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Original article

Long-term outcome of laparoscopic adjustable gastric banding (LAGB): results of a Swiss single-center study of 405 patients with up to 18 years' follow-up

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Abstract

Background: In the past, laparoscopic adjustable gastric banding (LAGB) seemed to be a promising bariatric procedure. However, many studies showed high rates of reoperation due to complications or insufficient weight loss. There is a lack of long-term studies with follow-up beyond 15 years.

Objective: To conduct long-term follow-up of patients after LAGB and analyze their weight loss as a primary endpoint.

Setting: Tertiary referral center for bariatric surgery, St. Claraspital, Switzerland.

Methods: A retrospective analysis of prospectively collected clinical data in a cohort of 405 patients having undergone LAGB was performed.

Results: A total of 405 patients (age 41 ± 10 years, body mass index [BMI] 44.3 ± 6 kg/m^2) were treated with LAGB between 1996 and 2010. Mean follow-up was 13 ± 3 years, with a follow-up rate of 85% (range 8–18 years), corresponding to 343 patients. One hundred patients exceeded 15-year follow-up. In 216 patients (63%), sleeve gastrectomy, gastric bypass, or biliopancreatic diversion with duodenal switch was performed as revisional surgery. Twenty-seven patients (8%) refused revisional surgery after band removal. Finally, 100 patients (29%) still have the band in place, with a mean BMI of 35 ± 7 kg/m^2, corresponding to an excess BMI loss of 48 ± 27%. Among these, the failure rate was 25%, according to the Bariatric Analysis and Reporting Outcome System (BAROS); 50% had a good to excellent outcome.

Conclusion: More than 10 years after LAGB, 71% of patients lost their bands and only 15% of the 343 followed patients with the band in place have a good to excellent result, according to BAROS. (Surg Obes Relat Dis 2017;13:1313–1320.) © 2017 American Society for Metabolic and Bariatric Surgery. All rights reserved.

Obesity is a worldwide epidemic. Its increasing prevalence has been reported in the past, and further growth is expected in the future [1–3]. The correlation between obesity and co-morbidities, as well as their effective treatment with bariatric surgery, is well documented [4–6]. In 1993, laparoscopic adjustable gastric banding (LAGB) was introduced as a minimally invasive, reversible, and effective technique to treat morbid obesity. It was a promising therapy at the time. Until 2007, the frequency of LAGB in bariatric surgery increased worldwide, with up to 100,000 procedures a year. Recently, this technique has been almost abandoned in both Europe and the United States due to increasing band-associated complications and the emergence of more popular procedures such as Roux-en-Y gastric bypass (RYGB) and laparoscopic sleeve gastrectomy [7–9]. However, the choice of which bariatric

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procedure is performed depends on the geographic location as well as the surgeon's and patient's preference. Few studies show long-term evidence for the use of LAGB with large patient cohorts and follow-up beyond 10 years [10,11]. To date, only 1 large study, conducted in Australia, presents acceptable long-term results supporting ongoing treatment with LAGB, in contrast with European findings [11]. The United States introduced LAGB in 2001, and long-term results at large centers are expected in the next few years. At our institution, LAGB was routinely performed until 2004. In this study, we highlight the long-term results in a cohort with a high follow-up rate.

Methods

Patients and study design

We performed a single-center retrospective analysis of prospectively collected data on 405 adult patients with obesity (body mass index [BMI] >35 kg/m^2) who underwent LAGB between December 1996 and September 2010. LAGB was routinely performed until 2004, accounting for 94% of primary LAGBs performed at our institution, St. Claraspital Basel, a tertiary referral center for bariatric surgery. Loss to follow-up was defined as no follow-up beyond 8 years after primary LAGB. Only patients with a minimum 8-year follow-up were included. The ethics committee had no concerns with regard to the study protocol submitted retrospectively.

