CASE REPORT

Two similar cases of internal hernia after laparoscopic Roux-en-Y gastric bypass surgery

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SUMMARY

Internal hernia after laparoscopic Roux-en-Y gastric bypass (LRYGB) surgery can lead to acute small bowel obstruction or chronic recurrent abdominal pain. We present two cases of internal hernias after antecolic antegastric LRYGB. Both patients presented to the emergency room with acute diffuse abdominal pain. Other than that, a physical examination and routine laboratory workup did not reveal any pathological finding. An abdominal CT was performed in both cases. It showed mesenteric torsion as a sign of internal hernia in one case, but remained inconclusive in the other patient. Immediate diagnostic laparoscopy was performed in both cases. Intraoperatively, both patients revealed an internal hernia, where the common channel herniated through the mesojejunal space. The conversion to upper median minilaparotomy was necessary for hernia reduction in both cases. No bowel resection was required and both patients recovered fully.

BACKGROUND

Laparoscopic Roux-en-Y gastric bypass (LRYGB) surgery is currently the most commonly performed bariatric surgical procedure providing excellent results with low morbidity and mortality.^{1–3} Owing to increasing numbers of bariatric operations performed general surgeons with little experience in bariatric surgery are confronted in the emergency room with patients suffering from acute problems after LRYGB. One of the most common and also most devastating complications that can arise after LRYGB is an internal hernia (IH), where usually parts of the bowel pass through a mesenteric defect. These spaces can develop after the LRYGB surgery due to the rearrangement of the bowel. It may lead to incarceration or strangulation of the herniated bowel loop. The possible mesenteric spaces after LRYGB arise at typical locations, which are displayed in figure 1. In antecolic antegastric LRYGB, there are two primary locations of IH: an open space between the alimentary (Roux) limb and the transverse colon (called Petersen's space) or a mesojejunal space at the jejunojejunostomy. In the less commonly performed retrocolic configuration of the gastroenterostomy, there is a third space behind the transverse colon that can lead to a mesocolic hernia.⁴

Symptoms of IH are unspecific. If bowel incarceration is transient, common presenting symptoms are chronic intermittent pain. In the case of acute incarceration, patients may present with symptoms of acute small bowel obstruction (SBO).⁴ Particularly the last-mentioned scenario often leads

to emergency admissions where fast and efficient diagnostic workup is crucial to reduce morbidity and mortality associated with bowel necrosis and sepsis. The presented cases emphasise the diagnostic difficulties and the need for early surgical exploration.

CASE PRESENTATION

Case 1: A 35-year-old female patient was admitted to the emergency unit. She had presented to the referring hospital with a 3-day history of abdominal cramps. Eighteen months before, an antecolic antegastric laparoscopic Roux-en-Y gastric bypass (AA-LRYGB) had been performed due to obesity with a body mass index (BMI) of 47 kg/m² in the referring centre with a thus far uneventful postoperative course and a weight loss of 58 kg (BMI 29 kg/m²). On admission she presented with slight periumbilical tenderness without any other abnormalities.

Case 2: A 31-year-old female patient presented in the emergency room with a history of upper abdominal cramps during the last 3 days. Nine months prior to presentation, an AA-LRYGB surgery was performed due to obesity (BMI 44 kg/m²) in another hospital. So far, the postoperative course was without problems and the patient had lost 34 kg (BMI 29 kg/m²). Apart from abdominal pain in the epigastrium physical examination revealed no pathological findings.

INVESTIGATIONS

Case 1: Laboratory findings were normal. An abdominal CT had already been performed by the referring hospital and showed segmental small bowel wall thickening but no signs of IH and no dilated bowel loops (figure 2).

Case 2: Routine blood analysis showed no abnormalities. An abdominal CT was performed which showed torsion of the small bowel mesentery and oedematous mesenteric swelling ('mesenteric swirl sign') as typical indirect signs of IH (figure 3).

TREATMENT

Case 1: After an inconclusive CT scan, we performed an immediate laparoscopy due to ongoing abdominal pain where a herniation of the complete common channel through an open mesojejunal defect and 180° torsion of the mesentery was found (figure 4). Upper median minilaparotomy was necessary for the reduction of the small bowel. Mesenteric spaces were closed with interrupted non-absorbable sutures.

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Figure 1 Potential mesenteric spaces; left, antecolic approach; right, retrocolic approach (AL, alimentary limb; BPL, biliopancreatic limb; CC, common channel; JJ, jejunojejunostomy).

Case 2: In clear CT findings of mesenteric torsion as a sign of IH an emergency diagnostic laparoscopy was performed. Similar to the other case, herniation of the complete common channel through mesojejunal defect was found. There was no evident bowel ischaemia but slightly livid colour change of the herniated small bowel. The Petersen's space was also found to be open but without herniation at that site. Owing to the oedematous swelling of the mesentery a laparoscopic hernia reduction was not feasible. The hernia was reduced through an

upper median minilaparotomy and both the mesojejunal and Petersen's space were closed with interrupted non-absorbable sutures.

