CASE REPORT JSLS

Gastric Bypass and Abdominal Pain: Think of Petersen Hernia

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ABSTRACT

Background: Laparoscopic Roux-en-Y gastric bypass (LRYGB) is one of the most commonly performed bariatric surgical procedures. A laparoscopic gastric bypass is associated with specific complications: internal herniation is one of these.

Case Report: A 47-year-old woman had undergone a laparoscopic Roux-en-Y gastric bypass (LRYGB) 18 months before presentation at our emergency department with mild abdominal complaints. Physical examination showed signs of an ileus in the absence of an acute abdomen. Laboratory investigations revealed no abnormalities (CRP 2.0 mg/L, white blood count 6.3 × 109/L). During admission, there was clinical deterioration on the third day. Emergency laparotomy was performed. An internal herniation through Petersen's space was found that strangulated and perforated the small bowel. A resection with primary anastomosis and closure of the defects was performed.

Conclusion: Diagnosing an internal herniation through Petersen's space is difficult due to the nonspecific clinical presentation. The interpretation of the CT scan poses another diagnostic challenge. This sign is present in 74% of the cases with this herniation. A missed diagnosis of internal herniation may cause potentially serious complications. A patient with a gastric bypass who experiences intermittent abdominal complaints should undergo laparoscopy to rule out internal herniation.

Key Words: Roux-en-Y gastric bypass, Peterson's space, Herniation, Laparoscopy.

INTRODUCTION

In obesity surgery, laparoscopic Roux-en-Y gastric bypass (LRYGB) is one of the most commonly performed bariatric procedures.[1] The LRYGB is an intervention with a mortality of 0.5% and morbidity of 7% to 14%.[2]

An internal hernia may occur after any abdominal surgical procedure. After LRYGB, a specific type of internal hernia may occur, because of the 2 specific potential hernia sites created with this procedure. The estimated incidence is between 0.9% and 4.5%.[3,4] It can lead to an acute strangulation of the intestine with possible fatal consequences. In this case report, we describe an instance of internal herniation with a delay in diagnosis due to its nonspecific presentation. Several suggestions are made to improve the accuracy of an earlier diagnosis of this potentially deadly complication.

CASE REPORT

A 47-year-old woman presented to our emergency department one and a half years after she had undergone a laparoscopic Roux-en-Y gastric bypass. The LRYGB was created with an antecolic alimentary limb of 150cm and a biliopancreatic limb of 50cm. The original report stated that possible hernia sites were closed during the primary surgical procedure by using sutures.

At the time of presentation, the patient's body mass index (BMI) had declined from 36.1kg/m^2 to 26kg/m^2. The patient complained of intermitted abdominal pain with nausea and vomiting. Physical examination revealed no tachycardia or fever. The bowel sounds were normal. Tenderness was found in the upper abdomen without further signs of peritonitis. A laboratory test showed no abnormalities (CRP 2.0mg/L, white cell count 6.3 × 10^9/L). A CT of the abdomen with oral contrast showed minimally dilated small bowel loops without signs of obstruction. Our differential diagnosis included an obstruction due to adhesions, internal herniation, or a gastrointestinal infection. The patient was admitted to our hospital for clinical observation. During admission, she continued having intermitted abdominal cramps. She developed diarrhea, which seemed to confirm the diagnosis of gastrointestinal infection. During

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the first 2 days of admission, our patient remained clinically stable without abnormalities on physical examination or blood tests. Three days after admission, she suffered from clinical deterioration. Physical examination of the abdomen showed the absence of bowel sounds and signs of generalized peritonitis. Laboratory tests showed an elevated CRP of 243mg/L and a reduced white cell count of 1.1×10^9/L. A CT of the abdomen showed free air within the peritoneal cavity and dilated small bowel loops.

An emergency laparoscopy showed a herniation of the small intestine distal to the jejunojejunostomy through Petersen's space. By laparotomy, 30cm of strangulated, perforated jejunum was resected. No evidence was found that potential hernia sites were closed during the first operation. We closed all internal hernia sites by suturing. The postoperative course was complicated by a paralytic ileus and pneumonia. Our patient was discharged after 18 days.

DISCUSSION

Our case shows internal herniation as a complication of the laparoscopic Roux-en-Y gastric bypass. In this surgical procedure, 2 possible internal hernia sites arise: (1) the opening in the mesentery of the jejunojejunostomy and (2) the opening between the mesentery of the alimentary loop and the mesocolon of the colon transversum. The latter is called Petersen's space **(Figure 1)**. In our case, a large part of the small intestine herniated through Petersen's space. This had resulted in an intermitted partial bowel obstruction without a complete obstruction. The probability of developing a Petersen's hernia is correlated with the surgical technique used in the laparoscopic gastric bypass. In patients with a Roux-en-Y gastric bypass with an antecolic alimentary loop as in our case is associated with a lower incidence compared to a retrocolic alimentary loop, 0.4% versus 4.5%, respectively.[5]

Recently, a study reported that closing all potential hernia sites is associated with a considerable decrease in the incidence of internal herniation.[6] Closure of the potential hernia sites during the LRYGB does not prevent internal herniation in all patients, as suggested in our case. Due to the reduction of intraabdominal fat after the bariatric procedure, potential hernia sites can re-open.[6–8]

This case demonstrates 2 diagnostic challenges in patients suffering from an internal hernia. The first challenge is the clinical presentation, which is often with mild and aspecific abdominal complaints. Even the ileus was intermittent, hampering the correct diagnosis.

