

## Conversions and complications in 185 laparoscopic adjustable silicone gastric banding cases

E. Chelala,<sup>1</sup> G. B. Cadière,<sup>1</sup> F. Favretti,<sup>2</sup> J. Himpens,<sup>1</sup> M. Vertruyen,<sup>1</sup> J. Bruyns,<sup>1</sup> L. Maroquin,<sup>1</sup> M. Lise<sup>2</sup>

<sup>1</sup> Department of G.I. Surgery, University Hospital Center Saint-Pierre, rue Haute, 322 1000 Brussels, Belgium

<sup>2</sup> University Hospital of Padoua, Italy

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### Abstract

**Background:** Kuzmak's gastric silicone banding technique is the least invasive operation for morbid obesity. The purpose of this study was to analyze the complications of this approach.

**Methods:** Between September 1992 and March 1996, 185 patients underwent laparoscopic gastroplasty by the adjustable silicone band technique. A minimally invasive procedure using five trocars was performed.

**Results:** In 11 patients exposure of the hiatus was impeded because of hypertrophy of the left liver lobe which led to conversion in eight patients and abortion of the procedure in three other patients. Anatomical complications: We observed two gastric perforations and one band slippage at the early stage, one infection and three rotations of the access port. Functional complications: There were eight (4%) cases of irreversible total food intolerance resulting in pouch dilation and eight cases (4%) of esophagitis. One fatality on the 45th day in a patient with a Prader-Willi syndrome.

**Conclusion:** The most disturbing complications of gastric banding technique are gastric perforation and pouch dilation. Their incidence may be reduced by improving the technique and by considering pitfalls of the procedure.

**Key words:** Laparoscopic — Gastroplasty — Conversions — Complications

Kuzmak's adjustable gastric banding procedure has been well established and has proven efficacy in morbidly obese patients. The procedure by laparoscopic approach has been performed in our institution since 1992 [1] with fewer general complications than the open procedure [7, 11]. However, complications related to the technique and the band are

not uncommon [9, 10, 12], and questions concerning pouch volume remain a common matter of debate [5, 12].

In an attempt to minimize the incidence of complications in the future we describe the pitfalls of the operative technique and detail how to avoid pouch dilation by trying to understand its physiopathology.

### Patients and methods

In 1992 one of us [1] first showed the feasibility of using the laparoscopic approach for the Kuzmak gastric banding technique in five patients. Few modifications had to be introduced to make the band suitable for laparoscopy.

After these changes, between September 1993 and March 1996 a total of 185 patients (150 female and 35 males) selected on basis of the criteria of the American Society of Bariatric Surgery [3, 15] underwent laparoscopic adjustable silicone gastric banding (LASGB). Median age was 38 years (18–65). The average body weight was 118 kg (74–202), the percentage of excess weight as compared to the ideal body weight was 199 (105–268); the mean body mass index was 43 (34–67); 37 patients had had previous abdominal surgery.

In 136 patients, gastroscopy found no evidence of esophagitis whereas 12 patients had esophagitis stage I, five stage II, and two stage III. Sixteen patients presented a hiatal hernia less than 2 cm.

After initiation of the pneumoperitoneum, five trocars are needed. A calibrated balloon-tipped orogastric tube is inserted in the stomach. The balloon is inflated with 25 cc of saline and then pulled back to the esogastric junction. Dissection of the lesser curvature is initiated with the coagulation hook, starting at the equator level of the inflated balloon. Dissection is then resumed 1 cm to the left of the hiatal pillar. A tunnel is created behind the stomach, joining the two dissected areas. A roticulating grasper is passed through the tunnel and grasps one end of the inflatable prosthesis. The band is looped around the stomach, thus creating a 15-cc proximal pouch. Slipping of the band is prevented by four anterior seroserosal stitches. Finally, a posterior fixation is performed after opening the pars flaccida of the gastrohepatic ligament. At the end of the procedure, an implantable reservoir is fixed on the left anterior rectus sheath, just distal to the costal edge.

