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Gastric Banding with Previous Roux-en-Y Gastric Bypass (Band over Pouch): Not Worth the Weight

Amir H. Sohail, MD, MSc, Raelina S. Howell, MD, Barbara M. Brathwaite, DNP, MS, RN, CBN, Jeffrey Silverstein, MD, Leo Amodu, MD, Patricia Cherasard, PA, MBA, PhD, Patrizio Petrone, MD, PhD, MPH, MHSA, Anirudha Goparaju, MD, Jun Levine, MD, Venkata Kella, MD, Collin E. M. Brathwaite, MD, MS

ABSTRACT

Background and Objectives: Revisional bariatric surgery continues to increase. Laparoscopic adjustable gastric banding (LAGB) after previous Roux-en-Y gastric bypass (RYGB), known colloquially as "band-overpouch" has become an option despite a dearth of critically analyzed long-term data.

Methods: Our prospectively maintained database was retrospectively reviewed for patients who underwent band-overpouch at our Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program Center of Excellence in a 18-year period ending October 31, 2021. We evaluated: demographics, comorbidities, operative procedures, and outcomes (30-day and > 30-day).

Results: During the study period, of 4,614 bariatric procedures performed, 42 were band-overpouch with 39 (93%) being women. Overall, mean age was 49.8 years (range 26–75), a mean weight 251 pounds (range 141–447), and mean body mass index 42.4 (range 26–62). Comorbidities included: hypertension (n = 31; 74%), diabetes (n = 27; 64%), obstructive sleep apnea (n = 26; 62%), gastroesophageal reflux disease (n = 26; 62%), and osteoarthritis (n = 25; 60%). All procedures were performed laparoscopically with no conversions to open. Mean length of stay was 1.2 days (range 1–3). Mean follow-up time was 4.2 years (range 0.5–11). Mean excess weight loss was 14.9%, 24.3%, and 28.2% at 6 months, 1 year and ≥ 3 years, respectively. There was one 30-day trocar-site hematoma requiring transfusion. Long-term events included: 1-year (1 endoscopy for retained food; 1 internal hernia), 3-year (1 LAGB erosion; 1 LAGB explant), 4-year (1 anastomotic ulcer), 6-year (1 LAGB explant and Roux-en-Y revision), and 8-year (1 LAGB erosion). One 5-year mortality occurred (2.4%), in association with hospitalization for chronic illness and malnutrition. Band erosions were successfully treated surgically without replacement.

Conclusion: Band-overpouch is associated with moderate excess weight loss and has good short-term safety outcomes.

Key Words: Gastric banding, Laparoscopic, Roux-en-Y Gastric bypass, Band-over-Pouch.

INTRODUCTION

Roux-en-Y gastric bypass (RYGB) is one of the most commonly performed weight loss surgical procedure globally.[1] Despite its well-documented effectiveness as a weight loss procedure with a high resolution rate for obesity related comorbid conditions, failure after RYGB (defined as < 50% Excess Weight Loss [EWL], or regain of > 15% of lowest postoperative weight after adequate initial weight loss) is common, with failure rate reported to be as high as 41%.[2] The etiology of failure after RYGB is multifactorial, ranging from behavioral[3] and dietary factors[4] to anatomic factors, such as dilatation of gastric pouch and gastrojejunostomy.[5] The first line management option after RYGB failure is dietary and lifestyle modification, which has varying success. Failure resulting from gastric pouch dilatation generally requires reintervention.[5] Gastric banding, as a standalone weight loss procedure, has been associated with mediocre weight loss in

Department of Surgery, NYU Langone Hospital—Long Island and NYU Long Island School of Medicine; Mineola, NY. (All authors)

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Address correspondence to: Dr. Patrizio Petrone, Department of Surgery, NYU Langone Hospital—Long Island, 222 Station Plaza North, Suite 300 Mineola, New York, 11501, Telephone: (516) 663-9571, E-mail: patrizio.petrone@nyulangone.org

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multicenter trials[6,7] and has been subject to conversion to sleeve gastrectomy or RYGB.[8,9] Ironically, it has also been used as rescue procedure for gastric pouch dilation after RYGB, also known as "band-overpouch". Saline administration adjusting the tightness of the gastric band allows for alteration in speed of gastric pouch emptying and is thus categorized as a restrictive procedure. Despite the theoretical plausibility of this procedure, there is paucity of evidence on its effectiveness, especially long term EWL, outcomes regarding resolution of comorbid conditions, and safety.[10–17] This study aims to assess the effectiveness and safety of band over pouch as a revisional procedure in patients with failure after initial RYGB procedure.

METHODS

Our prospectively maintained database was retrospectively reviewed for patients who underwent band over pouch at our Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MBSAQIP) Center of Excellence in an almost 18-year period from January 1, 2004 to October 31, 2021. Inclusion criteria included all patients undergoing LAGB after failed RYGB. Exclusion criteria included concomitant use of other revision techniques, e.g., lengthening of the Roux limb or the biliopancreatic limb.

