Revisions after failed gastric band: sleeve gastrectomy and Roux-en-Y gastric bypass

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Abstract

Introduction  Laparoscopic gastric band is an appealing bariatric operation due to its simplicity and good short-term outcomes; however, it is associated with complications (slippage, erosion, prolapse) and failure in reaching target weight loss. This study describes our experience with failed gastric bands that required a revisional procedure.

Materials and Methods  This single-center retrospective analysis includes all consecutive patients who underwent a gastric band removal and revisional surgery in our hospital from January 2008 to June 2014. A total of 81 patients were identified and divided in three groups: Group one included patients who just had the gastric band removed (43), group two consisted of patients who underwent a conversion to sleeve gastrectomy (SG) (26), and group three included patients who required a conversion to Roux-en Y gastric bypass (RYGB) (12). Patient demographics, date of gastric band placement, indications for revision, postoperative morbidity and mortality, operating time, blood loss, length of stay, and % excess weight loss (%EWL) were recorded. Perioperative and clinical outcomes were compared between conversions to SG and RYGB.

Results  In group two (n = 26), 21 conversions to SG were performed in concurrence with the band removal as a one-stage operation, while five procedures were performed in two-stages. There were no complications and no case was converted to open. Patients who underwent a one-stage procedure had a longer operative time, although it did not reach statistical significance. In group three, 12 patients underwent a conversion to RYGB as a revisional operation; 11 were performed as a one-stage procedure and only one patient underwent a two-stage procedure.

Conclusions  SG and RYGB are safe options to revise a failed gastric band. Both groups who received either a SG or RYGB had a low complication rate and acceptable %EWL with no statistical difference between the two.

Keywords  Failure · Gastric band · Insufficient weight loss · Revisional surgery

Obesity is associated with numerous comorbidities such as hypertension, diabetes, dyslipidemia, sleep apnea, cardiovascular disease, and early osteoarthritis [1]. These comorbidities can be treated successfully with bariatric surgery as demonstrated in recent literature [2–6]. The laparoscopic gastric band (LAGB) was a very popular technique around the 1990s in Europe and South America as an alternative to open Roux-en-Y gastric bypass surgery. Initially, LAGB gained popularity because of its relatively low complexity and adjustability. There was also a benefit from low perioperative
morbidity (1–5 %) and mortality rate (0–0.05 %), as well as good short-term results in the postoperative period [7–9]. Furthermore, the procedure is reversible [10].

In June 2001, the use of the laparoscopic gastric band was approved by the FDA, and to date more than 300,000 gastric bands have been placed worldwide [10]. LAGB also represents approximately 15 % of bariatric procedures, and it is the most common bariatric procedure performed in many countries [7, 11–14]. In the U.S., the gastric band is currently the third most frequently performed bariatric procedure after gastric bypass and sleeve gastrectomy. Despite its popularity, LAGB is very demanding in terms of follow-up, and it is not exempted from complications. Some of the limitations with the gastric band are long-term complications such as gastric pouch enlargement, band slippage, and band erosion. Also, the gastric band may have poor long-term results in terms of weight regain (27–100 % of patients) [15–23]. Consequently, more patients are seeking consultation for a revised procedure.

Patients with the gastric band who have had at least five adjustments and still fail to reach the target weight loss after two years are candidates for a revisional procedure. Also, any patient with pouch enlargement, slippage, or erosion is also considered on a case-by-case basis. The decision for band removal with or without revision is made in consultation with the patient. When a revisional procedure is desired, then SG or RYGB is typically offered to the patient. This study describes our experience with failed gastric band cases that required a revisional procedure.

Methods

Participants

This single-center retrospective analysis includes all consecutive patients who underwent a gastric band removal with or without a revisional procedure in the Division of General, Minimally Invasive and Robotic Surgery at the University of Illinois Hospital and Health Sciences System from January 2008 to June 2014.

The patients were divided into three groups. The first group included patients who underwent a gastric band removal due to complications (acute slippage, perforation, erosion, leakage, pouch enlargement, or esophageal dilation). The second group was comprised of patients who underwent a conversion from band to SG, and the third group included patients who underwent a conversion to RYGB.

