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Original article

Repeat sleeve gastrectomy: optimization of outcomes by modifying the indications and technique

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Abstract

Background: Few series are available concerning repeat sleeve gastrectomy (re-SG), and series have reported contradictory results concerning morbidity rates, with limited data concerning weight loss.

Objective: Evaluate the short- and medium-term outcomes of re-SG.

Setting: University hospital, France, public practice.

Methods: Between June 2007 and March 2016, all patients undergoing re-SG (n = 46 patients) were included. Re-SG was proposed for patients with insufficient excess weight loss (EWL) (≤50%) or renewed weight gain with excessively high residual gastric volume (>250 mL and/or large gastric pouch). The primary efficacy endpoint was the overall complication rate of re-SG. The secondary efficacy endpoints were operative data, evaluation of weight loss, and correction of co-morbidities, risk factors for gastric leak (GL), by comparing 2 periods (period 1, January 2004–December 2013: blue/green or purple staplers without reinforcement; period 2, after December 2013: black staplers with reinforcement) and comparison of weight loss according to the indication for re-SG.

Results: The re-SG group consisted of 46 patients (35 women, mean age: 47.5 yr). The mean body mass index (BMI) before SG was 47.2 kg/m² (35–63.6). The mean time interval between SG and re-SG was 73 months (11–106). The BMI before re-SG was 41.2 kg/m² (29–54.7). Indications for surgery were insufficient weight loss in 25 patients (54.3%) and weight regain in 21 patients (45.7%). A large gastric pouch was visible in 4 patients (8.6%). The mean operating time was 97.6 minutes (45–220). One death (2.1%) and 7 complications (15.2%) were observed. The mean length of hospital stay was 3.6 days (1–30). At last follow-up, mean BMI was 32.1 kg/m^2 (20.3–41.3) and mean EWL was 62.3% (18–127.2). When analyzing risk factors for GL, residual gastric volume between 250 and 350 mL was associated with a higher GL rate compared with a volume ≥350 mL, and re-SG performed during period 1 was associated with a higher GL rate than re-SG performed during period 2 (17.4% versus 0%; $P = .13$). Re-SG performed for weight regain was associated with a significantly higher additional weight loss compared with re-SG performed for insufficient weight loss (mean additional EWL of 45.9%; $P = .06$).

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Conclusion: Re-SG is feasible, but it requires adaptation of the surgical procedure to decrease complications. Results on weight loss are acceptable, but the best indications for re-SG were a gastric volume >350 mL and in the case of weight regain with the exception of technical failure of the primary SG. (Surg Obes Relat Dis 2018;▮:00–00.)

Keywords: Sleeve gastrectomy; Repeat sleeve gastrectomy; Gastric leak; Postoperative complications; Weight loss; Risk factor

Revisional surgery after bariatric surgery is a hot topic. Weight regain is observed after all types of bariatric surgery and can be explained by several common causes, such as the natural history of the surgical procedure, errors in the patient's eating habits, medications, and other factors. Sleeve gastrectomy (SG) has become increasingly popular over recent years due to its good results [1,2], its low postoperative complication and mortality rates [3], and the decreased long-term complication rate (especially mechanical complications and vitamin deficiency) compared with gastric banding, Roux-en-Y gastric bypass (RYGB) and duodenal switch (DS). SG is currently the most commonly performed surgical procedure for the treatment of morbid obesity in France [4] and more recently in the United States [5]. A recent review of the literature showed that the mean percentage of excess weight loss (EWL) 5 years after SG was 58.4% (range, 40%–86%) [6]. Arman et al. [7], in their long-term follow-up of patients undergoing SG (first patients of their experience), showed a revisional rate of 21% for insufficient weight loss or weight regain.

Various procedures can be proposed in these situations, such as RYGB or DS. Repeat-SG (Re-SG) was first described in 2006 by Baltasar et al. [8], and few series have been published since this initial report [9–11]. Studies concerning re-SG have reported contradictory results in terms of morbidity rates [12], with limited data on weight loss and no evaluation of the best indications for re-SG.

The objective of this study was to evaluate the results of re-SG performed for insufficient weight loss or weight regain after SG and to evaluate short- and medium-term outcomes to define the best indications for re-SG.

Methods

Population

A retrospective analysis was performed on prospective data (ACOS database) on a group patients undergoing re-SG (n = 46) between June 2007 and March 2016.

Preoperative screening

The indication for bariatric surgery was validated in accordance with French national guidelines and a multidisciplinary obesity staff meeting [13]. The patient's endocrine status was systematically assessed to detect thyroid and adrenal diseases requiring treatment before surgery. A psychiatric or psychological assessment was used to screen for personality disorders that would contraindicate (or that could be decompensated by) bariatric surgery. Preoperative nutritional support consisting of multiple consultations with a dietician and participation in obesity surgery-specific workshops was routinely provided. Hiatal hernia, Barrett esophagus, and *Helicobacter pylori* infections were evaluated by esophagogastroduodenoscopy. Pulmonary function tests, including sleep polysomnography, were used to screen for obstructive sleep apnea syndrome in all patients before surgery. Metabolic syndrome was defined according to the National Cholesterol Education Program's Adult Treatment Panel III report when 3 of 5 characteristics were present: abdominal obesity, given as waist circumference >102 cm in male patients and >88 cm in female patients; triglycerides ≥150 mg/dL; high-density lipoprotein cholesterol <40 mg/dL in male patients and <50 mg/dL in female patients; blood pressure ≥130/≥85 mm Hg; and fasting blood glucose ≥110 mg/dL. Gastric volumetry was routinely performed before proposing re-SG.

Gastric volumetry procedure

Residual gastric volume was measured by filling the gastric remnant with carbon dioxide, as follows. The patient was asked to drink a sodium bicarbonate solution (4 g in 100 mL of water) followed by a tartaric acid solution (4 g in 100 mL of water). Low-dose computed tomography acquisitions were performed 30 and 60 seconds after the tartaric acid intake. Residual gastric volume was defined as the volume situated between the gastroesophageal junction and the pylorus (i.e., anatomic structures that can be easily identified on computed tomography scan) [14]. The volume was measured separately by 2 radiologists using Myrian software (Microsoft Inc., Redwood City, CA) and expressed in milliliters. Differences of opinion between the 2 radiologists were resolved by consensus: the larger of the 2 estimated volumes was considered to be closest to the patient's true residual gastric volume.

Definition of gastric dilation after SG

Two types of dilation after SG are described [10]. Primary dilation was defined as a large upper gastric pouch without homogenous dilation of the gastric tube. Most of these cases are due to incomplete dissection of the fundus during primary SG (operative difficulties due to large left