Preoperative evaluation and LAGB technique

All patients were evaluated by an interdisciplinary team consisting of endocrinologists, psychiatrists, dieticians, and surgeons. Prerequisites for bariatric surgery were: previous failure of conservative management, a minimum age of 18 years, and BMI >40 kg/m^2 or >35 kg/m^2 with obesity-related co-morbidities at the time of consideration for surgery. Gastroscopy, abdominal sonography, and upper gastrointestinal series radiography were routinely performed preoperatively. Initially, Lap-Band® (Inamed/Allergan, Santa Barbara, CA, USA) surgery was performed using the perigastric technique until June 2000 (n = 168). Subsequently, the pars flaccida technique was established using a 9.75 cm Lap-Band (n = 15), changed to an 11 cm Lap-Band after a few months. In contrast to the perigastric technique, where the band is positioned directly onto the gastric wall, the pars flaccida technique includes fatty tissue of the lesser curvature between the band and the gastric wall [12]. This technique was established to reduce the rate of band slippage. In 25 patients with a large amount of fatty tissue around the stomach, a pars flaccida–to–perigastric technique was used. After positioning the access port on the lower left thoracic wall at the beginning, standard positioning was moved onto the subxiphoidal abdominal fascia.

Follow-up and study endpoints

Initial follow-up of all patients was performed by surgeons or endocrinologists at 4, 6, and 12 months after LAGB. The first band adjustment took place after 6 weeks, under radiological guidance. Adjustment was determined according to weight loss or the patient's symptoms. After 12 months, follow-up was carried out every 6 months until the fifth year postoperatively, and annually thereafter. If patients failed to attend clinic for scheduled follow-up visits after May 2013, follow-up was conducted by telephone interview by 2 trained residents. Patients were instructed to visit our Interdisciplinary Centre of Nutritional and Metabolic Diseases for a clinical examination and/or contrast swallow investigation whenever gastrointestinal symptoms such as reflux, food intolerance, regurgitation, regular vomiting, or abdominal pain were reported during the telephone interview. At scheduled follow-ups, patients were clinically examined and weight changes were documented. Blood studies were performed regularly to identify patients with substrate deficiencies early. Bariatric Analysis and Outcome System (BAROS) scores, including excess weight loss, quality of life (QOL), reoperations, complications, and reduction of co-morbidities, were routinely calculated for all patients [13]. Co-morbidities were used to calculate the BAROS score but not recorded individually. Five Moorehead-Ardelt–based QOL questions were used, focusing on self-esteem and physical, social, labor, and sexual well-being [14]. The QOL scale ranged from –2 to +3.

Band intolerance, a common band-associated complication, was defined as upper gastrointestinal symptoms, including food intolerance, reflux, dysphagia, or abdominal pain, with no radiological correlate such as slippage or dilation and no improvement by band adjustment. Band slippage was defined as dislocation of the band following band herniation, documented by upper gastrointestinal series in patients with upper gastrointestinal symptoms as described above. In this study, the type of slippage was not distinguished [12]. Port-/tube-associated complications consisted of dislocation or disconnection of the port itself or the tube.

Documented reoperations were divided into major (–1 point) and minor (–0.2 point) complications. Major complications were defined as all obesity-related reoperations, and minor complications were defined as port and tube reoperations. To calculate reduction in co-morbidities, current symptoms and need for medication were compared to preoperative assessment. Finally, using the sum of the above components, patients were allocated to different outcome groups according to BAROS score: *failure* (≤ 1 point), *fair* (>1 to 3 points), *good* (>3 to 5 points), *very good* (>5 to 7 points), and *excellent* (>7 to 9 points).

The primary endpoint was defined as long-term weight loss. Secondary endpoints included the BAROS score (as described above), current upper gastrointestinal symptoms, and latest bariatric surgery, including initial or secondary LAGB in place, definitive band removal, revisional

laparoscopic gastric bypass (rRYGB), sleeve gastrectomy, or biliopancreatic diversion with duodenal switch (BPD-DS). At our institution, the revisional therapy concept changed over the study period. Initially, patients who had sufficient weight loss but had band complications due to slippage underwent rebanding. The primary LAGB was always removed. If a patient suffered a band complication and insufficient weight loss, BPD-DS was performed in a 2-stage procedure [15]. In 2005, our revisional therapy concept was changed. At this time, patients with sufficient weight loss and band complications directly underwent rRYGB. Patients with insufficient weight loss were treated with sleeve gastrectomy to keep open the possibility of progressing to BPD-DS if restriction was not enough.