Pre-operative management for revisional procedures

Only those patients who fulfilled the NIH criteria for bariatric surgery were offered a revisional procedure [24]. All patients completed a medically supervised weight loss diet for 3–6 months and received psychological evaluation prior to having the revisional surgery. They also underwent an esophagogastroduodenoscopy (EGD) to rule out any esophageal or gastric erosion and an upper gastrointestinal series with barium swallow (upper GI) to evaluate band position, pouch size, and presence of esophageal dilation.

The type of revisional procedure was determined by the patient’s BMI, comorbidities, presence of hiatal hernia, past surgical history, and patient’s preferences. If the patient had a BMI >60, chronic renal disease, multiple medical problems, or a history of extensive abdominal surgery then sleeve gastrectomy was recommended. If the patient had a hiatal hernia, history of moderate to severe GERD, or history of diabetes, then gastric bypass was recommended.

The program’s preference is to perform both the band removal and the revisional surgery in the same setting to avoid a second operation and reduce cost. The revisional surgery is deferred to a second stage if intraoperatively there is extensive fibrosis from the gastric band, significant hemorrhage, or gastric perforation/band erosion.

Surgical technique

Band removal

The first step in the gastric band removal is adhesiolysis to clarify the anatomy. The gastro-gastric wrap is detached using scissors. The band is removed, and the fibrotic ring around the stomach is excised to allow for more precise stapling. The importance of removing the capsule is to avoid a thickened wall that can lead to an incomplete firing of the stapler which could cause a leak. An underwater leak test via EGD is performed to rule out an inadvertent gastric perforation that may not have been observed during laparoscopy.

Revision to sleeve gastrectomy

After band removal, the stomach is subsequently transected with a surgical stapler, starting 5 cm proximal to the pylorus and advancing to resect the greater curvature. The stapler reloads consist of three rows of staples, and the stapler height is 3–4 mm for normal tissue and 4–5 mm for thick tissue. The thick tissue loads are generally used for the first two firings across the antrum, and they may also be used to transect thickened scar tissue at the site of the previous band. All staplers were reinforced using Gore Seamguard® (WL Gore & Associates, Inc., Flagstaff, AZ). A 36 French bougie is used to tailor the sleeve and prevent any anatomic and functional stricture. The suture line is not oversewn. An upper GI endoscopy is performed to rule out...
any kinking, intragastric bleeding, or a leak at the suture line. A 10 French JP drain is left near the suture line.

Revision to Roux-en-Y gastric bypass

All cases were performed with the da Vinci® Surgical System.

Once the gastric band is removed, a 60 mL pouch is constructed by firing 2–3 endoscopic stapler reloads of 3–4 mm height. The first load is fired naked transversely across the stomach, approximately 5 cm distal to the gastroesophageal junction. The following loads are reinforced with Gore Seamguard®. The transverse colon is retracted, and the ligament of Treitz is identified. The jejunum is transected 50 cm distal to the angle of Treitz. Next, the alimentary limb of 120 cm is measured, and the jeunojejunalostomy is performed with a combination of stapling and sutures. After the omentum is divided, the alimentary limb is brought antecolic and antegastric and held in position with the fourth arm. A double layer hand-sewn gastrojejunojunostomy with 3–0 PDS suture is performed. An underwater leak test via EGD is performed to rule out a leak at the suture line. A 10 French JP drain is placed by the troesophageal junction. The following loads are reinforced by firing 2–3 endoscopic stapler reloads of 3–4 mm height. The first load is fired naked transversely across the stomach, approximately 5 cm distal to the gastroduodenal orifice. The second load is performed with a combination of stapling and sutures. After the omentum is divided, the alimentary limb is brought antecolic and antegastric and held in position with the fourth arm. A double layer hand-sewn gastrojejunojunostomy with 3–0 PDS suture is performed. An underwater leak test via EGD is performed to rule out a leak at the suture line. A 10 French JP drain is placed by the

Postoperative management

In selected cases where patients did not tolerate liquids on postoperative day one, an upper GI study with gastrografin was performed. Patients were discharged home by postoperative day two unless they were not tolerating liquids.