### Results

In our study, the mean operation time was 90 min (40–240). In three patients laparoscopy was abandoned right from the

**Table 1.** Reoperation for late complications ( $N = 8$ ; 4%)

Patient No. ( $N = 8$ )	Charact	Reason	Period postop	Laparoscopic treatment
3	BMI 36 Op 12/92	Defective band	36 months	Replacement
5	BMI 41 Op 12/93	Psychological	12 months	Removal
10	BMI 35 Op 10/94	Pouch dilation	14 months	Reposition
16	BMI 41 Op 11.94	Pouch dilation	5 months	Removal
22	BMI 42 Op 11/94	Pouch dilation	3 months	Reposition
24	BMI 36 Op 12/94	Pouch dilation	12 months	Reposition
26	BMI 34 Op 12/94	Pouch dilation	4 months	Removal
32	BMI 43 Op 12/94	Pouch dilation	4 months	Reposition

beginning because of left liver lobe hypertrophy. Eight conversions were necessary because of difficult and risky dissection, short instruments, and incorrect band position. The mean hospital stay was 2 days (2–10). Gastrograffin swallow was performed on the 1st postoperative day in order to check for leakage.

Band-related complications are divided in anatomical and functional.

#### *Anatomical complications*

Two patients had gastric perforation in their early postoperative course. One was caused by traumatic placement of a nasogastric tube on the 1st postoperative day and was treated by closure of the perforation by laparotomy. The second happened on the 5th postoperative day and necessitated laparoscopic reoperation for removal of the band and gastrorrhaphy. One band that had not been fixed slipped and induced food intolerance early on. One aspiration pneumonia was diagnosed on the 2nd postoperative day (patient 7) and was treated by deflation of the band and antibiotherapy. One patient had an infection of the access port 12 months postoperatively which was treated medically. Three access ports rotated (upside-down), necessitating reposition and re-fixation under local anesthesia.

#### *Functional complications*

*Requiring reoperation.* Functional complications requiring reoperation were noted in eight patients (see Table 1). We observed six cases of irreversible total food intolerance resulting in pouch dilation requiring surgery for repositioning in four cases and removal of the band in two cases. In two cases the band had to be replaced. In one of these, the band was removed for psychological reasons after 12 months. The patient was operated on 35 months later using the Mason II procedure. The other patient presented leakage of the band diagnosed radiologically. The band was replaced after 36 months.

*Requiring conservative treatment.* Four percent of the patients had recurrent heartburn with esophagitis (four stage

I, two stage II, one stage III) on control gastroscopy. Successful medical treatment was instituted with omeprazole.

There was one mortality: It occurred 45 days postoperatively in a patient with Prader-Willi syndrome. Cause of death was gastric bleeding.

#### **Discussion**

It is now widely admitted that surgery is the only effective approach for optimizing weight loss in the morbidly obese patient [13, 16]. After a well-established open gastric banding procedure was described by Kuzmak, and after observing his long-term results [11], we started using the laparoscopic approach as of October 1992. The modification of the technique and new devices allowed us to reduce our operating time and to decrease anatomical and functional complications.

We cancelled surgery for three patients judged to be contraindicated for the laparoscopic approach because of left liver hypertrophy as documented by subxyphoid ultrasonography measuring the depth of the left liver lobe. Now, however, we think that there is no final correlation between feasibility by laparoscopy and radiological assessment of left liver size. Decision about feasibility should be delayed until after introduction of the laparoscope and retraction of the liver to the right. No further conversions were noted, since we place the liver retractor more to the left of the xyphoid, thereby moving the liver from the left to the right. In eight patients we had to convert. In four cases dissection was judged hazardous because of left liver hypertrophy: In two cases early in our experience in superobese patients the instruments were too short, and in two band position was incorrect.

Gastric perforation is a serious early perioperative complication in LASGB. This occurred in two cases in our earlier patients, probably because efforts to create the retrogastric tunnel were too traumatic. In one of the two patients we did remove the band after closure of the perforation by laparoscopy on the 5th day. In the other case successful gastrorrhaphy was performed without removal of the band because it happened on the 1st postoperative day and

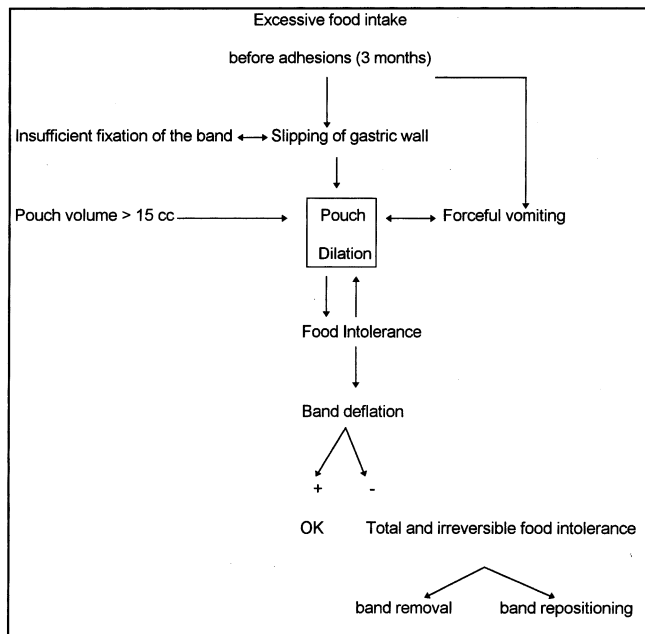


Fig. 1. Pathophysiology and management of pouch dilation.