Data collection and statistics

Data were prospectively collected using standardized protocol and were repeatedly updated in a computer database. Statistical analysis was performed using SPSS for Windows version 14.0. Data were shown as mean ± standard deviation with a range or percentage. Student independent T test was used to compare QOL score and chi-squared test for categorical data. P value $<.05$ was considered significant. Weight loss was reported by percentage of excess BMI loss (%EBMIL), with normal BMI defined as 25 kg/m^2.

Results

Baseline characteristics and follow-up

Overall, 405 adult patients with obesity were treated with LAGB between 1996 and 2010 at our institution. A follow-up rate of 85% was achieved (n = 343), with a mean 44 ± 6 kg/m^2 BMI at the time of LAGB; 75 (22%) of the patients were male and 268 (78%) were female (Table 1). Mean follow-up was 13 ± 3 (8–18) years after LAGB. Follow-up statistics showed 292 patients with a minimum follow-up of 10 years and 100 patients with a minimum follow-up of 15 years. Four patients reached the maximum follow-up of 18 years. In 290 of 343 followed patients (85%), follow-up was between May 2013 and 2015. All 343 patients had follow-up a minimum of 8 years after primary LAGB.

Table 1
Baseline characteristics at the time of LAGB

Parameter	Mean	± SD (range)
Age (years)	40	10 (18–66)
Male/Female	75 (22%)/268 (78%)	
BMI (kg/m^2)	44	6 (33–80)
EBMI (kg/m^2)	19	6 (8–55)
EW (kg)	47	17 (15–128)

LAGB = laparoscopic adjustable gastric banding; SD = standard deviation; BMI = body mass index; EBMI = excess BMI; EW = excess weight

Overall outcome of patients treated with LAGB

In all, 216 patients (63%) underwent revisional bariatric procedures due to complications, insufficient weight loss, or secondary weight regain. The most frequent indications leading to revisional bariatric procedure were band intolerance (n = 119) and band slippage (n = 31) (Table 2). Depending on the changed revisional therapy as described above, patients received BPD-DS, laparoscopic sleeve gastrectomy, or rRYGB as the latest bariatric procedure (Fig. 1). On average, the revisional bariatric procedure was performed 6 ± 4 years after initial LAGB, with a subsequent mean %EBMIL of 70% ± 38% at last follow-up.

At the beginning of the LAGB period, rebanding was performed 37 times in 36 of 343 patients (10%). In addition to bariatric conversions and rebanding, port-tubing revisions were performed 45 times in 38 patients, leading to an overall reoperation rate of 78%. Seventy-six of the 343 followed patients (22%) did not require revisional surgery during the 13 ± 3 years of follow-up.

One hundred patients (29%) had their LAGB still in place at the last follow-up. For 27 of the followed patients (8%), revisional bariatric procedure was declined at the time of LAGB removal.

Overall, 343 patients had a mean %EBMIL of 60% ± 37% at their last follow-up. Band- and port- associated complications were numerous, with an overall complication rate of 79% (n = 272) 13 years after LAGB (Table 3). Band intolerance and slippage were the 2 most common complications. Band intolerance was observed in 142 patients (41%) and band slippage in 63 patients (18%). Band slippage was observed 35 times in the group who had undergone the perigastric technique (n = 146) within 15 ± 2 years follow-up. On the other hand, band slippage was observed 28 times in the pars flaccida group (n = 197) after 11 ± 2 years (P = .021). In 1 patient, LAGB led to Mallory-Weiss syndrome, and 2 patients suffered from a band migration. All followed patients achieved an average QOL score of 1 ± 1 point.

