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Laparoscopic Heller myotomy after Roux-en-Y gastric bypass

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Summary
Background Achalasia is a rare motility disorder of the esophagus and laparoscopic Heller myotomy (LHM) is the standard of care for symptom relief. The onset of achalasia in obese patients after Roux-en-Y gastric bypass (RYGB) is rare, the diagnosis is difficult, and the treatment is challenging.
Methods We reviewed the hospital charts of a patient presenting with achalasia after RYGB. A review of the pertinent literature was performed.
Results A 51-year-old female was admitted to our department for a 10-month history of progressive dysphagia, regurgitation, and weight loss. She previously underwent laparoscopic RYGB for morbid obesity. The upper gastrointestinal endoscopy showed a dilated esophagus with increased resistance at the gastroesophageal junction. The barium swallow study revealed the classical "mouse-tail" appearance of the esophagogastric junction with delayed esophageal emptying. High-resolution manometry (HRM) was suggestive of a type II achalasia with esophageal body pan-pressurization. The patient underwent LHM. The overall operative time was 95 min and intraoperative blood loss was negligible. The postoperative course was uneventful and the patient was discharged on postoperative day 2. At 24-month follow-up, the patient has complete remission of symptoms.
Conclusion Development of achalasia in obese patients after RYGB is rare. The presence of pathognomonic symptoms should always raise clinical suspicion, while HRM is essential to confirm the diagnosis. To date, there is no robust evidence for the more appropriate treatment of esophageal achalasia after RYGB. In these patients, LHM seems feasible, safe, and effective in symptom relief.

Keywords Esophageal achalasia · Roux-en-Y gastric bypass · Laparoscopic Heller myotomy · Peroral Endoscopic Myotomy (POEM) · Dysphagia

Introduction

Achalasia is a rare primary esophageal motility disorder characterized by loss of physiological esophageal body peristalsis and lack of relaxation of the lower esophageal sphincter (LES). Dysphagia, regurgitation, chest pain, cough, and weight loss are common symptoms [1].

Obesity has been shown to be an independent risk factor for the development of esophageal motility disorders [2–4]. The diagnosis of achalasia in patients who previously underwent Roux-en-Y gastric bypass (RYGB) for morbid obesity is exceptional [5, 6]. Despite its rarity, the onset of pathognomonic symptoms should always raise the clinical suspicion of achalasia.

We describe a case of newly diagnosed achalasia treated with laparoscopic Heller myotomy (LHM) 9 years after laparoscopic RYGB.

Case report

We present the case of a 51-year-old female who underwent a laparoscopic RYGB for morbid obe-

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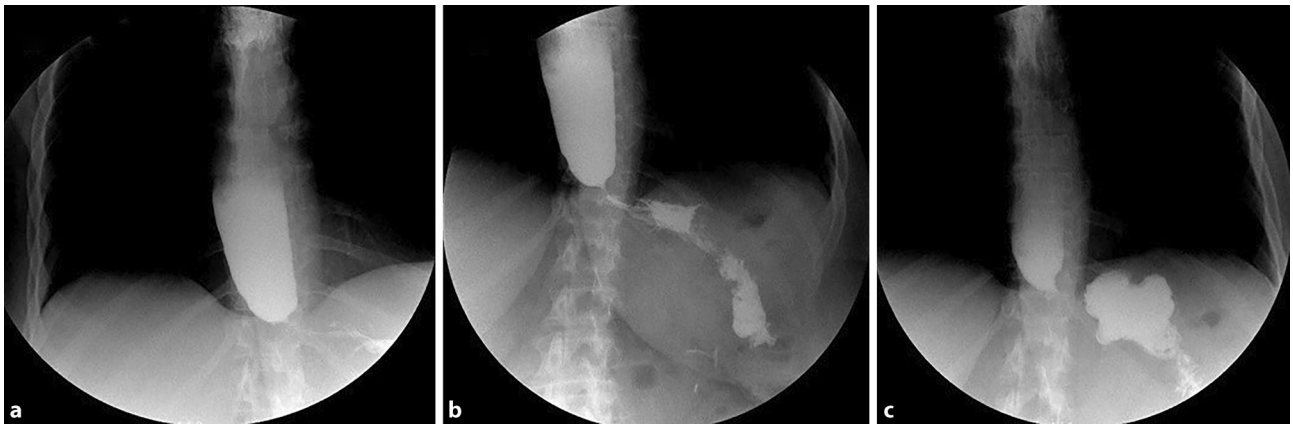

Fig. 1 The gastrografin swallow study revealed a dilated esophagus with the characteristic "mouse-tail" appearance at the cardia and delayed contrast emptying at 0 (**a**), 2 (**b**), and 5 min (**c**)

