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Late Complications of Laparoscopic Sleeve Resection of Gastric in Obese Patients

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Abstract Laparoscopic sleeve resection of the gastric is an effective operation for the treatment of obesity, but it is associated with risks of complications such as gastric stenosis and gastroesophageal reflux disease. Endoscopic methods, especially balloon dilation, show good results in the treatment of stenoses, although surgical intervention is indicated in case of failures. There was also a significant increase in the incidence of gastroesophageal reflux disease after surgery, which requires close postoperative monitoring and timely application of preventive and curative measures to reduce the risks of severe complications.

Keywords Gastroesophageal reflux disease, Morbid obesity, Severe complications, Stomach stenosis, Bariatric surgery, Laparoscopic sleeve resection of the stomach

1. Introduction

Laparoscopic sleeve resection of the gastric (LSRG) is one of the most common surgical treatments for obesity and associated metabolic disorders [1]. Despite the significant advantages of this approach, including marked weight loss and improved metabolic profile, postoperative complications such as gastric stenosis and gastroesophageal reflux disease (GERD) remain urgent problems [2]. Gastric stenosis leads to pronounced symptoms of food intolerance, dysphagia and vomiting, significantly impairing the quality of life of patients and requiring effective treatment approaches. GERD after LSRG is also of significant interest due to an increase in the frequency of its development or worsening of symptoms, including the risk of esophagitis and Barrett's esophagus [3]. The purpose of this review is to analyze the frequency and effectiveness of endoscopic treatments for gastric stenosis after LSRG, as well as to assess the frequency and severity of GERD in the postoperative period.

Stomach stenosis. The incidence of gastric stenosis after LSRG is approximately 1%, and it increases significantly in cases of repeated surgery, reaching 10%. Patients have symptoms of food intolerance, dysphagia, nausea and vomiting. Organic stenosis is associated with leakage and abscess, excessively tight gastric sleeve, mediastinal migration of the cardia, and intramural hematoma after suturing the staples. The causes of functional gastric stenosis are obstruction in the area of the angled tenderloin, axial twisting of the gastric tube and inversion of the small intestine [4]. The first-choice treatment for gastric stenosis is endoscopic pneumatic dilation, which is considered a safe and effective method.

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2. Materials and Methods

According to Turcu F et al. of the 4,304 patients after LSRG, 47 (1.1%) had stenosis. The frequency of this complication depends on the LSRG technique. In this category of patients, surgery was the first choice in 9 cases with a success rate of only 33.3%. For 46 patients referred for endoscopy, 79 sessions of pneumatic dilation were performed, with an average of 1.7±1.1 per patient. In 1 case, there was a complication in the form of perforation, but there was no bleeding or death. The frequency of follow-up was 93.5%. Overall, the success rate of endoscopic dilation was 90.7%. Endoscopic pneumatic dilation is a safe and effective procedure and should be the first-line choice in the treatment of post-LSRG stenosis.

Ogra R et al. reports a total of 857 patients who have undergone LSRG. Functional stenosis developed in 26 (3.03%) of 857 patients, which was confirmed by X-ray contrast examination. Three of these 26 patients developed fixed stenosis in the proximal stomach. All of them were successfully treated with one session of balloon dilation of controlled radial expansion (CRE) <20 mm. Of the 23 patients with stenosis at the first stage, 16 underwent CRE balloon dilation. Seven of these patients were successfully cured, although one required two dilation sessions. Of the 9 unsatisfactory cases after the first stage, 6 were successfully treated with a 30 mm balloon dilator, the remaining 3 required temporary installation of a self-expanding metal stent. Based on this experience, seven other patients who had strictures longer than 3 cm in length underwent the first stage of balloon dilation used for achalasia of the cardia. 5

had satisfactory results, but 2 also required temporary stent insertion. None of the 26 patients required surgery to eliminate the stenosis. From where the authors conclude that the use of a 30 mm balloon for achalasia and a stent is an effective and safe treatment for patients with post-LSRG stenosis who do not respond to dilation [5].

