

A 10-year Experience with Laparoscopic Gastric Banding for Morbid Obesity: High Long-Term Complication and Failure Rates

M. Suter, MD, PD, FACS^{1,2}; J. M. Calmes, MD²; A. Paroz, MD²; V. Giusti, MD, PD³

¹Department of Surgery, Hôpital du Chablais, Aigle-Monthey, Switzerland, ²Department of Surgery and ³Division of Endocrinology, Diabetology and Metabolism, Centre hospitalier universitaire vaudois (CHUV), Lausanne, Switzerland

Background: Since its introduction about 10 years ago, and because of its encouraging early results regarding weight loss and morbidity, laparoscopic gastric banding (LGB) has been considered by many as the treatment of choice for morbid obesity. Few long-term studies have been published. We present our results after up to 8 years (mean 74 months) of follow-up.

Methods: Prospective data of patients who had LGB have been collected since 1995, with exclusion of the first 30 patients (learning curve). Major late complications are defined as those requiring band removal (major reoperation), with or without conversion to another procedure. Failure is defined as an excess weight loss (EWL) of <25%, or major reoperation.

Results: Between June 1997 and June 2003, LGB was performed in 317 patients, 43 men and 274 women. Mean age was 38 years (19-69), mean weight was 119 kg (79-179), and mean BMI was 43.5 kg/m² (34-78). 97.8% of the patients were available for follow-up after 3 years, 88.2% after 5 years, and 81.5% after 7 years. Overall, 105 (33.1%) of the patients developed late complications, including band erosion in 9.5%, pouch dilatation/slippage in 6.3%, and catheter- or port-related problems in 7.6%. Major reoperation was required in 21.7% of the patients. The mean EWL at 5 years was 58.5% in patients with the band still in place. The failure rate increased from 13.2% after 18 months to 23.8% at 3, 31.5% at 5, and 36.9% at 7 years.

Conclusions: LGB appeared promising during the first few years after its introduction, but results wors-

en over time, despite improvements in the operative technique and material. Only about 60% of the patients without major complication maintain an acceptable EWL in the long term. Each year adds 3-4% to the major complication rate, which contributes to the total failure rate. With a nearly 40% 5-year failure rate, and a 43% 7-year success rate (EWL >50%), LGB should no longer be considered as the procedure of choice for obesity. Until reliable selection criteria for patients at low risk for long-term complications are developed, other longer lasting procedures should be used.

Key words: Morbid obesity, bariatric surgery, gastric banding, weight loss, complications

Introduction

Laparoscopic gastric banding was the first minimally invasive procedure for morbid obesity. As such, and because of its apparent simplicity, it contributed significantly to the boom of bariatric surgery during the second part of the 1990s. Early results in terms of weight loss were comparable to those of other restrictive operations, morbidity was very low, and mortality was almost non-existent. Even before large series and long-term results were published, several enthusiastic surgeons, including us, adopted it as the procedure of choice for morbid obesity, especially in Europe, Australia and Latin America. In the USA, because the FDA took longer to approve the device, gastric banding has only been used since a few years.

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Reprint requests to: M. Suter, MD, PD, FACS, Chief-surgeon, Department of Surgery, Hôpital du Chablais, 1860 Aigle, Switzerland. Fax: +41-24-468-86-23; e-mail: michelsuter@netplus.ch

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Today, more than 100,000 patients have undergone gastric banding around the world.

Despite this very large experience in many centers, very little is known about the long-term results of gastric banding. Several large series reporting relatively early results have shown the procedure to be safe, and associated with early weight loss comparable to that observed after other purely restrictive procedures like vertical banded gastroplasty.¹⁻⁷ Most published papers, however, report follow-up data limited to a 2- to 4-year period. In papers claiming to report on long-term results, the mean follow-up is usually <4 years, and only a limited percentage of the entire patient group have been followed >5 years.⁸⁻¹⁶

In this paper, we report our results in a series of 317 gastric banding patients with a mean follow-up of 74 months. So far, only one very little series including 45 patients has been reported with a longer follow-up, with an alarming 76% device-related long-term complication rate.¹⁷

