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Current Consensus

Combination of Laparoscopic Adjustable Gastric Banding and Gastric Bypass: Current Situation and Future Prospects – Routine Use Not Advised

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Although bariatric surgery has proven to be the most effective treatment for morbid obesity, most surgical techniques do have failures. In an effort to improve the reliability, several surgeons started to use a combination of a laparoscopic gastric bypass with an adjustable gastric band.Because of concerns regarding a possible negative outcome, an expert meeting was organized to evaluate the current situation and future application. In total, 104 operations were reported,with several technical variations.The overall complication rate was acceptable, but the percentage of the band erosions was 6.7%, which is too high.The potential advantages (adjustability, maintained access to the stomach and biliary tree, and reversibility) do not compensate for this complication rate. Based on the results and the opinion of the surgeons experienced in this technique, it is concluded that the combination of gastric bypass with an adjustable gastric band to form the pouch is not recommended.

Key words: Morbid obesity, bariatric surgery, laparoscopy, gastric bypass, ,adjustable gastric banding, surgical complications

Consensus from the Expert Meeting on the Adjustable Banded Gastric Bypass, March 29, 2003, at the 3rd Annual Meeting of the Italian Collaborative Study Group for the Lap-Band®, Pila, Italy, March 27-29, 2003.

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Introduction

Currently, it is widely accepted that bariatric surgery is the important treatment option for morbidly obese patients. Initially many different surgical procedures were proposed, including techniques that caused severe malabsorption, such as the jejuno-ileal bypass.[1] It was after the introduction of restrictive procedures by Mason (vertical banded gastroplasty, VBG), which were found to be safe and effective, that surgical treatment was implemented on a large scale.[2] The results of restrictive operations were good, but insufficient long-term weight loss in a significant number of patients and the mechanical failure of the VBG (staple-line disruption, band erosion, unacceptable food intolerance) resulted in the development of new techniques such as adjustable silicone gastric banding.[3] Laparoscopic application of the latter device has further increased the interest of surgeons to perform bariatric surgery.[4,5]

For several years, interest in gastric bypass has also increased considerably. In the United States, the majority of bariatric operations performed are currently gastric bypasses.[6,7] Again, laparoscopically performed gastric bypass operations likely have increased interest in bariatric surgery; of the estimated 100,000 procedures per year, more than 50% are now performed by laparoscopy.[8-10] With the large numbers of operated patients with increasingly

long and more complete follow-up, it has become obvious that, as with gastric restrictive surgery, gastric bypass operations are not fail-proof and a significant number of patients eventually regain some weight. Thus, Fobi and Capella modified the gastric bypass, adapting a concept of Mason, adding a restrictive component to the pouch (silicone band).[11,12]

In search for an even more complete and fail-proof procedure, several surgeons have combined the benefits of laparoscopic adjustable gastric banding (LAGB) with laparoscopic gastric bypass. Himpens[13] and Furbetta[14] in 2001were the first to report this technique. The purpose of this paper is to summarize the currently used techniques and give an overview of the results of the patients operated thus far, to formulate the possible advantages and disadvantages or risks. Furthermore, the conclusions of a meeting of surgeons with experience with this technique are summarized.

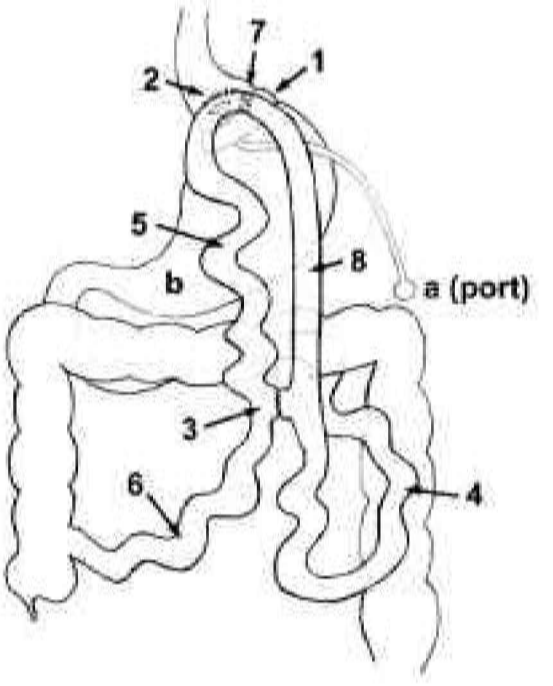

Figure 1. Functional gastric bypass according to Furbetta.[14] 1 - adjustable band; 2 - gastrojejunostomy; 3 - entero-enterostomy; 4 - biliary limb; 5 - alimentary limb; 6 - common channel; 7 - occluding staple-line; 8 - excluded limb.