Data collection and statistical analysis

The following variables were obtained from the electronic medical records (EMR) of the patients: age, gender, height, weight, BMI, medical comorbidities, date and type of surgery, length of surgical procedure, size of bougie, length of hospitalization, postoperative complications, % excess weight loss (%EWL), morbidity, and mortality.

Data were maintained in a prospectively filled database under IRB approval. Data analyses were conducted using SPSS 22.0 (IBM, SPSS Statistics). Comparisons between the groups were performed using Student’s t test for continuous variables and Fischer test for discrete variables. Confidence intervals were set at 95 % and a two-sided p value of <.05 was considered statistically significant.

Results

Between January 2008 and June 2014, a total of 81 patients underwent a gastric band removal by a single surgeon at our center. The first group included 43 patients who underwent gastric band removal with no additional procedure. The mean age of these patients was 37.13 (SD = 11.06) years. The mean BMI was 38.86 (SD = 13.15) kg/m². The average length of stay was 1.1 (SD = 1.1) day. The reasons for performing the gastric band removal in these patients were as follows: 15 chronic slippage (35.7 %); 10 acute slippage (23.8 %); 10 insufficient weight loss (23.8 %); 6 gastric band erosion (14.3 %); and 1 gastric band infection (2.4 %). The mean time between gastric band placement and gastric band removal was 56.8 (SD = 40.56) months.

The second group included 26 patients who underwent a conversion to SG. The mean age of these patients was 38.6 (SD = 14.7) years. The mean BMI was 48.6 (SD = 12.8) kg/m². The average length of stay was 3 (SD = 1.0) days. The mean time between gastric band placement and gastric band removal was 59.7 (SD = 27.9) months. The mean %EWL at 6 and 12 months following sleeve gastrectomy were 53.04 % (SD = 17.3) and 64.4 % (SD = 20.6), respectively.

The third group included 12 patients who underwent a conversion to RYGB. The mean age of these patients was 33.9 (SD = 7.9) years. The mean BMI was 44.6 (SD = 13.6) kg/m². The average length of stay was 2.64 (SD = 1.0) days. The mean time between gastric band placement and gastric band removal was 73.32 (SD = 27.9) months. The mean %EWL at 6 and 12 months following bypass were 36.2 % (SD = 19.4) and 46 % (SD = 25.0), respectively. Outcomes are described in (Table 1).

This study also compared results regarding complications, conversion to open, operative time, and length of stay between conversion to SG in one-stage versus two-stage (Table 2). There were no complications or conversions to open in either group. The mean operative time for one-stage conversion to sleeve gastrectomy was 140 min (SD = 50.7). The mean operative time for one-stage conversion to robotic Roux-en-Y gastric bypass was 218.4 min (SD = 99.5). When comparing the operative time and length of stay between one-stage and two-stage sleeve gastrectomy, there was no difference in either result.

Discussion

Band removal is the most important step in a revisional procedure for failed gastric band. The gastric band produces a fibrotic ring (capsule) around the stomach and it has to be meticulously excised, as an incomplete firing of the stapler can occur otherwise [25].

It is still not clear whether one-stage or two-stage is the best option for the revisional procedure. Many authors have
reported better results with a two-stage approach [26–28]. Stroh and colleagues. reported that the incidence of leakage after a one-stage procedure is significantly higher (4.4 %) than for the two-stage approach (0 %) [26].

Our preference is to perform a one-stage operation whenever possible, because it decreases the number of operations and overall cost. The revisional procedure is deferred to a second stage only in cases of intraoperative complications such as extensive fibrosis, significant hemorrhage, or gastric perforation. In this study, there were no significant differences between one-stage and two-stage sleeve gastrectomy regarding complications, length of stay, and operative time. Although one-stage procedures had longer operative times, there was no significant difference; this could be related to the small sample size (only 5 cases were performed in two-stages).

There is also controversy about which type of operation is the best revisional procedure after failed gastric band. The type of revision offered to the patients depends on the comorbidities, history of abdominal surgery, BMI, and pre-operative studies (EGD, upper GI series). In this series, the final decision was made after considering all these factors, as well as the patient’s preference.

