation of adhesions.³⁻⁵ There are four types of internal hernias secondary to laparoscopic Roux-en-Y gastric bypass (LRYGBP), including distinct variations at the transverse colon mesentery, the Petersen’s space, the mesojejunum window, and the jejunojejunal window.⁶ In a study of 349 patients, 34 developed secondary internal hernias following LRYGBP with 4 (11.6%) classified as transmesocolic, 10 (29.4%) at Petersen’s space, 15 (44.2%) as mesojejunum, and 5 (14.8%) as jejunojejunal.⁴ Herein, we report an interesting clinical course of a patient with two independent hernias at the Petersen’s space and jejunojejunal window post-LRYGBP. We share this case to emphasize the importance of maintaining a high index of suspicion for less common subtypes of internal hernias and for the possibility of multiple internal hernias presenting simultaneously in the same patient.

Case Description

A 52-year-old female presented six months after a LRYGBP to the same institution with one day of periumbilical and left-sided abdominal pain associated with vomiting. Her pertinent past medical history included prediabetes, hypertension, and polycystic ovarian syndrome. Her past surgical

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history included a cesarean section 16 years prior. Family history was noncontributory.

On physical examination, the abdomen appeared distended with diffuse tenderness to palpation. There were no peritoneal signs or palpable hernias. Her vital signs, complete blood count, and basic metabolic panel were without abnormality. Noncontrast computed tomography (CT) revealed dilated bowel proximal to the jejunojejunal anastomosis with distal decompression without evidence of mesenteric swirling (**Figure 1**). Subsequently, the patient underwent laparoscopic exploration, reduction, and repair of an internal hernia through the Petersen's

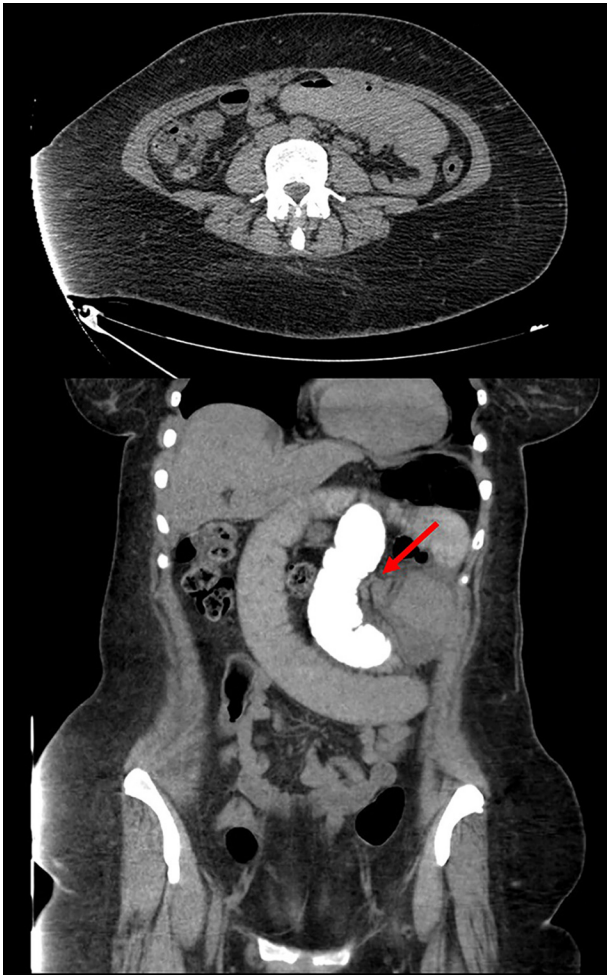


Figure 1. Noncontrast computed tomography obtained for evaluation of internal hernia six months following laparoscopic Roux-en-Y gastric bypass operation showing dilated bowel proximal to the jejunojejunal anastomosis with distal decompression (arrow), but without reported evidence of mesenteric swirling.

space using 3-0 Polysorb suture. Intraoperatively, it was clear the patient previously had an antecolic, retrogastric anastomosis on index operation. Additionally, only the mesenteric defect at the base of the jejunojejunal anastomosis was closed during the initial LRYGBP surgery using 3'0 Polysorb suture. The patient was discharged home from the PACU once deemed stable.

On postoperative day three, the patient returned to the emergency department with sudden onset abdominal pain with associated emesis. On physical examination, the abdomen was distended with tenderness to palpation focally in the left upper quadrant. There were no peritoneal signs or palpable hernias. Vital signs, complete blood count, and basic metabolic panel were unremarkable. Notably, the patient tested positive for COVID-19. Repeat noncontrast CT revealed proximal jejunal dilation with a transition point at the jejunojejunal anastomosis and concern for mesenteric swirling suggestive of internal herniation (**Figure 2**). The patient returned to the operating room for laparoscopic exploration, reduction, and repair which revealed that the Roux limb had herniated through a separate location underneath the Roux limb mesentery. This was completed using a 3'0 Polysorb suture. The previously repaired Petersen's defect was intact.