Outcome of patients with band in place

As previously mentioned, 100 patients had the LAGB in place at the end of the follow-up period. Of these, 5 patients required rebanding due to a complication but with sufficient weight loss, and the remaining 95 patients still had their

Table 2
Indications leading to latest bariatric procedure

Indication	n (%)
Band intolerance	119 (55)
Secondary weight regain	26 (12)
Insufficient weight loss	23 (11)
Slippage	31 (14)
Esophageal dysmotility	5 (2)
Pouch dilation	12 (6)
Total	216 (100)

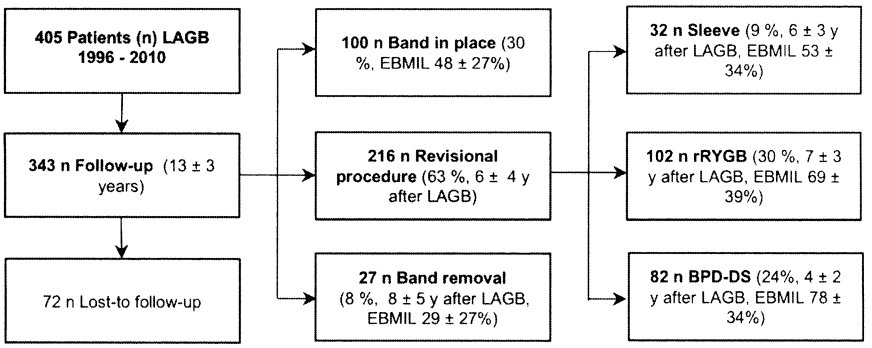

Fig. 1. Latest bariatric procedure 13 ± 3 years after primary LAGB. LAGB = laparoscopic adjustable gastric band; BMI = body mass index; EBMIL = excess BMI loss; Sleeve = sleeve gastrectomy; rRYGB = revisional laparoscopic gastric bypass; BPD-DS = biliopancreatic diversion with duodenal switch.

primary LAGB in place. Overall, %EBMIL was 48% ± 27%. The maximum weight loss was reached after 10 years, with a mean 56% ± 20% %EBMIL (Fig. 2). At 15-year follow-up, we still observed a 46% ± 20% %EBMIL (n = 7); at 16-year follow-up, 50% ± 32% (n = 10); at 17-year follow-up, 39% ± 25% (n = 4); and at 18-year follow-up, 51% ± 32% (n = 3) (Table 3). Eighty-four patients had a follow-up >10 years, with a mean %EBMIL of 48% ± 27%. Thirty-six patients with a band in place were followed up for >15 years beyond initial LAGB, with a mean % EBMIL of 53% ± 29%.

According to BAROS score, 50% of patients with a band in place had a good to excellent (>3 to 9) result, corresponding to 15% of all 334 followed patients. The mean QOL score (at 1.098 ± 1.001 points) was not significantly higher than for patients after band removal (0.908 ± .883, P = .28) or revisional procedure (1.003 ± 1.009, P = .52). In all, 62% of patients with a band in place suffered from food intolerance, 45% had at least 1 episode of vomiting per month, and 16% described recurring abdominal pain.

Forty-six patients received LAGB using the perigastric technique and had a subsequent %EBMIL of 49% ± 29% after an average follow-up of 15 ± 2 years. The remaining 54 patients, who were operated with the pars flaccida technique, had %EBMIL of 47% ± 26% after follow-up of 11 ± 2 years.

Table 3
Complications of 343 patients treated with laparoscopic adjustable gastric banding after mean follow-up of 13 years

Complication	Overall patients (n)	Patients (%)
Band-associated		
Band intolerance	149 (142)	41.4
Slippage	65 (63)	18.4
Pouch dilation	50 (49)	14.3
Esophageal dysmotility	26 (26)	7.6
Heavy reflux	22 (21)	6.1
Reflux esophagitis	11 (11)	3.2
Esophageal dilation	5 (5)	1.5
Dysphagia	4 (4)	1.2
Band migration	2 (2)	0.6
Mallory-Weiss syndrome	1 (1)	0.3
Port-/tube- associated	45 (38)	11.1

Outcome of patients with definitive band removal

Revisional bariatric procedure was indicated for but declined by 27 patients before band removal. On average, definitive band removal was performed 8 ± 4 years after initial band placement. Thirteen years after initial band placement and 5 ± 4 years after definitive band removal, patients achieved % EBMIL of 29% ± 27% without any restrictive or malabsorptive component. Of those 27 patients, 11% had a good to excellent result, 26% a fair result, and 63% a failure, according to BAROS score. Regarding the QOL questionnaire, which was independent of weight and complications, patients reached a mean of .91 ± .88 points. As expected, no one suffered from regular vomiting after definitive removal; 23% of these patients described food intolerance and 15% recurring abdominal pain.

