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Original article

# Laparoscopic sleeve gastrectomy as a revisional procedure for failed laparoscopic gastric banding with a “2-step approach”: a multicenter study

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## Abstract

**Background:** Laparoscopic sleeve gastrectomy (LSG) has been proposed as an alternative revisional procedure for failed/complicated gastric banding. This is a retrospective cohort study of a prospectively maintained database of revisional LSG after band removal for insufficient weight loss and/or band-related complications, using a 2-step approach. The outcomes were compared with a control group of primary LSG. The study was conducted at a university hospital (Sapienza University of Rome-Polo Pontino, Icot, Latina, Italy) and 2 community general hospitals (Hospital Andosilla Civita Castellana, Viterbo, Italy and Hospital Villa D’Agri, Potenza, Italy).

**Methods:** A total of 76 revisional LSG procedures was recorded; a control group of 279 LSG patients was selected. The primary endpoint was to compare the perioperative complication rate between the revisional versus the control group. Secondary endpoints were operative time, conversion rate, postoperative length of stay and percentage excess weight loss (%EWL) at 6, 12, and 24 months.

**Results:** The indications for band removal were inadequate weight loss (47 patients), slippage (10 patients), erosion (7 patients), and pouch dilation (12 patients). All procedures were completed laparoscopically. The median operative time was 78 minutes for the revision LSG and 65 minutes for the control LSG ( $P < .05$ ). In the revision group, the overall complication rate was 17.1%, and the median postoperative length of stay was 4 days; in the control group, the overall complication rate was 10.7%, and the median postoperative length of stay was 3. No complications requiring reoperation or readmission occurred in the revision group. In the control group, there were 5 cases of major complications. All the patients completed the follow-up. A total of 56 patients in the revision group and 184 patients in the control group were followed-up for at least 24 months. The %EWL at 6, 12, and 24 months was 46.5%, 66.4%, and 78.5%, respectively, in the revision group, and 49.8%, 78.2%, and 78%, respectively, in the control group.

**Conclusion:** Results confirmed that LSG, performed in 2 steps, is an effective revision procedure for failed or complicated laparoscopic adjustable gastric banding with good perioperative outcomes and 2-year weight loss. (Surg Obes Relat Dis 2014;■:00–00.) © 2014 American Society for Metabolic and Bariatric Surgery. All rights reserved.

## Keywords:

Gastric banding; Sleeve gastrectomy; Morbid obesity; Weight regain; Revisional surgery; Bariatric surgery; Laparoscopy

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Laparoscopic adjustable gastric banding (LAGB) was a popular bariatric restrictive procedure in the early 1990s. It was associated with good short-term results in terms of postoperative morbidity rate, mortality, weight loss, and

improving co-morbidities. However, the failure to reach or maintain an adequate weight loss has been reported in 40%–60% of patients [1–3]. Insufficient weight loss, weight regain, hardware-related problems (slippage, intragastric migration), motility disorders (esophageal dilation), and/or psychological intolerance are among the causes that often necessitate band removal and the decision to undergo another bariatric procedure. Laparoscopic Roux-en-Y gastric bypass (LRYGB) had been proposed as an effective revision procedure after failed or complicated gastric banding. The removal of the band is accomplished in 1 stage with the revision gastric bypass, but if gastric erosion is present, then the LRYGB is usually postponed and performed later in a second operation (the 2-stage approach). In those series, perioperative complication rates appear to be higher than in primary LRYGB [4–6].