According to Deslauriers V. et al. stenosis after LSRG is the most common postoperative complication, occurring in 3.9% of cases. Current treatment options include endoscopic treatments such as dilation and stent placement, as well as laparoscopic gastroschunting, wedge gastrectomy, or seromyotomy. A retrospective analysis showed that of the 1332 patients who underwent LSRG, 27/1332 (2%) patients developed stenosis and were treated endoscopically. A retrospective analysis showed that of the 1332 patients who underwent LSRG, 27/1332 (2%) patients developed stenosis and were treated endoscopically. Endoscopic procedures were performed under general anesthesia and, if necessary, using fluoroscopy. Consistent treatment was performed using CRE cylinders, achalasia cylinders (30-40 mm) and the installation of a stent for refractory cases. Successful endoscopic treatment was performed in 56% (15/27) of patients, 73% of patients underwent one dilation procedure. In all satisfactory cases, there were a maximum of 3 interventions. In unsatisfactory cases, 44% (12) underwent laparoscopic gastric bypass surgery. The average time between the initial surgery and the diagnosis of stenosis was 10.3 months. The average follow-up period after endoscopic treatment was 11.5 months. The only reported complication was stent migration (3.7%). Endoscopic treatment has shown its effectiveness in 56% of patients with stenosis after LSRG. Pneumatic balloon dilation seems to be a safe procedure for this group of patients. Laparoscopic gastric bypass surgery gives good results in patients who have had three consecutive endoscopic treatments that have been unsuccessful [6].

Similarly, Nath A et al. performed hydrostatic balloon dilation in 33 patients with narrowing sleeve gastric stenosis. He used 10-18 mm balloon dilation for 1 minute. Resolution was observed in 69% of his patients: 39.4% after the first expansion, 15.2% after the second expansion, and 15.2% after the third expansion. Two patients (6%) had no improvement at all [7].

3. Results and Discussions

Dhorepatil AS et al. reported on their experience using pneumatic balloon dilation for strictures after LSRG. 1409 patients who underwent LSRG were retrospectively analyzed, of whom 24 (1.7%) developed stenosis after surgery. The average age of the patients was 46.4 (±9.6) years, and the average body mass index was 43.7 (±6.4). The most common place for stricture was in the middle of the sleeve body (54.5%). The average time from primary surgery to diagnosis and the first pneumatic dilation was 5.6 months (±6.8) and 5.9 months (±6.6), respectively. All patients underwent dilation by 30 mm at 10 PSI for 10-20 minutes (average 14.5 minutes), followed by an increase in balloon size (30-40 mm) and duration (10-30 minutes) in subsequent sessions if the first session was ineffective. After the applied technique, the stenosis was resolved in 95.8% (23/24) of patients, in 1 (4.1%) 1 there was no effect. The authors believe that pneumatic dilation is an effective procedure in patients with stricture after gastric sleeve resection.

Another retrospective study included 22 patients with functional stenosis after LSRG who underwent endoscopic balloon dilation between 2017 and 2023. A total of 45 dilatations were performed using a 30 mm diameter balloon in 22 patients (100%), a 35 mm diameter balloon in 18 patients (81.82%) and a 40 mm diameter balloon in 5 patients (22.73%). The clinical effects in patients after the first balloon dilation were as follows: complete clinical effect (4 patients, 18.18%), partial clinical effect (12 patients, 54.55%) and no effect (6 patients, 27.27%). Clinical success was achieved in 19 (86.36%) patients within six months. In 3 (13.64%) patients who retained symptoms even after reaching the maximum balloon expansion of 40 mm, endoscopic dilation was considered unsuccessful and they were referred for surgery. No significant side effects were found during or after balloon expansion.

GERD. Laparoscopic sleeve resection of the stomach is also associated with the development or worsening of GERD. Althuwaini *et al*. conducted a study that included 213 patients who underwent Laparoscopic Sleeve Gastrectomy. The first occurrence of heartburn was registered in 47.06% of the cohort. The frequency of dysphagia and regurgitation also increased after surgery. An increase in the prevalence of GERD after Laparoscopic Sleeve Gastrectomy is associated with a decrease in the tension of the lower esophageal sphincter, a blunting of the angle of Gis, a decrease in gastric emptying and a decrease in the volume and pliability of the stomach, which leads to an increase in intragastric pressure.