Discussion

In this long-term longitudinal study, 343 adults with morbid obesity treated with LAGB were followed over a period of up to 18 years, with a follow-up length of >15 years for 100 patients. To our knowledge, this is among the first cohorts of this size with such a high follow-up rate beyond 15 years. At the end of follow-up, only 29% had a band in place and just 15% reached a good to excellent

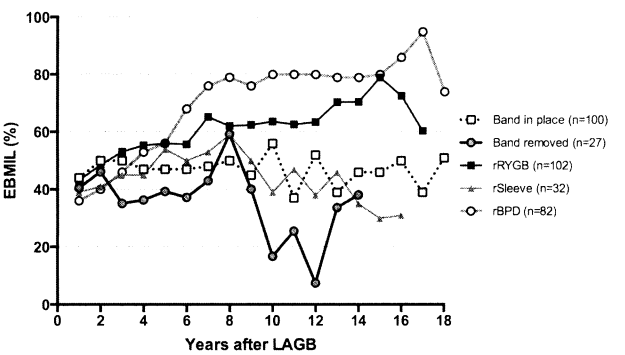

Fig. 2. History of excess BMI loss according to latest bariatric procedure. BMI = body mass index; EBMIL = excess BMI loss (%); rRYGB = revisional laparoscopic gastric bypass; rSleeve = revisional laparoscopic sleeve gastrectomy; rBPD = revisional laparoscopic biliopancreatic diversion with duodenal switch.

result according to BAROS score. Long-term follow-up revealed a worryingly high reoperation rate of 78%.

Globally, there is some controversy regarding the long-term tolerability of LAGB. reoperation/complication rates may be underestimated in short- and medium-term follow-up studies. Long-term studies are essential to determine the quality and safety of the procedure [16]. To date, only a few groups have presented long-term results of respectable sample sizes (n >280) of patients undergoing LABG with a follow-up beyond 10 years [11,17]. Additionally, loss to follow-up rate is important regarding the final outcome statement. A correlation between outcome and loss to follow-up has been reported [18]. On the one hand, Schouten et al. described a strong correlation between the numbers of band adjustments and weight loss; on the other hand, no correlation between reoperations, complications, and the numbers of band adjustments has been recorded [19]. Moreover, long-term follow-up studies are susceptible to a high number of patients being lost to follow-up, resulting in a greater risk of bias [17]. Our study achieved a follow-up rate of 85%, which is considered high in this nonselective LAGB cohort of 405 patients.

A further observed bias in various studies is the lack of definitions of lost to follow-up and time period of follow-up. A long time period between last follow-up visit and actual date increases the risk of bias, especially with respect to patients included at the early stages. We tried to reduce the risk of bias by following as many available patients as possible in a 2-year time frame (May 2013 to May 2015), resulting in 290 of 343 included patients who were available at this time and met the inclusion criteria.

A recent systematic review of long-term LAGB studies outlined significant heterogeneity [16]. Weight loss is often documented as excess weight loss (EWL) based on ideal weight, which can be calculated in various ways, such as Broca's formula or Metropolitan height and weight tables [20]. In our opinion, analyzing weight loss as %EBMIL would lead to more comparability and homogeneity of the studies for meta-analysis and systematic review. For this reason, weight loss is presented with %EBMIL in this study.