The conversion from band to sleeve gastrectomy is a valid option as prior studies have illustrated [29–31]. It is a feasible procedure, with few postoperative complications and good results regarding %EWL.

This is not the case for patients that have a large anterior pouch; in these patients, conversion to Roux-en-Y gastric bypass is the best option, since the anterior pouch can be reduced. There are many studies showing that RYGB as a revisional procedure is better in terms of weight loss when compared to the sleeve gastrectomy [21, 32].

In this study, regarding conversions from band to SG, there were no complications, no conversions to open, and no reoperations. The leak rate was 0 %, lower than that reported by previous literature [25]. The mean length of stay was also shorter than that reported by Utech et al. [31]. On conversions from band to RYGB, there were again no complications, no conversions to open, and no reoperations. These good results are possibly the consequence of meticulous surgery and an exhaustive pre-operative work-up of the patient, in order to offer the best revisional procedure. Another consideration for the 0 % leak rate after conversion to bypass could be the ability to precisely hand-sew the gastrojejunostomy with the Da Vinci system.

Technically, conversion from band to either SG or RYGB is feasible. Both have low rates of complications and good short-term results related to weight loss. There were no statistically significant differences between conversion to SG or RYGB in terms of complications, length of stay, and %EWL; although this series did show better results with respect to %EWL in conversion to SG. This could be due to the small sample size of the study.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Comparison between conversion to SG and conversion to RYGB</th>
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<tbody>
<tr>
<td></td>
<td>Conversion to sleeve</td>
</tr>
<tr>
<td>Numbers patients</td>
<td>26</td>
</tr>
<tr>
<td>Mean age</td>
<td>38.6 (SD = 14.7)</td>
</tr>
<tr>
<td>Mean BMI</td>
<td>48.6 (SD = 12.8)</td>
</tr>
<tr>
<td>Mean time between 1st and 2nd surgery (months)</td>
<td>59.7 (SD = 27.9)</td>
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<tr>
<td>Mean complications</td>
<td>0</td>
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<tr>
<td>Mean conversion</td>
<td>0</td>
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<tr>
<td>Mean length of stay</td>
<td>3 (SD = 1.0)</td>
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<tr>
<td>Reason why removal or conversion surgery</td>
<td>100 % Insufficient weight loss</td>
</tr>
<tr>
<td>Mean %EWL 6 months follow-up</td>
<td>53.04 (SD = 17.3)</td>
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<tr>
<td>Mean %EWL 12 months follow-up</td>
<td>64.4 (SD = 20.6)</td>
</tr>
<tr>
<td>One-stage</td>
<td>21</td>
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<tr>
<td>Two-stage</td>
<td>5</td>
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<tr>
<th>Table 2</th>
<th>Differences between one-stage or two-stage surgery in sleeve gastrectomy</th>
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<tbody>
<tr>
<td></td>
<td>One-stage</td>
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<tr>
<td>Mean operative time (min)</td>
<td>136.16 (SD = 57.41)</td>
</tr>
<tr>
<td>Mean complications</td>
<td>0</td>
</tr>
<tr>
<td>Mean conversions to open</td>
<td>0</td>
</tr>
<tr>
<td>Mean length of stay (day)</td>
<td>3 (SD = 1.33)</td>
</tr>
</tbody>
</table>
This study has limitations such as a small number of cases, retrospective data collection, and a short follow-up; however, it does show that the outcomes from both revisional procedures are satisfactory in terms of %EWL and a low complication rate. The revisional operation is a challenging situation for the bariatric surgeon, and a minimally invasive approach is always worth attempting. In these cases, the robotic system was particularly beneficial since it allows for accurate dissection and precise construction of the gastrojejunostomy.

Conclusion

In conclusion, based on these results, revisional surgery after failed gastric band is safe and adequate in terms of weight loss. Both laparoscopic sleeve gastrectomy and robot-assisted Roux-en-Y gastric bypass were successful as revisional procedures in terms of complications and weight loss in the short term. Larger studies with longer follow-up are required to determine whether one procedure out-performs the other as a revisional procedure for failed gastric bands.

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References