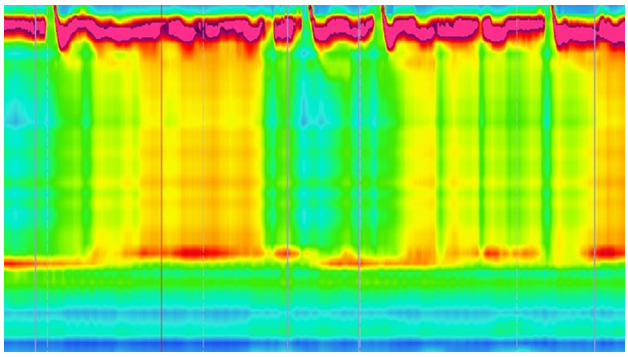

Fig. 2 High-resolution manometry showed a type II achalasia according to the Chicago classification 3.0

sity. Nine years after the operation, she presented at our tertiary referral center with a 10-month history of progressive dysphagia to solids and liquids, regurgitation, and weight loss (Eckardt score 2-3-1-3) [7]. At presentation her body mass index (BMI) was 25.7 kg/m^2. The upper gastrointestinal endoscopy showed a dilated esophagus with increased resistance at the gastroesophageal junction. The gastric pouch and gastrojejunostomy were regular. The barium swallow study revealed a dilated esophagus with the characteristic "mouse-tail" appearance at the cardia and delayed emptying at different times (Fig. 1). High-resolution manometry (HRM) was suggestive of a type II achalasia with esophageal body pan-pressurization and an elevated integrated relaxation pressure (IRP = 44.9; Fig. 2).

A pneumatic endoscopic dilation was initially performed. Because of the limited symptom relief (Eckardt score 2-3-1-2), the patient underwent laparoscopic Heller myotomy. Dissection of the anterior esophageal wall was performed by freeing the visceral surface from abdominal adhesions (Fig. 3a). The distal esophagus was mobilized and the anterior vagus nerve identified and preserved (Fig. 3b). The myotomy was started on the esophagus (6 cm) and extended distally on the gastric pouch (2 cm; Fig. 3c). Intraoperative endoscopy was performed to rule out air leak. Fundoplication was not fashioned and the right and left side of the myotomy were secured to the right and left crura with bilateral running sutures. The overall operative time was 95 min and intraoperative blood loss was negligible.

The gastrografin swallow study on postoperative day 1 showed the resolution of the outflow obstruction at the gastroesophageal junction (Fig. 4). The patient

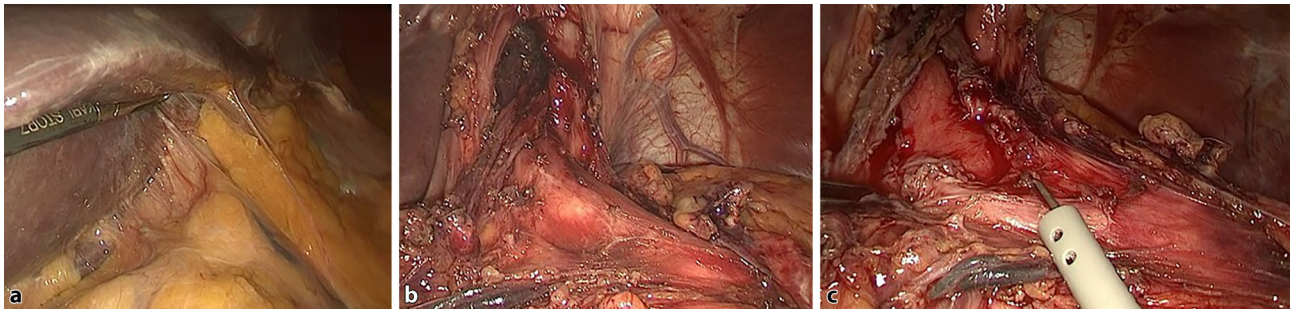

Fig. 3 **a** Dissection of the anterior esophageal wall was performed by freeing the visceral surface from dense abdominal adhesions. **b** Careful dissection allows precise identification and preservation of the anterior vagus nerve. **c** The myotomy was performed on the esophagus (6 cm) and extended distally on the gastric pouch (2 cm)