Overview of the Surgical Techniques

The following overview shows the main issues of the individual variations developed by several surgeons and are reported in alphabetical order of the surgeon's name.

Functional Gastric Bypass (Furbetta)

The functional gastric bypass according to Furbetta[14] consists of a laparoscopic adjustable gastric band (LAGB, Lap-Band®, Inamed, Santa Barbara, CA, USA), combined with a distal Roux-en-Y gastric bypass (RYGBP) (Figure 1). Initially, a loop gastric bypass was formed after which the afferent limb of the loop was closed with a stapler, but potential risk of a stagnant loop syndrome has led to the current technique in which an RYGBP is used. The gastro-jejunostomy is created side-to-side with a hand-sewn anastomosis. Proposed advantages are reduced risk of suture-line failure, prevention of acute dilatation of the bypassed stomach, access to the bypassed stomach and adjustability of the percentage of bypassed food. Furbetta proposed to make a long limb bypass approaching the biliopancreatic type of procedure; however, optimal limb-length still has to be determined. In total, 32 patients were treated with this technique.

Laparoscopic Inflatable Band with Roux-en-Y Gastric Bypass (Himpens)

The Lap-Band® with RYGBP as reported by Himpens,[13] consisted of a standard LAGB combined with a Roux-Y (biliary limb 50 cm, alimentary limb 75 cm) in an antecolic, antegastric fashion. The gastrojejunostomy was created with a linear cutting stapler. All defects in the mesentery were closed with sutures. In this series, the operation was initially introduced in re-do patients, but after successful implementation it was then performed as a primary operation in a small group of patients.

Laparoscopic Adjustable Gastric Bypass (Lesti)

The laparoscopic adjustable gastric bypass, according to Lesti (personal communication, 2003) has the same advantages as the functional gastric bypass.

This technique consists of a wedge resection of the fundus of the stomach to create a pouch, placement of an adjustable band distally around the pouch outlet and a RYGBP to the pouch (Figure 2). The advantage of this operation is that the distance of the silicone band to the gastro-jejunostomy is increased, reducing the risk of erosion of the band into the jejunum. This also gives the opportunity to place the anvil of the circular stapler in the pouch by opening the fundus in the area that will be resected later; in this way, the anvil of the stapler is not introduced down the esophagus, preventing possible complications. A further advantage may be the resection of part of the fundus, thus reducing grehlin production,[15] a point that is under investigation.

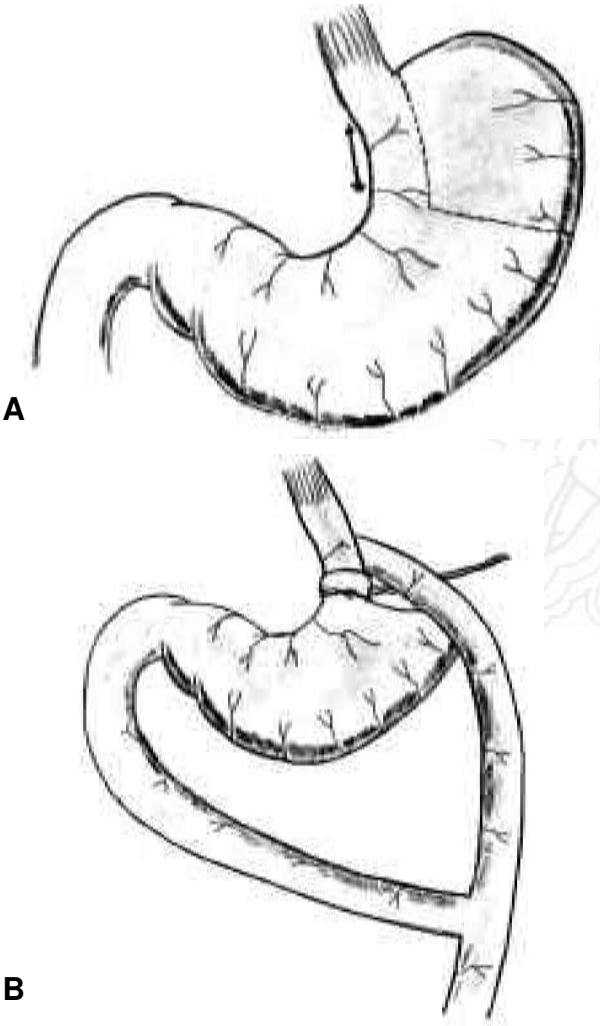

Figure 2. Functional laparoscopic Roux-en-Y gastric bypass with partial preservation of the stomach. A: partial resection of fundus; B: Band placement and gastrojejunostomy.