Patients and Methods

Patients with a body mass index (BMI) >40 kg/m², or >35 kg/m² with at least one severe co-morbidity, were offered gastric banding after failure of conservative treatment and complete evaluation by a multidisciplinary team, including an endocrinologist specialized in the management of obesity, a dietitian, a psychiatrist, an anesthesiologist and a bariatric surgeon. Other specialists (pneumologist, gastroenterologist, cardiologist) were consulted as required. Contraindications were according to the consensus development conference panel of the National Institutes of Health and to the consensus on obesity treatment in Switzerland.^{18,19} Since the introduction of laparoscopic bariatric surgery in our department in December 1995, a prospective computerized bariatric database has been created, including preoperative patient's demographic and anthropometric data, co-morbidities, operative and follow-up data. The latter include evolution of weight expressed as the percentage of excess weight loss (EWL), BMI, food tolerance, quality of life, late complications and reoperations. Major early complications were either life-threatening, or required reoperation. Major band-related complica-

tions were those requiring band removal and/or conversion to another bariatric procedure (major reoperation). Other reoperations were defined as minor.

Outcome measures were weight loss, expressed as EWL and BMI, long-term complications and failures. Ideal weight was defined according to the median value in the WHO table by Jelliffe.²⁰ Success was defined as EWL >50%. Failure was defined as either an EWL <25%, or the development of major long-term complications leading to band removal. For the purpose of intention-to-treat analysis, the initial weight was carried forward as of the time of de-banding in patients who required band removal, whether or not they were converted to another procedure.

The patients were given a single dose of prophylactic antibiotic (amoxicillin clavulanate 2.2 g or cefuroxim 1.5 g) at the induction of anesthesia. Thromboembolic prophylaxis was provided using low-molecular weight heparin, which started at the induction of anesthesia and was pursued until the end of the 4th postoperative week. The surgical technique has been described in detail elsewhere.²¹ Briefly, the procedure was done using 5 trocars and a 45° angled optic. The Lap-band® (Bioenterics, Carpinteria, CA, USA) was placed using the perigastric technique, and the SAGB® (Ethicon Endo-Surgery, Obtech Medical, Zug, Switzerland) was placed following the pars flaccida technique. In all cases, care was taken to place the band above the lesser omental sac. If the lesser sac was entered during dissection, a new retrogastric tunnel was created higher up. The band was left empty at the end of the procedure.

The patients were instructed to follow a semi-liquid diet for the first postoperative month. A barium swallow was performed 4 weeks after surgery to verify the correct position of the band. Initial band inflation was usually done at the same time. The patients were then instructed to follow a solid diet, to take small bites, to chew well, to eat slowly, to avoid drinking while eating and to avoid sparkling drinks. Further band adjustments were performed as necessary during follow-up, depending on the patient's weight loss and eating capacities. The maximal capacity of 5 ml for the Lap-band® and 9 ml for the SAGB® were strictly respected in all cases. Follow-up visits were scheduled at monthly intervals during the first semester, every 2 months during the second semester, quarterly the second year and then biannually. A barium swallow was performed routinely

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every 18-24 months to check the position of the band, the diameter of the pouch and the esophagus. Gastroscopy was liberally performed if warranted by clinical findings (weight regain, epigastric or retrosternal pain, severe heartburn, loss of satiety, loss of food restriction), except in a few patients enrolled in a prospective study on the effects of gastric banding on gastroesophageal reflux, in whom it was performed as part of the study protocol.

Thirty patients, who were operated during the so-called learning curve (December 1995 to May 1997), were excluded from analysis. During this initial period, we placed the band within the lesser omental sac, a technique that has since been abandoned because it is associated with a very high risk of slippage and pouch dilatation.

Results

Between May 1997 and July 2003, a total of 317 patients underwent laparoscopic gastric banding in our department. Table 1 summarizes the characteristics of these patients. Only 32 patients (10.1%) were super-obese. The mean duration of surgery was 87 minutes, and the mean duration of postoperative hospital stay was 3 days. A total of 159 patients received a Lap-band® and 158 patients received a SAGB®. Of these patients, 180 were included in a prospective randomized study intending to compare the outcomes of both types of bands, the early results of which have been reported elsewhere.²² In the others, the choice of the band was based on the surgeon's preference.

