Case report

Mechanical ileus and mesenteric ischemia as complications of MiniMizer-gastric-ring after laparoscopic banded Roux-en-Y-gastric bypass: A case report

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ABSTRACT

Introduction: Banded laparoscopic Roux-en-Y-gastric bypass (B-LRYGB) is a surgical technique that involves reinforcing the restriction by placing a silicone ring 2 cm above the gastrojejunostomy to prevent pouch dilation, thereby maintaining the achieved weight loss and preventing weight regain. Gastrojejunostomy stenosis, erosions, and ring-migration (slippage) are well-known complications in patients undergoing banded laparoscopic procedures. We believe that our study makes a significant contribution to the literature because, to the best of our knowledge, cranial slippage (herniation) of the alimentary limb through a non-slipped MiniMizer gastric ring after B-LRYGB as well as mesenteric ischemia because of ventral slippage have not been described before in the published literature.

Presentation of case: This study presents two rare complications in middle-aged women 26 months after B-LRYGB. The first case presented with mechanical ileus due to herniation of the alimentary limb without slippage of the MiniMizer ring. The second case involved mesenteric ischemia following ventral migration of the MiniMizer ring with herniation of the alimentary limb and its mesentery through the ring with consequent torsion of the mesentery. Both patients were managed with surgical intervention and band removal. The postoperative course was uneventful.

Discussion: In cases of MiniMizer ring complications, the presentation can be either acute or chronic. Severe mesenteric ischemia is acute and can be fatal. Patients may also present with chronic recurrent abdominal pain or mechanical ileus. The loss of mesenteric fat after successful weight loss might lead to the cranial herniation of the alimentary limb. This could also be a result of dysmotility or reverse peristalsis secondary to ectopic pacemaker cells over a fixed point (in this case, the gastrojejunostomy with the MiniMizer ring) [4,5]. A gradual herniation of the intestinal wall over the fixed point can also occur due to recurrent dietary non-adherence (such as large portions and hard consistency of the food).

Conclusion: A high sense of suspicion and radiological investigation are crucial factors in reaching the proper diagnosis. Further studies should be conducted to examine whether other forms of ring placement or fixation could help avoid the risk of potentially fatal complications.

1. Introduction

Morbid obesity is an emerging health problem that can be considered one of the major causes of many metabolic illnesses and a clear reduction of the quality of life. Roux-en-Y-gastric bypass (RYGB) is one of the most effective ways to overcome this problem after the failure of conservative therapy. Insufficient weight loss and weight regain by pouch and pouch-outlet dilatation are well-known consequences in some patients. Banded laparoscopic Roux-en-Y-gastric bypass (B-LRYGB) is a surgical technique that was developed to overcome this challenge. The technique involves reinforcing the restriction by placing a silicone ring 2 cm above the gastrojejunostomy to prevent pouch dilation, thereby maintaining the achieved weight loss and preventing weight regain.

Gastrojejunostomy stenosis, erosions, and ring-migration (slippage) are well-known complications that occur in up to 7% of banded bariatric procedures, specifically after B-LRYGB in 2.8%, 2.3%, and 1.5%, respectively [1]. Internal herniation of the small intestine through the Petersen’s space, jejunojejunal anastomosis, or transverse mesocolon

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defect is a well-known complication following Roux-en-Y-gastric bypass in 2–9% of cases [2]. This work was reported in line with the SCARE 2020 criteria [3].

In the following two cases of complications following B-LRYGB that were managed using surgical treatment.

2. Presentation of case

2.1. Case 1

A 49-year-old woman presented to our emergency department with a weeklong history of recurrent colicky pain in the epigastric region associated with recurrent vomiting of gastric contents in addition to fatigue. She had undergone banded laparoscopic Roux-en-Y-gastric bypass with MiniMizer gastric ring insertion 26 months earlier. Her BMI at the time of the initial surgery was 61 kg/m². The MiniMizer-ring was placed 2 cm above the gastrojejunostomy, locked at 7.5 cm, and fixed using a non-absorbable suture. The postoperative course at that time was unremarkable, and the patient was discharged on the third postoperative day. The patient achieved excellent postoperative weight loss with BMI dropping from 61 to 29 kg/m² over 26 months after the surgery.

During her current visit, the pain was found to be correlated with the early postprandial phase. She had no signs of fever, diarrhea, and other symptoms. Her medical or surgical history was not significant. The patient’s vital signs were normal during her current presentation, and abdominal examination revealed a distended abdomen with tenderness in the epigastric and umbilical region. There was no guarding or rigidity, and she had normal peristaltic movements. Laboratory results, including CBC, and a basic metabolic panel including liver function tests, were within normal limits.

Computed tomography (CT) of the abdomen revealed massive dilation of the proximal bowel below the gastrojejunostomy site without free air or fluid collection, along with dilation of the distal small bowel. The barium swallow examination demonstrated no passage of contrast beyond the dilated bowel segment. Diagnostic laparoscopy was performed. Intraoperatively, adhesions were found between the gastric pouch and the left lobe of the liver, which were dissected carefully. A dilated loop of the jejunum, 8 cm in diameter, was found underneath an area of star-like scar tissue. Upon careful preparation of the scar tissue, the MiniMizer gastric ring could be adequately exposed. The ring appeared to be in the correct location without any signs of slippage. At this time, it was evident that the proximal portion of the alimentary loop had slipped (herniated) cranially through the MiniMizer ring and was maximally dilated with additional peritoneal cystic swelling (Fig. 1).