OUTCOME AND FOLLOW-UP

The postoperative course was uncomplicated in both patients and they could both be discharged home 4 days after surgery.

DISCUSSION

Owing to several technical differences in LRYGB surgery it is difficult to give detailed information about true incidence of IH. In reported case series incidence varies from 0% to about 9%.⁵⁻⁸ As mentioned above, in AA-LRYGB, IH is located at Petersen's space or at the mesojejunal space. The retrocolic approach, where a third hernia site is possible (mesocolic hernia), is associated with a higher risk for IH.⁹ Differences in surgical techniques also influence the incidence distribution of hernia location. Therefore, it cannot be defined if Petersen's or intermesenteric hernia is more common. IH after LRYGB typically occurs after significant weight loss. Loss of mesenteric fat leads to a widening of intermesenteric spaces. Rapid excess weight loss seems to increase the

Figure 2 Abdominal CT showing segmental bowel wall thickening (arrow) but no direct signs of internal hernia.

Figure 3 Abdominal CT showing torsion of small bowel mesentery ('swirl sign'). SMA, superior mesenteric artery.

Figure 4 Intraoperative picture of herniation of the common channel through the open mesojeunal space (AL, alimentary limb; BPL, biliopancreatic limb; CC, common channel; JJ, jejunojunction; white arrow: direction of the herniation; black arrow: torsion of small bowel).

risk for hernia occurrence.⁶ Another situation with changing intra-abdominal anatomy is pregnancy. There are several case reports and series describing IH in patients after LRYGB with also fatal outcome for the mother and fetus.^{10 11}

Symptoms of IH are unspecific and depend on the time and extent of herniation and if acute SBO is present. Patients with intermittent herniation may report recurrent abdominal cramps with a possible postprandial exacerbation.⁴ Acute onset of abdominal pain can be a sign of an acute incarceration with threatening SBO, possibly accompanied by nausea and vomiting. As in the presented cases, these patients usually present to the emergency room. Laboratory findings do usually not help in the diagnostic workup, as they mostly reveal no abnormalities. Radiological imaging may comprise plain abdominal X-rays, upper gastrointestinal series, ultrasounds and abdominal CTs. The CT scan is the gold standard for IH but can also be non-diagnostic, especially in asymptomatic patients.⁴ In the majority of cases there are no direct signs of but typical indirect signs like a mesenteric swirl sign, that was present in case 2.¹² A CT scan may also help to distinguish between the different hernia types.¹³ It is important to know that CT scan may also be normal even in symptomatic patients.¹⁴

There is no doubt that in persisting symptoms, also in cases with non-diagnostic imaging, an early diagnostic laparoscopy is mandatory.⁴ If no bowel necrosis is present, hernia reduction should be attempted by laparoscopy.¹⁵ In difficult cases a sparing laparotomy may be indicated as in the presented cases. It is of utmost importance that a surgeon with experience in bariatric surgery is involved.

There is an ongoing debate among bariatric surgeons if primary closure of mesenteric defects reduces the risk for IH. Interestingly, there are studies that showed very low incidence of IH after LRYGB with no primary closure and therefore, the authors advise against routine closure of mesenteric defects.^{7 16} However, there is increasing evidence, that primary closure can reduce the incidence of IH.^{8 17–20} De la Cruz-Muñoz and colleagues reviewed 2079 patients after LRYGB surgery and compared IH incidences before and after they started to routinely close mesenteric defects at the initial surgery. They found a significant reduction of IH incidence.⁸ Closing mesenteric defects may also bear a risk for complications,²¹ however, we believe the benefit outbalances the risk. While it is recommended to use

non-absorbable sutures for closing the defects, it is not clear if running of interrupted sutures are superior. The presented cases were initially both operated in other hospitals. Therefore it is not known what surgical strategy was implemented. But from operation reports we know that no closure of mesenteric defects had been described leading to the assumption that in both cases potential mesenteric defects were left open.

In conclusion, we think the described cases show the difficulties of diagnosing IH after LRYGB and the importance for straightforward early surgical exploration by a surgeon with bariatric experience. Time is tissue and delayed diagnosis can lead to fatal outcomes.

Learning points

- ▶ Internal hernia after laparoscopic Roux-en-Y gastric bypass (LRYGB) surgery can arise in up to 10% and is a potential fatal complication.
- ▶ It requires a high index of suspicion and diagnosis is difficult due to unspecific symptoms.
- ▶ CT scan of internal hernia can be normal.
- ▶ Therefore, early diagnostic laparoscopy is mandatory when internal hernia is suspected.
- ▶ There is increasing evidence that primary closure of mesenteric defects reduces the risk for internal hernia after LRYGB.