Five patients developed major early postoperative complications, of which three (0.9%) were band-related. Two patients, who were readmitted after 7 and 10 days respectively, with fever and abdominal pain, were found to have a perforation near the car-

dia, and had their band removed. Another band had to be removed after 3 weeks in a patient who developed band infection without perforation. One patient who had undergone simultaneous cholecystectomy for gallstones had to be reoperated because of severe bleeding from the gallbladder bed. Finally, one patient developed cardiorespiratory arrest on the second postoperative day and died subsequently from the consequences of cerebral ischemia. The operative mortality was therefore 0.3%.

Our patients have been followed-up for an average of 74 months (27-101). Duration of follow-up exceeds 3 years in 310 patients (97.8%), 4 years in 282 (88.9%) and 5 years in 238 (75.1%). Four patients died during follow-up: the first accidentally after 5 months, the second committed suicide after 5 years, the third from myocardial infarction after 6 years, and the last as a result of arrhythmia 10 days after conversion to BPD-DS (duodenal switch) for insufficient weight loss 2 years after the initial procedure. Patients who died were excluded from analysis regarding long-term outcome as of the time of death. Table 2 shows the number of patients eligible for follow-up at each time interval, and the respective number of patients available. Table 3 shows long-term complications. A total of 105 patients (33.1%) developed at least one complication, 94 (29.6%) required at least one reoperation, and 69 (21.7%) a major reoperation. Table 4 shows the minor reoperations, and Table 5 presents the major ones. Figure 1 shows the cumulative prevalence of major reoperations over time. At the present time point, the band has had to be removed in 21.7% of our patients.

The results regarding weight loss are expressed in Figures 2 and 3. In each of these figures, the results of the patients who still have their band in place are

Table 1. Preoperative characteristics of the patients. Data given as mean (range)

Males / females	43 / 274	
Mean age	38.5 years	(19-69)
Mean weight	119.3 kg	(79.4-179)
Mean BMI	43.5 kg/m ²	(34.1-78)
Mean % excess weight	97.1%	(52-191)
Patients with co-morbidities (%)	258	(81%)

Table 2. Eligible and available patients at follow-up

Year after surgery	Eligible patients (% total)	Available patients (% eligible)
1	315 (99.4%)	311 (98.7%)
2	315 (99.4%)	304 (96.5%)
3	310 (97.8%)	294 (94.8%)
4	282 (88.9%)	261 (92.5%)
5	238 (75.1%)	210 (88.2%)
6	187 (59.0%)	159 (85.0%)
7	103 (32.5%)	84 (81.5%)
8	24 (7.5%)	16 (66.6%)

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Table 3. Long-term complications after gastric banding

Type of complication	Number	%
Leak (port or catheter)	24	7.6%
Port infection	4	1.2%
Other port-related problems	4	1.2%
Pouch dilatation / slippage	20	6.3%
Band leak	2	0.6%
Band erosion	30	9.5%
Band infection	1	0.3%
Severe esophageal dilatation	10	3.2%
Severe food intolerance / severe reflux symptoms	22	6.9%
Insufficient weight loss (EWL <25 % at 5 years)	12	10.5%
Total patients with at least one complication	105	33.1%

