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Sleeve-Dor Fundoplication – An Innovative Surgical Technique to Avoid the Epidemic Long Term de Novo Gastroesophageal Reflux and Barrett´s Esophagus After Sleeve Gastrectomy for Obesity

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Abstract

Background: Sleeve gastrectomy (SG) in current literature showed an increased risk of "de novo" gastroesophageal reflux disease (GERD) and increased risk for Barrett's esophagus in longer follow-up series, with a possibility of esophageal adenocarcinoma in this population. Adding primarily an anterior Dor Fundoplication to SG (Sleeve-Dor) may protect the patient for future and can potentially avoid these chronic complications for patients with obesity.

Methodology: A standard SG is performed laparoscopically, and a small redundance of the fundus is maintained as a wrap, and this will be fixed to the right crura without dissection of the anatomy of the hiatus. The resulted anterior 180° Dor fundoplication is usually sufficient to relieve or to avoid reflux symptomatic.

Discussion: Based on our preliminary and literature experiences, the SG with anterior Dor fundoplication (Sleeve-Dor) procedure could provide favorable safety profile, satisfactory reflux control and good bariatric outcomes. The complication rate is lower compared to published for Nissen Sleeve or Sleeve-Rossetti technique, with no leaks or major complications recorded to date. Sleeve-Dor procedure may be a potential primary and standard surgery for morbidly obese patients, especially for patients with preoperative GERD symptoms without major findings at endoscopy.

Keywords

sleeve gastrectomy, anterior 180° fundoplication, D-SLEEVE, Sleeve-Dor, barbed suture, gastroesophageal reflux disease, Barrett esophagus, GERD

Background

Sleeve gastrectomy (SG) is one of the most common and effective bariatric surgeries worldwide. However, recent studies have demonstrated SG would significantly increase the risk of "de novo" postoperative gastroesophageal reflux disease (GERD) or exacerbate the exiting GERD symptoms for morbidly obese patients. Gastroesophageal reflux disease is closely associated with esophagitis and even Barrett's esophagus (BE),[1,2] the latter is a precancerous lesion of esophageal adenocarcinoma. In a 5-year follow-up after SG, the incidence of GERD symptoms could increase to 76.0%, and the rate of Barrett found to be 18.8%.[1] Furthermore, the potential incidence of esophageal adenocarcinoma in patients after SG is still unknown. Aiming to minimize the above-mentioned challenging situations, an anterior 180° fundoplication (Dor fundoplication) combined with SG (Sleeve-Dor) has been proposed by our research group, which can be applied not only to prevent and control postoperative GERD symptoms and their related clinical consequences, but also to simplify the antireflux operation.

Methodology

For the approach, the patient is placed in supine position. Five trocars are inserted after pneumoperitoneum is established via CO_2 insufflation. Sleeve gastrectomy was

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performed in the standard fashion, the greater omentum is separated using harmonic scissors alongside the gastric greater curvature, beginning at 3 cm distance from pylorus and upwards to the angle of His. The dissection should be meticulously performed around the gastric fundus, avoiding thermal damage to this important anatomic site. Subsequently, the right crus is exposed, the vagal nerves preserved, and hiatal hernia was repaired if present. After a 36 F calibration bougie is introduced into the gastric cavity, the stomach is divided through stapling device parallel and close to the calibration bougie, beginning at 3 cm to pylorus until 4 cm lateral from the gastro-esophageal junction (Figure 1A). An anterior 180° fundoplication is constructed by suturing the remaining fundus to the right-crus with only one barbed running suture (non-absorbable 2-0 V-LOC, Medtronic, New Haven, USA), the suture is performed from proximal to distal. (Figures 1B-1C).

Discussion

For patients with preoperative findings of severe GERD or BE, the primary standard indication is the Roux-en-Y Gastric Bypass. As SG exacerbate pre-existing GERD symptoms or increase the risk of "de novo" GERD after operation, the standard SG seems inappropriate for the therapy of morbidly obese patients with preoperative GERD symptoms.[3] Furthermore, patients not suffering from preoperative GERD are exposed toa a rate of 30% of de novo GERD in the first 5 years. Previously, several kinds of fundoplication like Nissen and Rossetti have been successively combined with SG and achieved satisfactory anti-reflux outcomes.[4] However, comparing to the abovementioned fundoplication, the anterior fundoplication may represent a simpler surgical procedure and lower risk of postoperative complications, with comparable remission rate of postoperative GERD symptoms.[4,5] While a higher incidence of complications as necrosis of the wrap, leaks and peritonitis in up to 6.4% after Nissen-Sleeve technique can be found in published evidence, that suggests it would not be suitable to be the response for this growing issue.[6]

Sleeve gastrectomy combined with anterior Dor fundoplication may represent a potential alternative therapy for the abovementioned challenging situations. Moon et al[7] initially combined the anterior 120° fundoplication with SG, the fundic wrap was constructed via rotating the remaining fundus anteriorly and suturing it both to the right and left crus after the regular SG. After this procedure, 93.5% (29/31) patients achieved excellent control