DISCUSSION

Our case illustrates a unique scenario of a patient presenting six months after LRYGBP with multiple internal hernias: one through the Peterson's space and the other involving the jejunojejunal window, which was missed during the index surgery. The most common clinical presentation of internal hernia is colicky abdominal pain with vomiting and possible signs of small bowel obstruction. The duration of time between our patient's LRYGBP operation and the onset of symptoms was six months, which is consistent with the average time to onset for most cases of internal hernias secondary to LRYGBP documented in the literature.^{4,5} Four variants of internal hernias secondary to LRYGBP have been described in the literature based on location: (1) through the transverse colon mesenteric defect, (2) through the space between the mesentery of Roux limb and transverse mesocolon (known as Petersen's space), (3) through the entero-enterostomy mesenteric defect, and (4) through the jejunojejunal mesenteric defect.^{4,6,7} Although herniation through Peterson's defect is one of the most common mechanisms of internal hernia following LRYGBP, herniation through the jejunojejunal window is a well-

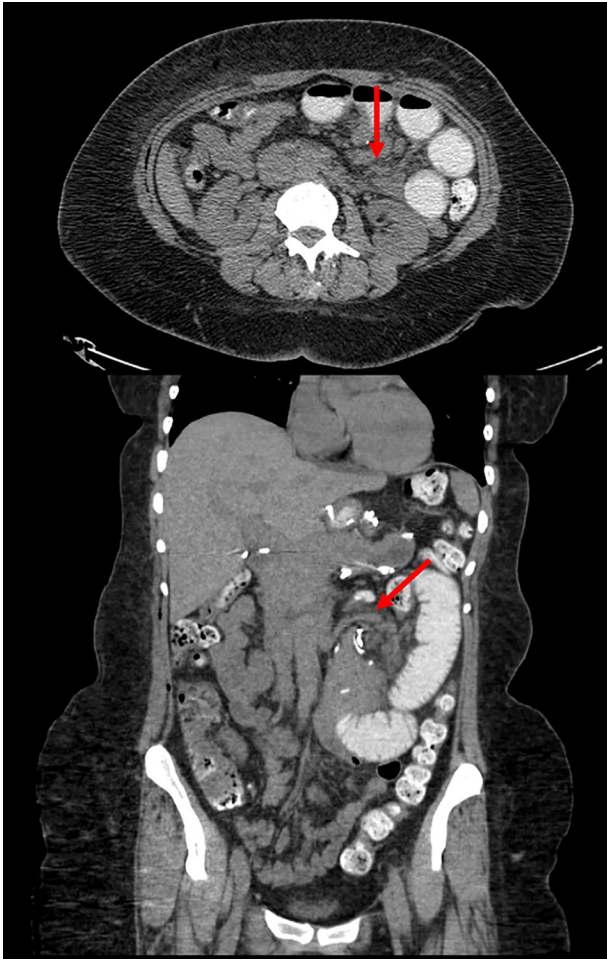


Figure 2. Three days after initial internal hernia repair at Petersen's space, repeat noncontrast computed tomography revealed proximal jejunal dilation with a transition point at the jejunojejunal anastomosis (arrow) and concern for mesenteric swirling suggestive of internal herniation at the jejunojejunal window.

documented complication of LRYGBP surgery.⁷ As seen in this case, a thorough and systematic search for internal hernias is critical using clinical, radiographic, and intraoperative evidence. The current case highlights the opportunity for new herniation through a missed defect. Failure to do so may result in additional invasive interventions and further morbidity, especially given the propensity for closed loop obstruction seen in patients with less clinically overt internal hernias.⁶

Internal hernias are the leading cause of small bowel obstruction following LRYGBP as the procedure itself creates two distinct spaces for herniation. In a review of 26 studies including 11,918 patients, the reported

incidence of internal hernias following LRYGBP was 2.51%.⁴ In recent years, characterization of internal hernias on CT has been of particular interest, as studies have found that identifiable features on imaging are often missed. In a blinded study of three radiologists, CT imaging was found to have 63% sensitivity and 76% specificity for transmesenteric internal hernias.⁸ Another study of 1,000 LRYGBP patients identified 45 cases of secondary internal herniation, with index imaging modalities diagnostic in 64% of cases, while retrospective review revealed imaging abnormalities in 97% of cases.⁵ A study evaluating the unique diagnostic features of the internal hernia variants found Petersen's space hernias to be associated with small bowel loops abutting onto the left abdominal wall with a shift of the superior mesenteric vessels left; whereas, the jejunojejunal hernias were associated with jejunojejunal suture widening.⁷ In our patient, initial noncontrast CT imaging revealed dilated bowel proximal to the jejunojejunal anastomosis with distal decompression without mesenteric swirling. Repeat CT showed dilated proximal jejunum with a transition point at the jejunojejunal anastomosis and concern for regional mesenteric swirling.

Evidence from the literature in conjunction with our case highlight the importance of a high index of clinical suspicion for internal hernias following LRYGBP, even if radiographic evidence is equivocal or unconvincing. To minimize the risk of bowel ischemia, additional invasive procedures, and downstream morbidity, physicians should implement a systematic approach to diagnosing internal hernias. In patients with a history of LRYGBP or other abdominal surgeries who have clinical features of herniation, radiologists should search thoroughly for radiographic evidence of IH, and strong communication between radiology and surgery should be a priority. Furthermore, intravenous contrast enhanced cross-sectional imaging should be pursued, while weighing for potential adverse effects given individual patient factors. Laboratory findings such as leukocytosis can also aid in the diagnosis and decision for surgical management, though this was not applicable in our case. To minimize the chance of overlooking additional hernias, surgeons should thoroughly examine each of the potential spaces for herniation while in the operating room and confirm the absence of additional hernias. With the increasing growth of our morbidly obese population and the paralleled demand for bariatric interventions, surgeons should be alert for the clinical signs of internal herniation following LRYGBP, and aware of multiple, less common locations of mesenteric defects.

CONCLUSION

In summary, internal hernias occur at a higher incidence following LRYGBP than the traditional open technique. Imperfect sensitivity and specificity of CT imaging presents a diagnostic challenge for surgeons, and a high index of clinical suspicion is required for prompt recognition. Thorough examination of the small bowel and all four sites for potential defects is essential to identify any areas of herniation, as multiple may be present in the same patient.

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