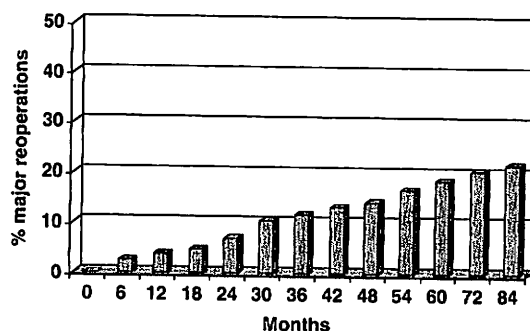
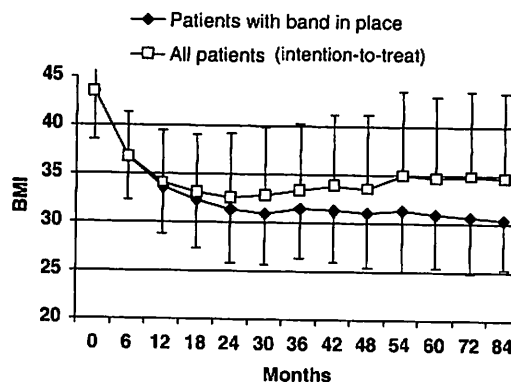
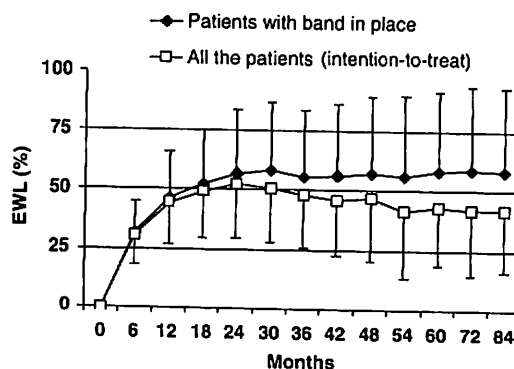
Table 4. Minor reoperations

Type of reoperation	Number of patients	%
Port removal	5	1.6%
Port change	3	0.9%
Port repositioning	5	1.6%
Incisional hernia repair	1	0.3%
Port-catheter leak repair	31	9.8%
Band change	8	2.5%
Band repositioning	9	2.8%
Others	2	0.6%

Table 5. Major reoperations

Type of reoperation	Number	%
Band removal alone	24	7.6%
Conversion to BPD-DS	1	0.3%
Conversion to RYGBP (one or two steps)	44	13.9 %
Total patients	69	21.7%

presented together with the results if the whole series is considered (intention-to-treat). Figure 4 shows the overall results according to Reinhold's criteria,⁵ where failure is considered when EWL is <25% or if the band had to be removed. Patients without major reoperation maintain a relatively stable EWL of 50-60%. Of the latter, 106 (79.1%) have a BMI <35, and 62 (46.2%) a BMI <30 kg/m² after 5 years.

**Figure 1.** Cumulated prevalence of major complications over time.**Figure 2.** Evolution of the BMI over time.**Figure 3.** Evolution of the excess weight loss over time.

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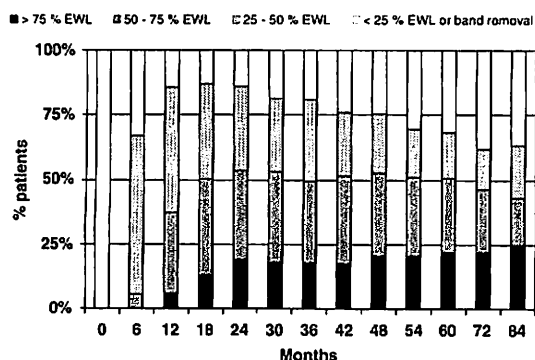


Figure 4. Distribution of EWL over time according to Reinhold's criteria.

Discussion

The introduction of laparoscopic gastric banding in 1993 has played a major role in the development of bariatric surgery. As a minimally invasive procedure (no suturing or opening of the digestive tract) performed in a minimally invasive fashion, it has encouraged both patients and physicians to consider surgery as a valid option in the management of morbid obesity. The early results were encouraging, with low early morbidity, almost no mortality, and weight loss that compared well with other purely restrictive procedures performed.¹⁻⁷ Today, more than 100,000 patients in the world have been submitted to the procedure. Unfortunately, >10 years after the introduction of gastric banding, knowledge about its long-term results is still very limited, with most published papers reporting follow-up durations between 24 and 48 months, if not less. Even in papers claiming to report on long-term results, follow-up extending beyond 5 years is usually limited to a very small percentage of the entire patient group, and the mean follow-up is usually <4 years.⁸⁻¹⁶ This creates a dilution effect in the number of complications, the true incidence of which is difficult to appreciate. In a paper reporting on a small group of 45 patients, but with the longest mean follow-up ever reported (105 months), the authors found a 76 % incidence of late specific complications.¹⁷