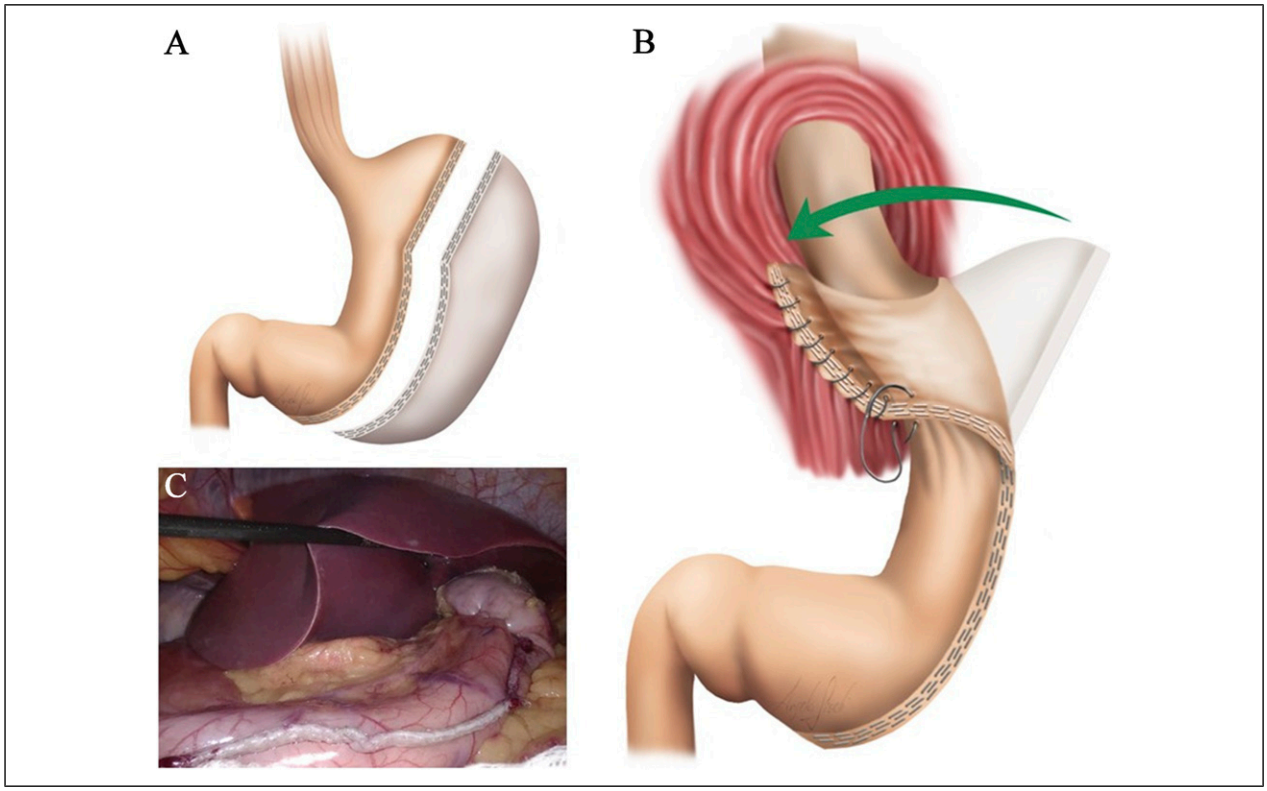

Figure 1. Sleeve gastrectomy with Dor fundoplication procedure. (A). The sleeved stomach is constructed by using the linear stapler. (B). The rest gastric fundus is forward rotated 180°, and sutured to the right crus and the gastric anterior wall with one barbed running suture. (C). Intraoperative laparoscopic view of the sleeved stomach and the fundic wrap.

of reflux symptoms, only one case (3.2%) reported postoperative leak and readmitted, who was treated conservatively and completely resolved. Satisfactory weight loss outcomes were also obtained, the average percentage of excess weight loss (%EWL) and percentage of weight loss at postoperative 6-month were 46.6% ± 12.4% and 21.4% ± 3.9%, respectively. Following closely, anterior 180° fundoplication was combined with SG (D-SLEEVE) by Del Genio et al[8] In the 1-year follow up, D-SLEEVE could reconstruct and maintain an effective pressure of the lower esophageal sphincter (LES), maximally reduced reflux events, and prevented esophagus from the acid expose and corrosion. The technique achieved similar weight loss compared to the standard SG (%EWL, 59% vs 56%, ***p*** = nonsensical).

In our hospital, Sleeve-Dor has been performed as the primary surgery for morbidly obese patients with indication for SG and is fully integrated in the decision algorithm for the therapy of obesity. There are some reasons that this procedure deserved to be performed. Firstly, it has low complication rate and satisfactory reflux control and good weight-loss outcomes.[5,7,8] Secondly, based in recent evidence, the prevalence of GERD symptoms and its clinical consequences (esophagitis and BE) would significantly increase after SG.[1] Meanwhile, it is still difficult for surgeons to predict in which patients GERD symptoms, esophagitis or BE will occur after SG, due to lack of the appropriate predictive model in absence of routine preoperative esophageal manometry. Therefore, for hospitals with high-volume of laparoscopic standard SG, the Sleeve-Dor procedure may be suggested as the primary and standard surgery for morbidly obese patients, especially for patients with preoperative GERD symptoms indicated for SG.

Author Contributions

Study concept and design: Ricardo Zorron, Andre F. Teixeira, and Renjie Li
Acquisition of data: Renjie Li, Wael Eskander, and Ricardo Zorron
Analysis and interpretation: All authors
Study supervision: Renjie Li, Andre F. Teixeira, and Ricardo Zorron. Sleeve-Dor Fundoplication – an innovative surgical technique to avoid the epidemic long term de novo gastroesophageal reflux and Barrett´s esophagus after Sleeve Gastrectomy for obesity

Declaration of Conflicting Interests

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