

Use of Adjustable Silicone Gastric Banding for Revision of Failed Gastric Bariatric Operations

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Background: Revision of gastric bariatric operations is sometimes technically difficult and may fail to achieve prolonged weight reduction. The use of the adjustable silicone gastric banding (ASGB) offers a new approach for these revisions.

Methods: ASGB was performed as a revisional procedure on 37 patients whose initial bariatric operations were as follows: silastic ring vertical gastroplasty (21), gastric bypass (12), horizontal gastroplasty (3) and vertical banded gastroplasty (1).

Results: The length of the procedure varied from 55 to 145 minutes (mean 83 minutes). Intraoperative complications included two fundic tears which were sutured without any postoperative sequelae. Five patients needed reoperation during the first postoperative year due to gastric volvulus (1), tubing tear (1) and development of postoperative ventral hernia (3). BMI fell from $44.8 \pm SD 8.07$ to $33.4 \pm 6.9 \text{ kg/m}^2$ for patients operated with BMI higher than 35 kg/m^2 and from 29.2 ± 3.32 to $25.4 \pm 2.8 \text{ kg/m}^2$ for patients operated with BMI lower than 35 kg/m^2 .

Conclusions: ASBG can be performed with revisions with an acceptable complication rate and postoperative weight reduction.

Keywords: Adjustable silicone gastric banding, bariatric surgery, morbid obesity, revision

Introduction

Regain of body weight after initial satisfactory weight reduction may occur after gastric bariatric operations. There may be many clinical reasons responsible for this occurrence, such as staple-line

disruption or pouch dilatation after silastic ring vertical gastroplasty (SRVG) or stoma and/or pouch dilatation after gastric bypass (GBP). Correction of these conditions is sometimes technically difficult and may fail to achieve prolonged weight reduction. The introduction of the adjustable silicone gastric band (ASGB) offers a new more feasible operative approach. An advantage of this technique is that it is associated with minimal additional trauma to the stomach because no suture-lines or anastomoses are needed. In addition, postoperatively a desired stomal size can be achieved. We hereby describe retrospectively our experience with the use of ASGB (Lap-Band[®], BioEnterics Corporation, Carpinteria, CA, U.S.A.) after failure of earlier gastric reduction procedures.

Patients and Methods

From January 1996 to May 1998, introduction of an ASBG was performed on 37 patients, who had undergone an earlier gastric bariatric procedure which failed. Their ages were 17 - 65 years (mean 38 years). The previous procedures were SRVG - 21 patients, GBP - 12 patients, horizontal gastroplasty - 3 and vertical banded gastroplasty (VBG) - 1 patient. In three patients, the present procedure was the third bariatric gastric operation. The time elapsed since the initial bariatric operation varied from 2 - 192 months (mean 94 months).

Failure of the initial procedure was evident by increased body weight after satisfactory weight reduction in 34 of the patients. The causes for this

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weight gain were as follows: staple-line disruption in 20 patients, pouch dilatation after SRVG in two patients and dilatation of the gastric pouch and/or gastrojejunostomy after GBP in 12 patients. Three patients were operated upon 2-4 months after SRVG due to excessive weight loss and vomiting as a result of severe pouch outlet stenosis.

The 34 patients who gained weight could be divided into two groups. The first group (group A) included 11 patients who were investigated and operated upon immediately after a slight increase in weight. Their BMI varied from 24 to 34 kg/m² (mean \pm SD 29.9 \pm 3.32). The second group (group B) included 23 patients who were referred to our department after significant weight gain. The BMI of this group varied from 36 to 72 kg/m² (mean \pm SD 44.8 \pm 8.07). The mean follow-up period of these patients after the revision with ASGB is 27 months (range 16-44 months).