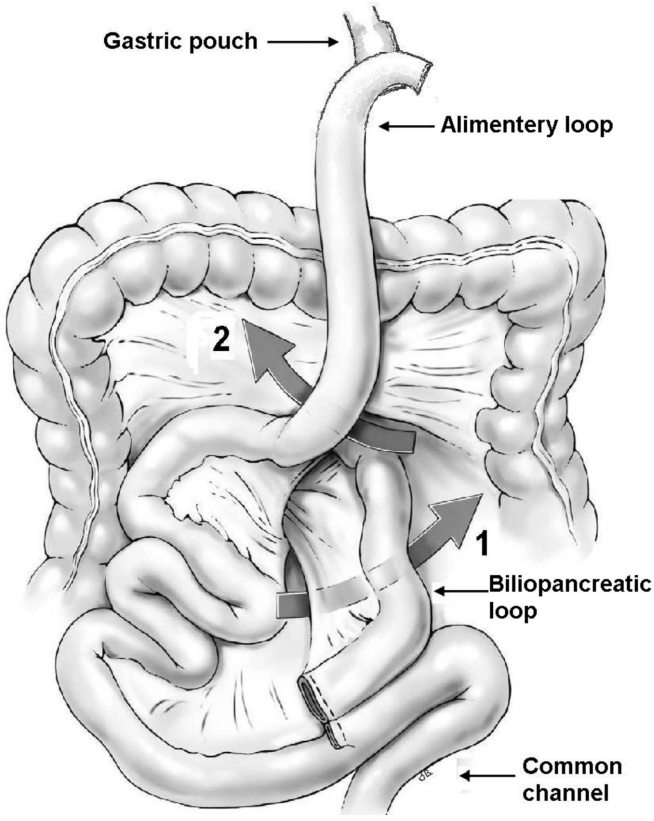

Figure 1. Possible herniation sites after antecolic Roux-and-Y gastric bypass.

The second challenge is the interpretation of a radiological investigation. On the first CT, abdominal signs of internal herniation were not identified. Retrospectively, a "swirl sign" was also present on the first CT scan. The "swirl sign" also called "whirlpool sign" is a specific indicator of the presence of an internal herniation through Petersen's space. This radiological finding is caused by a rotation of the complete mesentery, which can by recognized by following the routes of the mesenteric vein and the mesenteric artery. **Figure 2** shows a swirl sign in our patient.[9] The swirl sign can be demonstrated by scrolling through our CT scan online. The sensitivity of the swirl sign is 74% and the specificity is 83%.[10] Due to the herniation, dilated small intestinal loops will be found along the abdominal wall, and the transverse colon is moved to the center of the abdomen.

We initially missed the proper diagnosis, causing considerable diagnostic delay. In patients with abdominal complaints and a swirl sign on CT after a (laparoscopic)

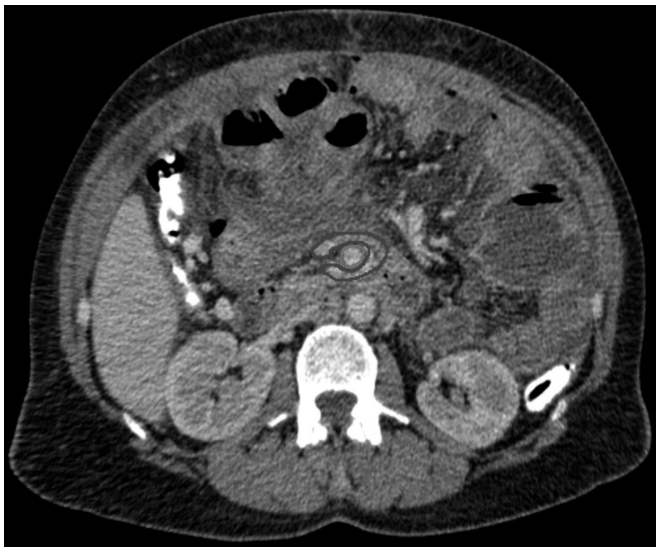

Figure 2. Transverse section CT of the abdomen. The red mark shows the superior mesenteric artery, and the blue mark shows the superior mesenteric vein.

Roux-en-Y gastric bypass, we recommend an immediate laparoscopy. The threshold in performing a laparoscopy should be very low in these patients, because the CT will not show abnormalities in 26% of the patients with an internal herniation.[4]

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