The present study includes a much larger group, and follow-up, extending between 30 and 99 months, with a mean of 74 months, is the second longest ever reported. Seventy-five percent of the patients are beyond the 5-year limit, almost 90%

beyond 4 years, and the follow-up rate is acceptable. Despite repeated reminders with letters or phone calls, a number of our patients are considered lost to follow-up, as is the case in virtually all bariatric series. The success of any bariatric procedure depends on weight loss, with the consequent correction of co-morbidities and improvement in quality of life, morbidity and durability.

In this series, average weight loss in patients who still have their band in place is very acceptable. The distribution of weight loss, however, varies widely even in this favorable group. EWL is <50% in 33.6% of these patients after 5 years, and 43% after 7 years. Similarly, insufficient weight loss (EWL <25%) affects 10.5% of these patients after 5 years, and 14% after 7 years. When the overall results are considered, the incidence of failure (EWL <25% or band removal) increased constantly over time from 13.2% after 18 months (best mark) to 36.9% after 7 years. The success rate (EWL >50%) was maximal after 24 months at 53.8%, but declined progressively to 42.9% after 7 years. This seriously questions the durability of gastric banding in terms of weight loss.

In this series, we found that the rate of long-term complications, and especially that of major long-term complications increases constantly over time, according to a linear pattern. This is in accordance with the findings of Camerini et al¹⁷ in a much smaller group. Our overall complication rate of 33.1% is higher than in most reported series, but lies within the extremes of the literature. This is likely related to our longer and more complete follow-up. In a prospective randomized study comparing the Lap-band® with the SAGB®, we found no significant difference between the complication rates of these two devices up to 3 years postoperatively.²² Patients enrolled in this study now have a mean follow-up of 63 months, and a recent unpublished update still showed no significant difference.

Our incidences of individual long-term complications are all within the reported rates in the literature. For instance, band slippage with or without pouch dilatation has been reported in up to 10-12.5 % of the cases.^{12,24,25} Our rate of 6.9% is acceptable, but could probably be lower had we used the pars flaccida technique for all our patients. The latter technique has been shown to significantly reduce the incidence of this complication.²⁶ Leak from the port-catheter system (7.6% in the present series) was seen mostly in the Lap-band®

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group at the junction between the two parts of the system, where the tubing is rigidified by a metallic connecting piece, or at the limit between the port and the catheter. The manufacturer has now modified these two parts, reinforcing the connection between the port and tube and lengthening the catheter before the connecting piece. This has significantly reduced the rate of these leaks, which can usually be easily corrected.

The incidence of band erosion in the present series is higher than usually reported. This also is probably due to our longer follow-up, and we have seen this complication up to >5 years postoperatively. Another possible explanation could be a more aggressive policy with band adjustments, but this is unlikely: the maximum filling volume of the band has always been strictly respected in our patients, and our weight loss curves are very similar to those reported by others. Two groups, looking specifically for this complication using routine endoscopy, also found a high incidence of erosions.^{27,28} As band erosion is often asymptomatic, or only associated with slight abdominal discomfort and/or weight regain, and since endoscopy is not performed routinely, it can be assumed that the true incidence of band erosion is underestimated in the literature. This is a major concern to us, because band erosion represents a total failure of the concept of gastric banding. Furthermore, it is associated with dense scarring and distortion of the tissues at the level of the cardia, which can seriously complicate re-do surgery, even if it is performed openly.²⁹