Operative Technique

The abdomen is approached through an upper mid-line incision. The sternum is lifted with the Goligher retractor. Lateral traction of the wound edge is achieved with the specially designed Finochietto Rib retractor. Adhesions found between the left lobe of the liver and the stomach are carefully lysed until the esophagogastric junction is identified. Where the patient had undergone a gastric bypass, special care must be taken not to injure the Roux-y jejunal limb and the gastrojejunostomy. In patients, who developed staple line disruption after SRVG, it is not always essential to remove the silastic ring. This applies also in patients where the outlet is found to be stenotic. When there is stenosis without staple-line disruption, the silicone ring must be removed. If after removal of the ring the stenosis is not significantly improved (free passage of 30 Fr tube), the outlet of the pouch has to be dilated. This can be done by opening the distal part of the staple-line, which can be achieved by performance of a gastrotomy and single firing of a GIA stapler.

With careful blunt dissection between the thumb and the index finger, a retrogastric tunnel is created from the lesser curvature to the angle of His

through the avascular gastrophrenic suspensory ligament of the fundus. A penrose drain is placed along this tunnel and around the fundus. The right limb of the penrose drain is brought through an opening made next to the lesser curvature 2-3 cm below the gastroesophageal junction.

At this stage, the stomach is inflated with saline in order to rule out any unrecognized damage to the gastric wall. Then the gastric band is introduced and closed on the calibration tube while inflating its balloon with 15cc air. Free passage of the calibration tube through the band must be achieved after deflation of its balloon. However, in the case of previous Roux-en-Y gastric bypass, the band is applied around the proximal pouch and the remainder of the operation is left *in situ*.

In the last 15 patients, we did not perform calibration of the band, because we had had a few patients who developed signs of pouch outlet stenosis on the first postoperative day. This most probably was caused by gastric mucosal edema following irritation by the calibration process. These patients were immediately improved after puncturing and emptying of the fluid from access port.

The band is fixed by two 2-0 Prolene imbricating sutures at the anterior lesser and greater curvatures. Fixation of the band by two sutures is sufficient, because in a revision a lot of adhesions are found around the stomach and the likelihood for band slippage is very low. Subsequently, the tubing is connected to the access port which is fixed to the anterior fascia of the left rectus abdominis muscle. The earliest that we begin to inflate the band is 1 month after the procedure. However, if the patient loses 4 kg or more per month and has early satiety, it can be postponed until the weight reduction is not optimal or the ability for food intake increases.

Results

The length of the procedure varied from 55 to 145 minutes (mean 83 minutes). Additional procedures were performed on nine patients. These procedures included cholecystectomy for cholelithiasis in six and gastrotomy for enlargement of pouch outlet obstruction in three patients.

The intraoperative complications of these reoper-

ations were bleeding from a short gastric artery in one patient and a gastric tear in two patients. In the latter two patients, the procedure was the third operation, and the tear occurred during dissection of the stomach from the left liver lobe in one patient and during creation of the retrogastric tunnel in the other. In both patients, the tear was located at the anterior fundic wall and was easily repaired. The postoperative complications are summarized in Table 1.

One patient had to be reoperated 8 months postoperatively due to gastric outlet obstruction. Laparotomy revealed presence of gastric volvulus which was caused by adhesion of the antrum to the fundus of the stomach. The adhesion was caused by a Prolene suture which was inserted for fixation of the band to the lesser curvature of the stomach. In one patient, a tear of the tubing at the connection to the access port developed 1 year postoperatively; the access port was changed when the patient underwent laparoscopic repair of postoperative ventral hernia. Postoperative ventral hernia occurred in three patients; two were repaired laparoscopically with a Gore-Tex® mesh, and one patient underwent open repair using a polypropylene (Prolene®) prosthesis.

The length of hospital stay was 2 - 14 days (mean 4.4 days). The mean \pm SD postoperative weight reduction in group A was from a BMI of 29.9 ± 3.32 to 25.4 ± 2.8 kg/m² and in group B from a BMI of 44.8 ± 8.07 to 33.4 ± 6.9 kg/m².