Information on demographics (age, sex), comorbid conditions, preoperative weight and body mass index (BMI), interval between RYGB and rescue LAGB, intraoperative details (intraoperative complications, conversion to open procedure), hospital course (length of stay [LOS], immediate postoperative complications), follow-up time, and long-term outcomes (EWL, complications, reoperations, mortality) was retrieved. The percentage EWL was calculated using the patients' weight at the time of revisional surgery and using the formula: weight loss/baseline excess weight x 100 [where baseline excess weight = initial weight - ideal weight]. Electronic medical records were queried to obtain any additional data not recorded in the database.

Regarding a decision for revision, we did not have a strict definition of pouch dilatation. Our standard bypasses have a pouch of no more than 5 cm in length from the gastroesophageal junction to the gastro-jejunal anastomosis. An enlarged pouch often exceeded this length and also had apparent wider dimensions than the native proximal stomach. We do have our gastroenterologists measure the size of the stoma of the anastomosis using a balloon that is used for dilating strictures. The maximum size of these is 20 mm thus it was possible to estimate anastomotic stretch as well. Unfortunately, some patients were evaluated in other hospitals so these specific measures were not always available. Appearance on upper gastrointestinal tract radiography was also utilized in the pre-operative assessment. Our program also offers endoscopic suturing to reduce the size of the stoma however these procedures were not performed together.

Technique of Band Placement

We utilized the pars flaccida technique for band placement. Briefly, the pars flaccida area of the gastrohepatic ligament was entered then the retrogastric region dissected carefully without making a wide opening. The retrogastric space just anterior to the right crus was then traversed to exit at the base of the left crus. This allowed the band to be placed just below the gastroesophageal junction. If there was not enough pouch to create a fundoplication completely from the pouch to avoid slippage of the band, then the excluded stomach was utilized for this. The small bowel was avoided in all suturing to reduce the risk of erosion.

Band Management Protocol

The management process for bands depended on the size and type of the band. The two bands available in the United States were the Lap-Band® System (formerly manufactured by Allergan) and the REALIZE™ band (Johnson & Johnson). For the Lap-Band® AP Standard, patients were started at 2 ml of saline then monthly adjustments made by instilling 00.5 to 1 ml depending on their tolerance of fluid in the office at the visit. Patients with the Lap-Band® AP Large or the REALIZE™ band were started with more fluid at the outset, sometimes 4–5 ml then 00.5 ml increments as long as they were tolerating administration. The tolerance of various foods and the number of vomiting episodes were all part of the assessment and the determination of the need to add fluid. A maximum of 6 ml was usually required for the AP Standard Band and 10 ml for the AP Large or REALIZE™ band. For all bands, adjustments were made no more frequently than every 4 weeks. Patients also had to drink a cup of water in the office immediately after adjustments prior to leaving. We did not routinely perform adjustments under fluoroscopic assessment.

All continuous variables were demonstrated as mean and standard deviation, unless otherwise noted, and percentage was obtained for all binary variables. All analyses

were performed using SAS version 90.4 (SAS Institute INC., Cary, NC).

RESULTS

During the study period, 4,614 bariatric procedures were performed, of which 42 were LAGB after failed RYGB. **Tables 1** and **2** report the demographics and outcomes of the patients included in the study.

There was no concomitant use of any other revisional techniques. All procedures were successfully performed laparoscopically with no conversions to open procedure. There were no intraoperative complications.

In the first 30 days postoperatively, the complication rate was 2.4% (1 complication: a trocar-site hematoma requiring blood transfusion, which was successfully managed nonoperatively). Overall adverse event rate was 19.0% (8 patients with adverse events). **Table 3** shows the long-term events and patient management.

Table 1.
Patient Demographics

Demographics (n = 42)	
Gender, n (%)	
Female	39 (93)
Male	3 (7)
Age, years	
Mean	49.8
Standard Deviation	11.4
Range	26 – 75
Body Mass Index	
Mean	42.4
Standard Deviation	7.7
Range	26 – 62
Weight, pounds	
Mean	251.1
Standard Deviation	51.2
Range	141 – 447
Comorbidities, n (%)	
Hypertension	31 (74)
Diabetes	27 (64)
Obstructive Sleep Apnea	26 (62)
Gastroesophageal reflux disease	26 (62)
Osteoarthritis	25 (60)

Table 2.
Patient Outcomes

Outcomes	
Length of stay, days	
Mean	1.2
Standard Deviation	0.6
Range	1 – 3
30-day events, n (%)	
Incisional hematoma	1 (2.3)
Roux-en-Y to Adjustable Gastric Banding interval, years	
Mean	5.5
Standard Deviation	3.4
Range	1 – 21
Follow up time, years	
Mean	6.5
Standard Deviation	2.0
Range	2 – 11
Mean Excess Weight Loss, % (Standard Deviation)	
6 months	15 (14)
1 year	25 (21)
2 years	22 (21)
≥ 3 years	28 (26)

Nine long-term events occurred in eight patients–one patient underwent operation for internal hernia at one year postoperatively, followed by explantation of the band five years postoperatively due to intractable pain. Erosions were successfully treated surgically with explantation of the band without replacement. There were no cases of band slippage. The 5-year mortality rate was 2.4% (1 patient); which occurred at another institution when the patient was hospitalized for chronic illnesses, malnutrition, and endocarditis likely secondary to peripherally inserted central catheter infection.