Lap Banded Roux-en-Y Gastric Bypass (Weiner)

The lap-banded RYGBP according to Weiner,[16] also consists of a small pouch with the Lap-Band® combined with a RYGBP (Figure 3). He advocates a hand-sewn anastomosis, because a circular stapler will not fit into the small pouch. Furthermore, in his view it is important in primary cases to first place the band and then cover it completely with the gastric fundus before transecting the jejunum for the Roux-Y construction. He is less in favor of using the additional bypass as a secondary operation in failed Lap-Band® patients. Despite the fact that in secondary cases, the Lap-Band® is entirely covered with scar tissue and gastric fundus, reducing the risk of erosion of the band into the jejunum, his experience is that secondary procedures result in a higher number of complications.

Laparoscopic Reversible Gastric Bypass (Zimmerman)

The LRGBP according to J-M Zimmerman (personal communication, 2003) consists of a standard LAGB in combination with a RYGBP (Figure 4). In this technique, the gastrojejunostomy is constructed

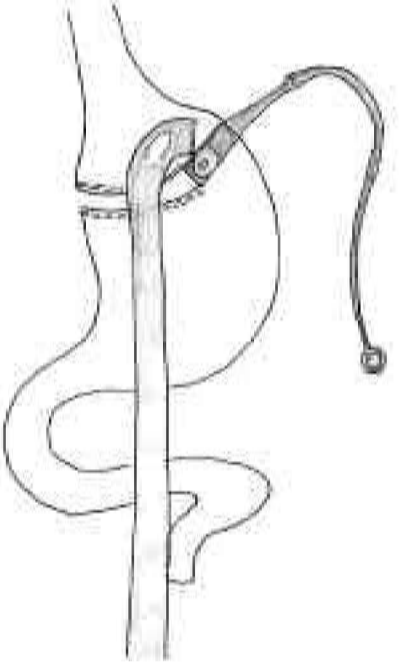

Figure 3. Banded Roux-en-Y gastric bypass according to Weiner.[15]

Figure 4. Laparoscopic reversible gastric bypass according to Zimmerman.

with a circular stapler. The anvil of the stapler is introduced with the trans-esophageal technique as described by Wittgrove and Clark.[17,18] The claimed advantages are non-transection of the stomach, accessibility to the bypassed stomach, protection of the gastrojejunostomy (empty band directly after the operation), prevention of gastric pouch dilatation and adjustability of the bypass in relation to rate of weight loss, treatment of nutritional deficiencies, etc.

Considerations

Is there really an advantage of the procedure, do the patients get adjustments, is the access to the stomach used? In the limited experience with this procedure and the short follow-up, it is difficult to make objective conclusions. It is obvious that access to the stomach is preserved as well as access to the biliary tree, which usually is impossible after standard RYGBP. With respect to the usefulness of adjustability of the bypass, this may only be desirable in patients with a distal RYGBP. In standard Roux-Y patients, restriction is probably the main effect of the treatment! Another advantage of this technique is the possibility to open the band in the case of nutrient deficiencies (vitamins, iron) or excessive weight loss. However, risk of contamination of the implant due to the bowel transsection should be kept in mind.

Results

During the expert meeting (March 29, 2003, Pila, Italy), the surgeons present reported a total of 104 operated patients with a minimal follow-up of 6 months. Together with the 14 patients reported by Himpens[13] and the 16 patients recently reported by Cariani,[19] this means that at least 134 patients have received a combination of the Lap-band® with a RYGBP. Of the 104 patients reported in Pila, 73 were primary operations and 31 were secondary procedures. Indications for the primary procedures were: non-compliant patients, or patients that do not want a restrictive procedure (Furbetta), indications for a standard RYGBP (sweets eater, binge eater, super-obese BMI >50 kg/m^2) (Lesti, Weiner, Zimmerman). Indications for secondary operations were: failure of the Lap-band® with respect to weight loss, sweets eater and pouch dilatation. Pouch dilatation or slippage is a contraindication for a secondary procedure according to Furbetta, whereas the other surgeons (Zimmerman and Weiner) consider this as a good indication for a conversion from Lap-band to the combination of the Lap-band® with RYGBP. However, according to Weiner, the secondary operation does carry a higher risk for postoperative complications.[16]

The average weight loss appears to be similar to the results obtained with a standard RYGBP (open or laparoscopic). The results are summarized in Table 1. In general, the band is left empty following the operation, to be adjusted during the next weeks or month. All surgeons emphasize that it is important not to over-inflate the band and not to entirely block the outlet of the pouch to the remnant stomach, because this will increase the risk of band erosion. Except for Lesti, who inflates the band with 2-4 cc of saline after 1 month to reduce the passage of Gastrografin® to the distal stomach to about 10%, no clear strategy with respect to band inflation has been formulated by the surgeons. This is an impor-