Pioneer surgeons of LAGB were enthusiastic and described it as a first-line treatment for chronic obesity due to its expected safety and its being minimally invasive, resulting in satisfactory weight loss [8]. In LAGB implantation, the gastrointestinal lumen keeps its integrity, unlike RYGB, sleeve gastrectomy, or BPD-DS, which all carry the risk of potential leak of the anastomosis or staple line. Short-term studies presented promising results, with an acceptable 7.8–12.8% reoperation rate and 47.4–72% EWL in the first 3 years [21–24]. Our group's experience was similar, with a 60% EWL and a 12% reoperation rate in 250 patients 3 years after LAGB [24]. The most common complication leading to reoperation was dorsal or lateral band slippage. With the introduction of the pars flaccida technique, a significant reduction of slippage was observed [25–28]. Consequently, our institution changed from the perigastric to the pars flaccida technique in July 2000, after having already treated 168 patients [12]. Although more patients underwent the pars flaccida technique with a shorter follow-up rate in our cohort, the results presented here support the significant decrease in slippage rate when using pars flaccida compared to perigastric (35 versus 28 slippages, $P = .021$). Despite technical advances, complications requiring revision were still numerous in medium-term studies with a follow-up rate of 7–10 years [29–31]. Balsiger et al. observed a high rate of reoperation, 32%, in his 7-year follow-up study [32]. Aarts et al. reported a complication rate of 47% and a reoperation rate of 68% in 201 followed patients and 199 patients with a minimum 10-year follow-up [10]. Our study confirms, and even exceeds, this high reoperation rate, with 78% of patients requiring reoperations. The high rates in the present series are explained by long follow-up time and high follow-up rate at 10 or 15 years. In a recently published systematic review, the median long-term complication rate was 42.7% and median reoperation rate was 36.5%, limited by the low number of studies included with follow-up >10 years and no study with 100 patients beyond 15-year follow-up [16].

Contrary to our short-term study, band intolerance represented the leading complication in the long term and was responsible for revision in more than 50% of reoperated patients. Band adjustment during regular clinic visits was not a feasible management option in these patients and no anatomic correlate was detected by radiological studies, but sometimes a thick scar underneath the band was found later, during the bariatric revisional procedure.

Frequent complications mostly led to reoperation. At the beginning of our LAGB experience, slippage was the leading cause of reoperation, as previously mentioned. If weight loss was satisfactory and no other complication occurred, this complication was treated with rebanding. When observing complications such as band intolerance and insufficient weight loss, a bariatric revision was performed (BPD-DS, rRYGB, or sleeve gastrectomy) [9]. In a complicated setting with sufficient weight loss, rRYGB or sleeve gastrectomy was performed. If weight loss was insufficient, patients underwent BPD-DS [15]. Finally, in our study, 71% of patients lost their band after 13 ± 3 years. If we assume patients lost to follow-up had band failure, the numbers are even higher. Overall, long-term weight loss was 60% ± 37% EBMIL, limited by the unselected cohort and the high numbers of patients with revisional bariatric procedures (intention to treat). Patients with a band in place achieved 48% ± 27% EBMIL after a mean follow-up of 13 ± 3 years, and patients with a band in place and follow-up >15 years achieved a 53% ± 29% EBMIL, which is acceptable. Of these, despite demonstrating a higher slippage rate, patients undergoing the perigastric technique had a higher EBMIL (49% ± 29%) compared to the pars flaccida group (47% ± 26%). Unfortunately, only 50% of patients with a

band in place reached good to excellent results according to BAROS score. The QOL score (1.098 ± 1.001) was higher than in patients with band removal and revisional bariatric procedure. Despite this difference in QOL not carrying any significance, the trend implies that QOL is not strictly weight-dependent. Food intolerance is a commonly reported complication of gastric banding [33]. In our cohort with a band in place, 62% of the patients suffered from food intolerance of different degrees. Furthermore, Favretti et al. describe reversibility as being one of the most favorable characteristics of the gastric band [8]. Our analysis of patients with definitive band removal does not corroborate this statement. On the contrary, 23% of the 27 patients undergoing band removal without subsequent revisional bariatric procedure still suffered from food intolerance 5 ± 4 years after band removal. However, patients still had surprising weight loss, with 29% ± 27% EBMIL.