soiling was only minimal. We suggest that removal of the band and gastrostomy should not be done routinely if the perforation is diagnosed early. Choosing reference landmarks (equator of the calibrated tube balloon), dissecting under vision (thanks to the use of 30° optical system), dissecting downward the left crus, reducing the blind area, and resisting the impulse to push the roticulating forceps forcefully may further minimize the risk of perforation. Since too tight a calibration of stoma during operation may contribute to gastric tissue edema, early food intolerance, esophagitis, and aspiration pneumonia, as seen in patient 7, we changed our strategy, as of patient 34, to keep the band completely deflated after surgery. Insufflation is delayed until after barium swallow at 1 month postoperative.

A large debate still exists concerning the positioning, infection, and fixation of the access port. Since we observed three instances of rotation of the access port, we stress that any twist, kink, or insufficient length of the port tubing may contribute to port rotation and that fixation should be done by unresorbable suture, with three stitches on the left rectus sheath.

Pouch dilation is a common problem associated with gastroplasty procedure, resulting in late functional stenosis [4, 6, 10, 14]. In an effort to understand the mechanism and the physiopathology of food intolerance and pouch dilation, we tried to analyze some factors that possibly contributed to the enlargement of the proximal pouch. An algorithm of pouch dilation summarizes our policy in Fig. 1. One cause of pouch dilation is excessive vomiting. Overeating and ingestion of sparkling drinks may lead to pouch enlargement and may also contribute to excessive vomiting. Therefore, a restrictive liquid diet must be maintained in the early postoperative stage to allow adhesions to form and to prevent slippage of the gastric wall. All patients to be treated by this method need to fully understand what strict alimentary restriction means and what the consequences are of uncontrolled eating behaviors. Therefore, in our opinion the ap-

propriate treatment in Prader-Willi syndrome is biliopancreatic derivation and not LASGB.

We and others [5] believe that a pouch of 15 cc reduces the incidence of pouch enlargement problems. (After changing our policy, reducing from 25 cc to 15 cc, we had less pouch enlargement.)

Food intolerance can be managed successfully by band deflation (in some cases with gastric aspiration and parenteral nutrition). If the condition is not promptly solved, irreversible total food intolerance will occur and surgical revision by removing or repositioning the band will be unavoidable.

We reported six cases of pouch dilation because of posterior slippage of the gastric wall and two replacements in our first 40 cases. We therefore think band dilation is to be recommended to assure posterior fixation of the band. The Endo stitch (USSC, Norwalk, CT) has proven useful in performing this task. We did not encounter any pouch dilation after beginning posterior fixation as of patient 34. The eight patients with slipped band were reoperated. At laparoscopy, posterior slippage below the peritoneal reflection was apparent. There were remarkably few adhesions after the procedure except from left liver to the band.

Technically the procedure started with the dissection of the adhesions between the liver and the anterior gastric wall. A tight fibrous capsula was found, mostly on the proximal pouch, and had to be incised horizontally (scissors) on the anterior side of the ring toward the gastrosplenic ligament. Opening the pars flaccida on the lesser curvature gives access to the lesser sac, providing opening of the posterior fibrous capsula. The band was liberated and the slipped gastric wall was reduced. The band was liberated and repositioned on a calibrating pouch of 15 cc and secured by four anterior and one posterior seroserosal stitches.

Many (10%) patients develop esophagitis. Large hiatal hernia as well as important esophagitis (stage III Savary) must therefore be considered a contraindication for banding. Esophagitis stage decreases in the long run. In 4% of the cases, however, recurrent heartburn persists, probably because of alimentary stasis. Interestingly, all of the patients responded to medical treatment by omeprazole. Predisposition to reflux esophagitis [8] according to the law of Laplace [2] and incompetence of the lower esophageal sphincter (observed in 30% of patients) should be considered in these patients.

In this preliminary report, we conclude that a longer follow-up is needed to establish the role of LASGB.

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