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REFERENCES

- 1 DeMaria EJ. Bariatric surgery for morbid obesity. *N Engl J Med* 2007;356:2176–83.
- 2 Dixon JB, Straznicki NE, Lambert EA, *et al.* Surgical approaches to the treatment of obesity. *Nat Rev Gastroenterol Hepatol* 2011;8:429–37.
- 3 Flum DR, Belle SH, King WC, *et al.* Perioperative safety in the longitudinal assessment of bariatric surgery. *N Engl J Med* 2009;361:445–54.
- 4 O'Rourke RW. Management strategies for internal hernia after gastric bypass. *J Gastrointest Surg* 2011;15:1049–54.
- 5 Suter M, Donadini A, Romy S, *et al.* Laparoscopic Roux-en-Y gastric bypass: significant long-term weight loss, improvement of obesity-related comorbidities and quality of life. *Ann Surg* 2011;254:267–73.
- 6 Schneider C, Cobb W, Scott J, *et al.* Rapid excess weight loss following laparoscopic gastric bypass leads to increased risk of internal hernia. *Surg Endosc* 2011;25:1594–8.
- 7 Madan AK, Lo Menzo E, Dhawan N, *et al.* Internal hernias and nonclosure of mesenteric defects during laparoscopic Roux-en-Y gastric bypass. *Obes Surg* 2009;19:549–52.
- 8 De la Cruz-Muñoz N, Cabrera JC, Cuesta M, *et al.* Closure of mesenteric defect can lead to decrease in internal hernias after Roux-en-Y gastric bypass. *Surg Obes Relat Dis* 2011;7:176–80.
- 9 Steele KE, Prokopowicz GP, Magnuson T, *et al.* Laparoscopic antecolic Roux-en-Y gastric bypass with closure of internal defects leads to fewer internal hernias than the retrocolic approach. *Surg Endosc* 2008;22:2056–61.
- 10 Torres-Villalobos GM, Kellogg TA, Leslie DB, *et al.* Small bowel obstruction and internal hernias during pregnancy after gastric bypass surgery. *Obes Surg* 2009;19:944–50.

- 11 Moore KA, Ouyang DW, Whang EE. Maternal and fetal deaths after gastric bypass surgery for morbid obesity. *N Engl J Med* 2004;351:721–2.
- 12 Lockhart ME, Tessler FN, Canon CL, *et al.* Internal hernia after gastric bypass: sensitivity and specificity of seven CT signs with surgical correlation and controls. *AJR Am J Roentgenol* 2007;188:745–50.
- 13 Kawkabani Marchini A, Denys A, Paroz A, *et al.* The four different types of internal hernia occurring after laparoscopic Roux-en-Y gastric bypass performed for morbid obesity: are there any multidetector computed tomography (MDCT) features permitting their distinction? *Obes Surg* 2011;21:506–16.
- 14 Comeau E, Gagner M, Inabnet WB, *et al.* Symptomatic internal hernias after laparoscopic bariatric surgery. *Surg Endosc* 2005;19:34–9.
- 15 Leyba JL, Navarrete S, Navarrete Llopis S, *et al.* Laparoscopic technique for hernia reduction and mesenteric defect closure in patients with internal hernia as a postoperative complication of laparoscopic Roux-en-Y gastric bypass. *Surg Laparosc Endosc Percutan Tech* 2012;22:e182–5.
- 16 Cho M, Pinto D, Carrodegua L, *et al.* Frequency and management of internal hernias after laparoscopic antecolic antegastric Roux-en-Y gastric bypass without division of the small bowel mesentery or closure of mesenteric defects: review of 1400 consecutive cases. *Surg Obes Relat Dis* 2006;2:87–91.
- 17 Iannelli A, Facchiano E, Gugenheim J. Internal hernia as a complication of laparoscopic Roux-en-Y gastric bypass. *Obes Surg* 2007;17:1283–6.
- 18 Bauman RW, Pirrello JR. Internal hernia at Petersen's space after laparoscopic Roux-en-Y gastric bypass: 6.2% incidence without closure—a single surgeon series of 1047 cases. *Surg Obes Relat Dis* 2009;5:565–70.
- 19 Rodriguez A, Mosti M, Sierra M, *et al.* Small bowel obstruction after antecolic and antegastric laparoscopic Roux-en-Y gastric bypass: could the incidence be reduced? *Obes Surg* 2010;20:1380–4.
- 20 Abasbassi M, Pottel H, Deylgat B, *et al.* Small bowel obstruction after antecolic antegastric laparoscopic roux-en-Y gastric bypass without division of small bowel mesentery: a single-centre, 7-year review. *Obes Surg* 2011;21:1822–7.
- 21 Gumbs AA, Duffy AJ, Chandwani R, *et al.* Jejunojunal anastomotic obstruction following laparoscopic Roux-en-Y gastric bypass due to non-absorbable suture: a report of seven cases. *Obes Surg* 2006;16:12–15.

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