Table 1. Number of combined operations

Surgeon	No.	Primary	Secondary	Initial BMI (mean)	Follow-up	
Himpens*	13	11	2			
					6 months	12 months
Furbetta	19	12	7			
Lesti	22	22		49.2	40.7	35.4
Weiner	32	16		46	34	29.5
			16	36	33	29
Zimmerman	31	23	8	52	38 (n=25)	35 (n=13)
Total	104	73	31	47 (n=85)	36.9 (n=79)	32.4 (n=67)

*The data of Himpens were obtained from his publication in *Le journal de Coelio-chirurgie* (2002)[19] and are not included in the total number of patients reported during the meeting in Pila, Italy.

tant point to be addressed in future studies. The overall weight loss at 6 months was 21% of BMI and at 12 months 31% of BMI. There was no significant difference among the different surgeons at this length of follow up.

The combination of a Lap-band® with a RYGBP may give rise to complications related to the bypass or the band. In addition, potential complications include band erosion into the jejunum and band infection due to possible contact of the band with bowel contents. The complications reported are as follows: Furbetta – no conversion to open surgery, no complications; Lesti – 1 conversion to open surgery, 1 band erosion after 6 months; Weiner – 1 band erosion into the jejunum, 1 pouch dilation and therefore no weight loss, 1 bleed and later band infection resulting in removal (day 8); Zimmerman – 1 bleed from the anastomosis, 1 trocar hernia, 1 infection (possible leak) requiring parenteral nutrition but no re-operation, 1 severe pouch dilatation, and 1 erosion. In his publication in 2002, Himpens reported 3 band erosions and 1 patient in which the band had to be removed because of intolerance of food restriction.[19] In his series, all erosions were into the jejunal loop. The total number of erosions in Himpens' series is now 4 out of 16 (J. M. Himpens, personal communication, 2003). Finally, in the series reported by Cariani[20] the complications were 1 stenosis and 2 band erosions. The total number of reported erosions is now 9 out of 134 (6.7%).

Discussion

Despite the publication by Himpens et al,[13] who came to the conclusion that a combination of a RYGBP with a Lap-band® is not to be recommended for widespread use, several surgeons have either picked up this concept or have developed a concept of there own. In the learning curve of this procedure, complications were encountered related to this technique. The contact of the small bowel with the Lap-band® device is especially a concern, and in this limited series of patients appeared to be the major complication. However, modifications in the technique have been made to reduce this risk.

Potential advantages of the combination of LAGB with RYGBP are obvious (Table 2). The distal part of the stomach and of course the duodenum and bile ducts can still be assessed (and accessed) by endoscope, the degree of restriction can be adjusted in relation to weight loss, and in the case of severe deficiencies this can be obviated by just opening the band. However, the disadvantages and risks should not be overlooked. The main concern of band erosion both to the stomach and small bowel have been mentioned. The increased risk of infection of the band has not been reported in patients operated so far, but is present, and by combining two operations, each has the risk of both procedures.

So far the results appear to be comparable to the standard laparoscopic RYGBP. However, the follow-up is still relatively short and the number of patients limited. There is no standardized technique and the surgeons that have embarked on this type of

Table 2. Potential advantages and disadvantages of the combined operation

Advantages	Disadvantages
Access to bypassed stomach	Band erosion
– Ulcer	– Stomach
– Bleeding	– Jejunum
– Malignancy	Band infection
Access to duodenum	More complicated procedure
Access to bile ducts	Long-term insufficient weight loss
Tailored weight loss	Higher overall risk
Reversal of deficiencies (vitamins, nutrients)	
Reversibility of entire procedure	
Reduced risk of gastrojejunostomy leaks	
– Less pressure on the anastomosis	
Prevention of acute gastric dilatation	

operation are without exception very experienced laparoscopic and bariatric surgeons. Moreover, whereas in a number of patients with a gastric bypass, weight regain is prevented by placing a band above the gastrojejunostomy, in the current proposed operation this band is placed below the gastrojejunostomy, creating a potential problem in case of future weight regain in these patients.[21]

Therefore, the combination of LAGB and RYGBP should not be recommended as a standard bariatric procedure. The number of band erosions (6.7%) is too high to continue this type of operation in the current setting. We thus recommend to perform this type of operation only in a well-controlled clinical trial. In such a trial, preferably patients are to be randomized between a laparoscopic gastric bypass and the combination of a Lap-band® with a gastric bypass. To reduce the risk of band erosion to the small bowel, it can be considered to start such a study in patients who already have a Lap-band® in place.

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