Recently, laparoscopic sleeve gastrectomy (LSG) has been proposed as an alternative revision procedure for failed or complicated gastric banding [6]. Most bariatric surgeons perform the revision procedure in 1 stage. The short-term weight loss of revisional sleeve gastrectomy (after gastric banding) is comparable to the weight loss obtained in the non-revisional sleeve gastrectomy (primary LSG) in patients never operated on before; however, the perioperative complication rate after 1-stage revision LSG appears to be higher than in primary LSG [7–12]. To reduce the complication rate, some authors have proposed performing the revisional LSG several weeks after removal of the gastric band (the 2-stage approach) [13–15], to allow time for the regression of the fibrous capsule and scarring that is commonly found at the gastric band site. The present study is a retrospective review of a multicenter prospectively maintained database of 2-step revision LSG for insufficient weight loss, weight regain, or band-related major complication.

## Patients and methods

### Study design

This cohort study retrospectively analyzed the data collected prospectively in a database used for clinical follow-up (retrospective cohort study). The database was adopted by the above-mentioned centers in 2007 and, since then, has been used for clinical purposes; the data were collected by the authors during the follow-up. The collected

Table 1

Revisional group characteristics	
Band duration, (months) median	51 (1–112)
Indication for laparoscopic adjustable gastric band removal	
Inadequate weight loss	47 (61.8%)
Slippage	10 (13.1%)
Erosion	7 (9.2%)
Pouch dilation	12 (15.7%)
Interval band-removal–Sleeve (months)	5 (1–39)

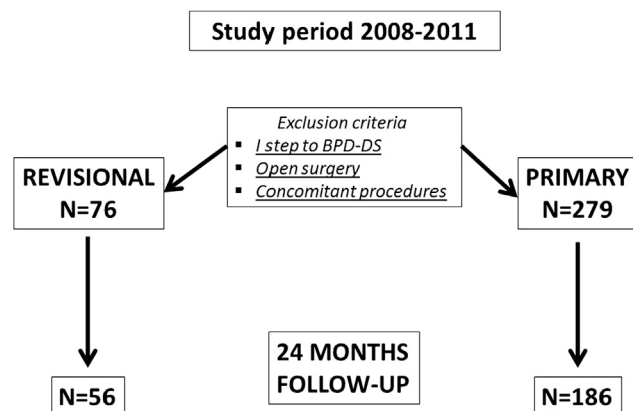


Fig. 1. Study flow-chart.

data included patient demographic characteristics, previous medical history, weight, height, obesity-related co-morbidities, dates of surgery and postoperative office evaluations, weight and evolution of the co-morbid conditions at each office evaluation, medication use, hospital stay duration, duration of surgery, and complications. BMI, ideal weight, excess weight, and excess weight loss were calculated.

From January 2008 to December 2011, 3 bariatric surgeons in 3 different hospitals performed a 2-step revision LSG on 76 consecutive patients. Revisional surgery was indicated for inadequate LAGB excess weight loss (% EWL <30%), long-term weight regain, and/or food intolerance in patients with an intact anatomy (confirmed by upper gastrointestinal radiologic series and endoscopy) and LAGB-related complications (Table 1). A total of 279 LSG patients, who had procedures performed in the same interval period as the primary procedure, were selected as the control group according to the criteria specified in Fig. 1. Six patients with severe GERD symptoms and/or esophagitis class B or superior (Los Angeles classification) at upper gastrointestinal endoscopy were not considered for

Table 2  
Demographic characteristics

Characteristic	Revisional LSG	Primary LSG	P
Number	76	279	
Gender			
Male	16 (21%)	70 (24.1%)	.2
Female	60 (79%)	209 (74.9%)	
Age, year (median)	45.5 (22–70)	41 (19–71)	.0007
Preoperative weight, kg (median)	119.5 (83–245)	126 (75–213)	.7
Preoperative BMI, kg/m <sup>2</sup> (median)	43.9 (32.6–74.9)	44.6 (31.2–63.6)	.8
Co-morbidities			
Diabetes type II	13 (17.1%)	43 (15.4%)	
Hypertension	15 (19%)	52 (18%)	
OSAS	9 (11.8%)	24 (8.6%)	

LSG = laparoscopic sleeve gastrectomy; OSAS = obstructive sleep apnea syndrome.

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