DISCUSSION

Our study shows that LAGB in patients with failure of RYGB is feasible and can be performed with a low short-term complication rate. However, the EWL is not comparable to RYGB or sleeve gastrectomy performed as primary procedures. It also produces less weight loss than gastric band as a primary procedure as well. In our study, band-overpouch was associated with EWL of 14.9%, 24.3%, and 28.2% at 6 months, 1 year, and ≥ 3 years,

Table 3.
Management of Long-Term Events

Long-Term Events (n = 9)	
Event	**Treatment**
1 year	
Internal hernia	Re-operation
PO intolerance/retained food	Esophagogastroduodenoscopy
3 year	
Adjustable gastric banding erosion	Explant
Dysphagia/Gastroesophageal reflux disease	Explant
4 year	
Gastrojejunal ulcer	Re-operation
5 year	
Intractable pain	Explant
Endocarditis	Mortality
6 year	
Intractable pain	Explant
8 year	
Adjustable gastric banding erosion	Explant

respectively. These results are consistent with previous evidence on EWL outcomes with this salvage procedure.[10–17] Importantly, there is paucity of data on long-term outcomes with LAGB after failed RYGB. Median/mean follow-up in previous studies ranges from 14 months to 33.5 months.[10–17] Liu et al. followed 20 patients (out of 86 study participants) for 5 years and reported a 65.9% EWL.[15] The series with the longest overall follow-up (33.5 months) by Lazardis et al. reported a 37.6% EWL, which is comparable to our EWL outcomes at 4 years of 28.2%.[10]

Patients included in our series had an adverse event rate of 19.0% (8/42 patients). Interestingly, there is considerable variation in safety outcomes and reoperation rates after LAGB in patients with failure of RYGB. The band-related complication rate in the series by Irani et al. (n = 42) was 10%, while Aminian et al. reported considerably higher adverse event and reoperation rates of 43% and 29%, respectively.[16,17] In the study by Aminian et al. band removal was the most common re-operation (21%); long-term band removal rate in our study was only 9.5%.[16] Given the wide range of confounding factors, such as surgeon experience, surgical technique, use of adjustable vs. nonadjustable gastric bands, varying pre-operative assessment protocols to identify appropriate candidates, etc., it is difficult to pinpoint the exact underlying reason for this wide variation in band-related complication and reoperation rates. Although not seen in our study participants, band slippage is another major complication seen with gastric banding.[11,17] Interestingly, a randomized-controlled trial by O'Brien et al. showed a significant reduction in this complication (15% to 4%, $P < .001$) if a pars flaccida technique was used instead of a perigastric approach.[18]

RYGB is a very effective weight loss surgery. However, a host of reasons, such as long-term changes in RYGB anatomy, alterations in gastrointestinal hormones and behavioral factors, can result in insufficient weight loss or weight regain after RYGB.[1–3] Surgical and endoscopic options in this scenario include revision of gastric bypass with changes in alimentary or biliopancreatic limb, limb distalization, pouch resizing, LAGB, reduction in gastrojejunal stoma, and transoral gastric outlet reduction (TORe), among others.[10,11,19–23] While some of these procedures such as revision of RYGB and pouch resizing are effective, the associated pitfalls such as creation of new anastomosis, re-operation in a previous surgical field, micronutrient deficiencies, protein calorie malnutrition and even need

for parenteral nutrition cannot be overlooked.[20,21] Given that reduction in gastrojejunal stoma has suboptimal EWL outcomes, possibly secondary to redilatation of stoma over time, TORe is likely to have similar outcomes.[22] Studies on pouch resizing have shown promising results but long term data are lacking.[23] A major challenge faced by clinicians involved in care of bariatric patients with failure of RYGB is absence of any generally accepted guidelines on optimal intervention. Results from our study and previous evidence suggest that LAGB after failed RYGB is relatively safe, with a major advantage of absence of any new anastomosis or use of stapling devices.[10–16] However, the high re-intervention rate in some series secondary to band-related complications is concerning. A multidisciplinary approach meticulously accounting for all factors contributing to RYGB failure should be taken prior to intervention in this bariatric population subgroup.

This study has one of the longest follow-up periods in patients undergoing revisional LAGB after failed RYGB and thus helps to bridge gaps in evidence on the long-term safety and efficacy outcomes of this procedure. The major limitations of our study include its retrospective, observational design with its inherent biases, and absence of data on long term effects of rescue LAGB on comorbid conditions.

CONCLUSIONS

In patients with weight regain or insufficient weight loss after RYGB and failure of conservative measures, placement of an adjustable gastric band around the gastric pouch is a technically feasible option, which is associated with additional EWL, although to a limited extent. The procedure had good short-term safety outcomes in our series; however, there is wide variation in morbidity, i.e., band-related complication and re-operation rates, in the literature. Careful multidisciplinary assessment must be pursued to determine the most appropriate management in patients with failure of RYGB.

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