Progressive food intolerance, sometimes associated with reflux and/or esophageal dilatation, is another late complication, the incidence of which increases over time. Using a simple questionnaire regarding food tolerance, we have demonstrated a significant and progressive decrease in food tolerance over time even in patients without a major complication. We also have shown that even shortly after gastric banding (6-17 months), a number of patients can develop esophagitis and pathologic pH-study scores, and that the strength of contraction decreases in the lower esophagus.³⁰ Recently, a German group showed that, with a mean follow-up of 30 months, esophagitis was present in 30% of the patients and a pathologic pH study in 43.8%.³¹ Some believe that these complications are only due to a too tight band. It is true that in these patients, band emptying usually improves food tolerance, corrects reflux and results in regression of

esophageal dilatation. Nevertheless, it is almost always associated with excessive weight regain. After resolution of the problem, new attempts at band readjustments for weight loss very often result in its recurrence. In these cases, a compromise between weight maintenance and the importance of the discomfort caused by the complication has to be made, usually at the expense of weight, and most patients prefer at this stage to be converted to Roux-en-Y gastric bypass, which provides good weight loss and control with much better food tolerance, virtually no reflux and restoration of esophageal anatomy.

This series shows that a considerable time is needed to apprehend the high incidence of long-term complications after gastric banding. The formidable enthusiasm that embraced many surgeons during the late 1990s is now fading away, at least in Switzerland and in Europe. In Switzerland, this is reflected by the proportion between new gastric banding procedures and Roux-en-Y gastric bypass, which has changed from 20:1 in 1998 to 1:4 in 2004, and is still declining, like in most European countries. Laparoscopic gastric banding was introduced in the USA only a few years ago. As in Europe, and before the appearance of long-term complications, the enthusiasm related to the apparent simplicity of the procedure and good early results might drive a considerable number of surgeons and patients to choose gastric banding for morbid obesity. If long-term results mimic those reported in this paper, this could cause a disaster, with thousands of patients requiring reoperations, with their associated risks, because of severe long-term complications and/or insufficient weight. The results presented in this paper should serve as a warning.

In conclusion, laparoscopic adjustable gastric banding is the least invasive surgical procedure for obesity. It appeared promising after encouraging early results. However, despite improvements in the operative technique and in the material, results worsen over time. The proportion of patients with good weight loss (EWL >50%), even in those without major complication, remains at best between 55 and 65%. Furthermore, each year adds 3-4% to the major complication rate, which contributes significantly to the total failure rate, and seriously questions the durability of the concept. With a success rate <50% and a failure rate that approaches 40% after 7 years, adjustable gastric banding should no longer be considered as the procedure of choice for morbid obesi-

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ty. Until reliable selection criteria for patients at low risk for long-term complications are developed, other longer lasting procedures should be used in most cases, and gastric banding should be performed only in carefully selected and fully informed patients.