In one study, 63 patients who underwent LSRG before surgery and an average of 13 months (range 12-15 months) after surgery underwent EGDFS. The average age of the patients was 38.2 (18-66) years, and the average body mass index was 36.3±4.1 kg/m^2. After LSRG, there was a significant decrease in both the body mass index (42.1±1.2 versus 29.9±1.0 kg/m^2) and the percentage loss of excess weight by 56.6±3.6%. However, the prevalence of erosive esophagitis during endoscopy increased from 9 (14.3%) to 28 (44.4%) patients. Of these, 15 (23.8%) had an A degree, 11 (17.5%) had a B degree, and 2 (3.2%) had a C degree. There was no correlation between GERD symptoms and erosive esophagitis; however, this study revealed a trend suggesting a higher prevalence of erosive esophagitis with sleeve diameter > 2 cm (p=0.069). Although LSRG is effective in the treatment of obesity and its metabolic syndromes, the prevalence of erosive esophagitis increased significantly 1 year after surgery.

In a prospective study of 109 LSRG patients with a preoperative body mass index of 47.8±16 kg/m2. At 18 months of follow-up, the body mass index and the percentage of excess weight loss were 29.3±6 kg/m2 and 64%±9.4%, respectively. The resolution/improvement of concomitant diseases was as follows: diabetes 73%, hypertension 57.5%

and obstructive sleep apnea 89%. GERD symptoms increased from 33% to 44% (P=no statistical significance), erosive esophagitis from 20.1% (100% grade A) to 33.9% (74% grade A) (P<0.001), and hernia of the esophageal orifice of the diaphragm (HEOD) from 22% to 34.8% (P < 0.001). Postoperative results in patients with symptoms were as follows: erosive esophagitis was detected in 64.5%, HEOD in 23%, while 12.5% had a normal EGDFS picture. A significant association was found between the manifestation of GERD symptoms and the presence of erosive esophagitis on EGDFS (P<0.05). De novo symptoms were observed in 36.9% of patients, erosive esophagitis in 28.7% and HEOD in 16.4%. The complication rate was 3.5%; there was no mortality. The prevalence of symptoms of GERD, erosive esophagitis, and HEOD increased after LSRG. At 18 months of follow-up, the severity of esophagitis was mild, most of them were grade A esophagitis. A correlation was found between the manifestation of GERD symptoms and the presence of erosive esophagitis on EGDFS.

A prospective study by Genco et al. of 110 LSRG patients followed for an average of 58 months showed that the frequency of symptoms of GERD, erosive esophagitis, increased significantly after surgery. Upward migration of the Z-line was detected in 73.6% of cases during subsequent endoscopy. The most alarming thing about this study was the fact that Barrett's non-dysplastic esophagus was first diagnosed in 17.2% of patients. This finding has been replicated in other studies.

4. Conclusions

Gastric stenosis is an important and potentially serious complication after LSRG, the frequency of which varies from 1% to 3.9% and depends on many factors, including the chosen surgical technique, the presence of technical difficulties during surgery and the individual characteristics of patients. Endoscopic balloon dilation is the first-choice method in the treatment of this complication and demonstrates high rates of efficacy (from 56% to 95.8%) and safety. However, it is important to keep in mind that the success of the procedure depends on the nature and extent of the stricture, the type of balloon used, and the timeliness of the intervention. In cases where endoscopic treatment proves ineffective after several attempts, surgical intervention such as laparoscopic patronal bypass reconstruction is indicated, which also yields satisfactory results.

In addition, special attention should be paid to the development or intensification of GERD symptoms after LSRG, which were noted in a significant percentage of cases. The postoperative frequency of erosive esophagitis increases significantly, in some cases leading to serious consequences such as Barrett's esophagus. Given these risks, it is necessary to conduct careful postoperative monitoring of patients, including endoscopic examinations, especially in the first years after surgery. It is also necessary to develop and apply measures for the prevention and timely treatment of GERD, including drug therapy and, if necessary, surgical correction. These measures are aimed at preventing serious complications and improving the quality of life of patients in the long term.

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