The MiniMizer-ring was removed, followed by resecting the massively dilated portion of the gastrojejunostomy and the proximal alimentary limb (total of 20 cm), and a new anastomosis was created. Upon further exploration, we observed herniation of the distal alimentary and biliopancreatic loop through the Petersen foramen. Subsequently, the hernia was reduced, and closure of the Petersen foramen and mesenteric defects of the Jejunejunostomy was attempted using a non-dissolvable V-Loc™ suture. The postoperative course was unremarkable, and the patient was discharged on the 4th postoperative day.

2.2. Case 2

A 38-year-old woman presented to the emergency department in an outside hospital with sudden onset of severe diffuse abdominal pain, which was consistent with acute abdomen syndrome. She had undergone banded laparoscopic Roux-en-Y-gastric bypass with MiniMizer-ring insertion 26 months earlier. Her BMI at the time was 64 kg/m². The MiniMizer-Band was placed 2 cm above the gastrojejunostomy and was locked at 7.5 cm and fixed with a non-absorbable suture. Her postoperative course was unremarkable at that time, and the patient was discharged on the third postoperative day.

Fig. 1. Cranial herniation (slippage) of the proximal portion of the alimentary loop through the MiniMizer ring.

During her current visit, computed tomography (CT) of the abdomen and pelvis demonstrated complete obliteration of the superior mesenteric artery and vein with malperfusion of the entire small intestine. No free air or fluid collection was observed (Fig. 2). The patient underwent emergency open laparotomy due to mesenteric ischemia. The intraoperative findings were consistent with the CT findings. Although not gangrenized, the entire small intestine appeared discolored up to the ileocecal valve. No perforation or abscess formation was observed.

The ventral migration of the dorsally well-fixed MiniMizer-gastric-ring with subsequent herniation of the alimentary limb with torsion of the mesentery was found to be the mechanism responsible for her complication. The MiniMizer ring was removed, followed by rapid resolution of the discoloration. The color of the entire intestine returned to normal after 1 min. Partial resection of the bowel was not required. The postoperative course was unremarkable, and the patient was discharged on the 4th postoperative day and presented to our center for postoperative follow-up.

3. Discussion

Cases of cranial slippage (herniation) of the alimentary limb through a non-slipped MiniMizer gastric ring after B-LRYGB have not been described earlier in the literature. Here, we report two cases of complications associated with MiniMizer-gastric-ring. In the first case, the proximal portion of the alimentary loop had slipped (herniated) cranially through the MiniMizer ring and was maximally dilated while causing additional peritoneal cystic swelling. In the second case, we found a ventral slippage of the MiniMizer ring, which led to mesenteric ischemia by the same mechanism through herniation of the alimentary limb and torsion of the mesentery. The findings from the first case were in contrast with the second case.

In cases of MiniMizer ring complications, the presentation can be either acute or chronic. Severe mesenteric ischemia is acute and can be fatal. Patients may also present with chronic recurrent abdominal pain.
or mechanical ileus. The loss of mesenteric fat after successful weight loss might lead to the cranial herniation of the alimentary limb. This could also be a result of dysmotility or reverse peristalsis secondary to ectopic pacemaker cells over a fixed point (in this case, the gastro-jejunostomy with the MiniMizer ring) [4,5]. A gradual herniation of the intestinal wall over the fixed point can also occur due to recurrent dietary non-adherence (such as large portions and hard consistency of the food). After conducting a thorough literature review of all the complications that follow a B-LRYGB, we found two cases with a presentation similar to that of our patients but with different mechanisms. The first case described intussusception of the alimentary limb through a slipped minimizer [6]. In contrast, in the second case, a 33-week pregnant woman developed a mechanical ileus due to complete dislocation and migration of the MiniMizer ring up to the jejunoojejunostomy [7].

4. Conclusion

To the best of our knowledge, cranial slippage (herniation) of the alimentary limb through a non-slipped MiniMizer gastric ring after B-LRYGB as well as mesenteric ischemia because of ventral slippage have not been described before. A high sense of suspicion and radiological investigation are crucial factors in reaching the proper mechanism. The ideal treatment in this situation is surgical exploration and band removal. Further surgical therapy depends on the intraoperative findings. Although these are just two cases we encountered at our institution, we aim to raise awareness about these newly described outcomes and offer feasible recommendations for managing this complication. Further studies should be conducted to examine whether other forms of ring placement or fixation could help avoid the risk of potentially fatal complications.

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Ethical approval

All procedures were performed in accordance with the ethical standards of our institution and declaration form.

Informed consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

Dr. Alaa Mousli: Writing- Review & Editing, Visualization.
Dr. med. Oliver Stumpf: Supervision.

Registration of research studies

Not applicable.

Guarantor

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Declaration of competing interest

None.

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