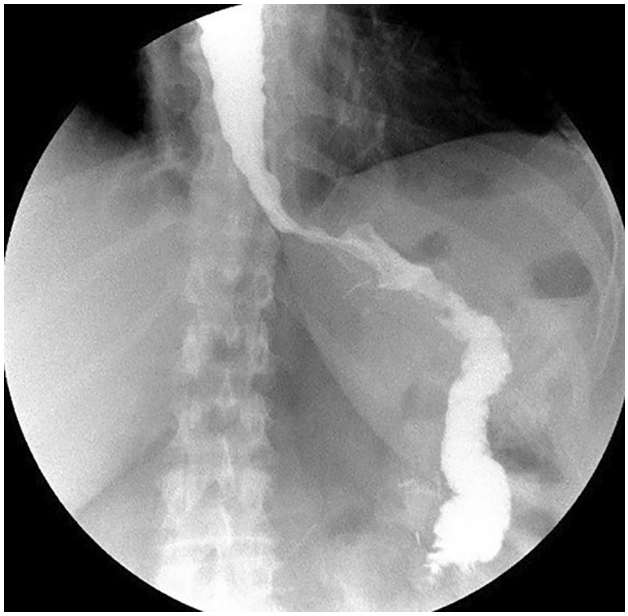

Fig. 4 The gastrografin swallow study on postoperative day 1 revealed the resolution of the outflow obstruction at the cardia

was allowed to eat a semiliquid diet and discharged home on postoperative day 2. At 24-month follow-up, the patient has complete resolution of symptoms.

Discussion

Esophageal achalasia in patients previously submitted to weight-loss procedures for morbid obesity is exceptional but should always be suspected in case of pathognomonic symptoms onset. Laparoscopic Heller myotomy in tertiary referral centers is feasible, safe, and effective to relieve gastroesophageal outflow obstruction in these patients.

The effect of RYGB on esophageal motility is unclear, with some studies showing a hypotensive LES and a minimal effect on physiological motility [8]. Even if a clear correlation has not yet been demonstrated, it is possible that an iatrogenic vagus nerve injury will induce neuropathic dysfunction with consequent esophageal body motility disorders [9]. In previous studies, obesity has been suggested to be an independent risk factor for the development of esophageal motility disorders [2, 3]. To date, only few case reports have described the onset of achalasia in RYGB patients, but because of the increasing number of morbidly obese patients and weight-loss procedures, post-bariatric patients with symptomatic achalasia pose a surgical challenge [10].

LHM and graded pneumatic dilation are the standard of care in patients with esophageal achalasia, with similar results in medium-term follow-up [11]. Sequential pneumatic dilation has been shown to be effective but, in case of recurrent symptoms, laparoscopic myotomy should be considered as definitive treatment [12]. Because of anatomical changing and intra-abdominal adhesions, the management of symptomatic post-bariatric surgery patients is challenging, with a hypothetical increase in iatrogenic vagus nerve injury and mucosal perforation rate. For these reasons, careful laparoscopic dissection of the distal esophagus, hiatus, and proximal portion of the gastric pouch is essential. The role of intraoperative endoscopy is crucial to check for the completeness of the myotomy and to test for the presence of occult perforations [13]. In 2009, Ramos et al. first reported the case of a patient with achalasia diagnosed 4 years after RYGB, who was successfully treated with LHM without fundoplication [3]. Fundoplication is not technically feasible in all patients because of the previous bariatric operation; however, a modified Dor using the gastric remnant has been described [14]. In our opinion, the fundoplication in post-RYGB patients is not necessary because the exclusion of the acid-production portion of the stomach should theoretically prevent the onset of gastroesophageal reflux disease. To avoid re-approximation of the two edges of the myotomy, a running suture could be performed with the right and left diaphragmatic pillars. Recently, robotic Heller myotomy after RYGB has been described; the authors stated that the stable working platform and tremor filtering may theoretically reduce the incidence of mucosal perforation [15]. Peroral Endoscopic Myotomy (POEM), with a selective myotomy of the muscular circular layer in achalasic patients post RYGB, was first described by Yang et al. in 2014 [16]. The authors stated that in patients who have undergone RYGB, the endoscopic approach should be preferred. The possibility to perform a long myotomy (up to 14 cm), the reduced invasivity, and the possibility to complete a selective anterior or posterior wall myotomy are unquestionable advantages [17].

The onset of esophageal achalasia after weight-loss bariatric procedures and specifically RYGB is extremely rare but should always be considered. A differential diagnosis with pseudoachalasia secondary to the bariatric procedure should be always ruled out with HRM. Cautious dissection of the distal esophagus, hiatus, and proximal portion of the gastric pouch is mandatory to avoid mucosal perforation and vagus nerve injury. Multidisciplinary management between endoscopists, esophageal surgeons, bariatric surgeons, and anesthesiologists is mandatory. Both LHM and POEM are valid treatment options in the management of achalasic patients after RYGB and the definitive management should be based on the surgeon's expertise. In expert hands, LHM after RYGB is feasible, safe, and effective in symptom relief. Further studies are warranted to analyze the pros and cons of LHM and POEM in such patients.

Compliance with ethical guidelines

Conflict of interest A. Aiolfi, S. Tornese, L. Barbieri, V. Panizzo, G. Micheletto, and D. Bona declare that they have no competing interests.

Ethical standards All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

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