References

1. Favretti F, Cadière GB, Segato G et al. Laparoscopic adjustable gastric banding. Technique and results. *Obes Surg* 1995; 5: 364-71.
2. Belachew M, Legrand M, Vincent V et al. Laparoscopic adjustable gastric banding. *World J Surg* 1998; 22: 955-63.
3. O'Brien PE, Brown WA, Smith A et al. Prospective study of a laparoscopically placed, adjustable gastric band in the treatment of morbid obesity. *Br J Surg* 1999; 86: 113-8.
4. Fielding GA, Rhodes M, Nathanson LK. Laparoscopic gastric banding for morbid obesity. Surgical outcome in 335 cases. *Surg Endosc* 1999; 13: 550-4.
5. Suter M, Giusti V, Heriaef E et al. Early results of laparoscopic gastric banding compared with open vertical banded gastroplasty. *Obes Surg* 1999; 9: 374-80.
6. Ceelen W, Walder J, Cardon A et al. Surgical treatment of severe obesity with a low-pressure adjustable gastric band. *Ann Surg* 2003; 237: 10-6.
7. Zinzindohoue F, Chevallier JM, Douard R et al. Laparoscopic gastric banding: a minimally invasive surgical treatment for morbid obesity. *Ann Surg* 2003; 237: 1-9.
8. O'Brien PE, Dixon JB. Laparoscopic adjustable gastric banding in the treatment of morbid obesity. *Arch Surg* 2003; 138: 376-82.
9. Vertruyen M. Experience with Lap-band® system up to 7 years. *Obes Surg* 2002; 12: 569-72.
10. Steffen R, Biertho L, Ricklin T et al. Laparoscopic Swedish adjustable gastric banding: a five-year prospective study. *Obes Surg* 2003; 13: 404-11.
11. Martikainen T, Pirinen E, Alhava E et al. Long-term results, late complications and quality of life in a series of adjustable gastric banding. *Obes Surg* 2004; 14: 648-54.
12. Favretti F, Cadière GB, Segato G et al. Laparoscopic gastric banding. Selection and technique in 830 patients. *Obes Surg* 2002; 12: 385-90.
13. Belachew M, Belva P, Desai C. Long-term results of laparoscopic adjustable gastric banding for the treatment of morbid obesity. *Obes Surg* 2002; 12: 564-8.
14. Angrisani L, Furbetta F, Doldi SB et al. Lap-Band® adjustable gastric banding system. The Italian experience with 1863 patients operated on 6 years. *Surg Endosc* 2003; 17: 409-12.
15. Weiner R, Blanco-Engert R, Weiner S et al. Outcome after laparoscopic adjustable gastric banding – 8 years experience. *Obes Surg* 2003; 13: 427-34.
16. Mittermaier RP, Weiss H, Nehoda H et al. Laparoscopic Swedish adjustable gastric banding: 6-year follow-up and comparison to other laparoscopic procedures. *Obes Surg* 2003; 13: 412-7.
17. Camerini G, Adami G, Marinari GM et al. Thirteen years of follow-up in patients with adjustable silicone gastric banding for obesity: weight loss and constant rate of late specific complications. *Obes Surg* 2004; 14: 1343-8.
18. Gastrointestinal surgery for severe obesity: National Institutes of Health Consensus Development Conference Draft Statement. *Obes Surg* 1991; 1: 257-64.
19. Consensus sur le traitement de l'obésité en Suisse. *Schweiz Med Wochenschr* 1999; 129 (Suppl 114): 4S-20S.
20. Jelliffe DB. *Wld Hlth Organ Monogr Ser* 1966; 53: 3-271.
21. Suter M, Bettschart V, Giusti V et al. A 3-year experience with laparoscopic gastric banding for obesity. *Surg Endosc* 2000; 14: 532-6.
22. Suter M, Giusti V, Worreth M et al. Laparoscopic gastric banding. A prospective study comparing the Lapband and the SAGB: early results. *Ann Surg* 2005; 241: 55-62.
23. Reinhold RB. Critical analysis of long-term weight loss following gastric bypass. *Surg Gynecol Obstet* 1982; 155: 385-94.
24. Chevallier JM, Zinzindohoue F, Douard R et al. Complications after laparoscopic gastric banding for morbid obesity: experience with 1000 patients over 7 years. *Obes Surg* 2004; 14: 407-14.
25. O'Brien PE, Dixon JB, Brown W et al. The laparoscopic adjustable gastric band (Lap-Band®): a prospective study of medium-term effects on weight, health and quality of life. *Obes Surg* 2002; 12: 652-60.
26. O'Brien PE, Dixon JB, Laurie C et al. A prospective randomized trial of placement of the laparoscopic adjustable gastric band: comparison of the perigastric and pars flaccida pathways. *Obes Surg* 2005; 15: 820-6.
27. Westling A, Bjurling K, Öhrvall M et al. Silicone-adjustable gastric banding: disappointing results. *Obes Surg* 1998; 8: 467-74.
28. Silecchia G, Restuccia A, Elmore U et al. Laparoscopic adjustable gastric banding. Prospective evaluation of intragastric migration of the Lap-Band. *Surg Laparosc Endosc* 2001; 11: 229-34.
29. Suter M, Giusti V, Héraief E, Calmes JM. Band erosion after laparoscopic gastric banding: Occurrence and results after conversion to Roux-en-Y gastric bypass. *Obes Surg* 2004; 14: 381-6.
30. Suter M, Dorta G, Giusti V et al. Gastric banding interferes with esophageal motility and gastroesophageal reflux. *Arch Surg* 2005; 140: 639-43.
31. Gutschow CA, Collet P, Prenzel K et al. Long-term results and gastroesophageal reflux in a series of laparoscopic adjustable gastric banding. *J Gastrointest Surg* 2005; 9: 941-8.

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