Through the interview process, patient satisfaction score was determined. Nineteen patients (51%) were very satisfied, 16 patients (43%) were satisfied and two patients (6%) were dissatisfied with the operative results. The dissatisfaction was due to insufficient weight loss.

Table 1. Postoperative complications

Complication	No. of Patients
Pulmonary atelectasis	2 (5.4%)
Wound infection	5 (13.5%)
Gastric volvulus	1 (2.7%)
Tubing tear	1 (2.7%)
Postoperative ventral hernia	3 (8.4%)

Discussion

Reoperations after primary gastric bariatric operations are technically difficult and can be associated with increased morbidity and mortality.¹ Failure of the previous bariatric operation means weight gain after initial satisfactory weight reduction or excessive weight loss and development of digestive symptoms, such as reflux esophagitis. The need for revisionary procedures has been reported in 5% to 36% of the patients undergoing VBG^{2,3} and in 5% to 23% of those undergoing GBP.^{4,5} Failure of SRVG or VBG may be caused by staple-line disruption, gastric pouch dilatation and stomal stenosis. These conditions can be corrected by restapling of the stomach or by conversion of the gastroplasty to a vertical Roux-en-Y gastric bypass (RYGBP).⁶⁻⁸ Failure of GBP has indicated conversion to malabsorptive procedures, such as biliopancreatic diversion.⁶ All these revisionary procedures are technically complicated and may expose the patient to severe complications.

Behrns et al⁶ reviewed the results of revisionary bariatric procedures in 61 patients. The most common revisionary operation was RYGBP (32 patients) and VBG (20 patients). Seven percent of their patients developed pulmonary emboli which is much higher than expected.⁹ In addition, 5% of their revisions developed gastric staple-line or anastomotic leaks postoperatively. The leak incidence after revisionary gastric bariatric operations reported by other authors is even higher and varied between 5% and 28%.^{8,10,11} The major reasons for these gastric leaks are poor blood supply and an inadequately drained "blind" gastric pouch which may develop between two staple-lines.⁶

Revision of SRVG or VBG to vertical RYGBP means reliance on the original or refashioned vertical staple-line. This staple-line can undergo disruption. According to a review by Surgerman et al.,⁷ staple-line disruption was noted by three of their 58 patients converted from VBG to RYGBP.

The main goal of revisional bariatric surgery is to achieve weight loss. Some of the published series reported discouraging results. Schwartz⁵ reviewed 42 patients with 23-month follow-up, and found that only 33% of the patients achieved satisfactory weight loss. Yale¹² reported 120 reoperations with

a 20% failure rate; he defined a failure as failure to achieve a 20% weight loss. The average weight loss among the 61 patients reported by Behrns⁶ was only 16 kg.

The ASGB offers a new surgical option for revision of failed gastric procedures.¹³ Proper placement of the gastric band requires that the surgeon have previous experience in that procedure. If more than one previous operation had been performed, the reoperation may be associated with difficult dissection at the anterior and posterior aspects of the stomach. However, unless major blood vessels are injured, the procedure does not compromise the blood supply and does not cause additional damage to the integrity of the gastric wall. Therefore, the likelihood of development of gastric leaks is low, unless they were missed during the procedure. Thus, the resumption of oral intake can be initiated early in the postoperative course.

Our study found that this procedure can be performed with a minimal incidence of intraoperative and postoperative complications. The two fundic tears that occurred during reoperation were in patients in whom this was a third operation. Our experience demonstrated that after appropriate suture of the gastric tear, the band can be safely introduced without postoperative sequelae. Weight reduction following the procedure was satisfactory for most of our patients. Only two of them were dissatisfied because the amount of weight loss did not meet their expectations.

In conclusion, the ASGB appears to be a relatively simple technique for revision of bariatric gastric procedures. Its complication rate and results are acceptable. In the use of this technique, the surgeon must have previous experience in bariatric operations and ASBG.

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