This study carries the limitations of a nonrandomized retrospective single-center study. Secondly, despite a high follow-up rate, our 15% loss to follow-up must also be considered a limitation. Patients lost to follow-up were regarded as band failures. A further limitation is the variability of time of follow-up. In 53 of 343 followed patients with minimum 8-year follow-up, the latest follow-up was before May 2013. There is a higher probability that these patients had an unknown band removal or bariatric revisional procedure at another center.

Conclusion

In our experience, more than 13 years after LAGB as a treatment for obesity, only 29% of patients (n = 100) still had their band in place, resulting in an overall 15% of patients (51 of 343) achieving a good to excellent result according to BAROS score. LAGB is weight-loss effective, but nonreversible, and carries a high complication rate leading to reoperation. Symptoms can persist even after removal in up to 23% of patients. Gastric banding should not be the treatment of choice for patients with refractory obesity after failed conservative management.

Appendix A

Supplementary data

Supplementary data associated with this article can be found in the online version at http://dx.doi.org/10.1016/j.soard.2017.04.030.

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Paired editorial

Comment on: Long-term experience of laparoscopic adjustable gastric banding: are we learning lessons?

Bariatric surgery has evolved rapidly in recent years. Its discovery in the 1950s-60s was largely accidental, the result of observed major weight loss after surgery for peptic ulcer disease and gastrointestinal cancers. This led to the appropriation of gastrointestinal bypass procedures for the purpose of weight loss [1,2]. Since then, a broad range of new interventions has been developed, including numerous procedures, such as gastric banding, sleeve gastrectomy, and single-anastomosis (mini) gastric bypass, and a myriad of devices, such as balloons and barriers. Perhaps the greatest challenge when introducing new techniques, in any medical field, is to achieve a balance between demonstrating sufficient long-term safety and efficacy, and making the treatment available early. This is particularly relevant in bariatric and metabolic surgery, where evidence of procedure safety, the greatest benefits to patient health, and indeed healthcare economy, are only accurately quantified within high-quality long-term follow-up studies.

This important study [3] from Switzerland represents an honest and clear retrospective account of a large single-center, long-term experience of laparoscopic adjustable gastric banding (LAGB). Following the initial success and rapid uptake of LAGB, it has become apparent that outcomes are not as good as anticipated in the 1990s [4].

This study's strengths include an impressively high follow-up rate of 85% across a mean of 13 years, despite the large series size. This is especially important in a field susceptible to selection bias in long-term outcome reporting owing to significant loss to follow-up. The authors are also commended for appropriately acknowledging the limitations of a retrospective design and single-center, single-country setting.

Between 1996 and 2004, 410 patients underwent LAGB at this center and follow-up data from 343 of these patients were captured by this study. Of these, more than 100 had reached 15-year follow-up. Three main long-term findings are reported. Firstly, most (71%) patients had their band removed; secondly, almost two thirds (63%) received revisional surgery; and thirdly, just 50% of the 100 patients whose band remained in place had a "good," "very good," or "excellent" outcome. This can be read as a success rate of less than 15%.

There are important lessons to learn from this experience regarding the potential consequences of widespread adoption of new procedures before the availability of sufficient robust scientific evidence for long-term safety and efficacy.

Open adjustable gastric banding was initially reported to be extremely successful, Hallberg showing in 1993 that mean BMI was cut by almost a third within 18 months, from 45 to 31 kg/m^2 [4]. However, the same series demonstrated a staggering 100% complication rate [4] and, even within more modern series, the reoperation rate for LAGB is almost two thirds [5]. It is unsurprising then, that LAGB's dominance was short-lived, reducing from 68% of primary bariatric procedures globally in 2008 to just 7% by 2014 [6]. Meanwhile, sleeve gastrectomy has emerged and become dominant, increasing its global share of procedures from 0% to 46% between 2003 [7] and 2014

[6]. We have been fortunate that medium- and long-term outcomes following sleeve gastrectomy have generally surpassed initial expectations, but clearly the lessons from LAGB did not deter its rapid and wide uptake.

As our understanding of the mechanisms of action advances, and metabolic indications for bariatric and metabolic surgery widen, we must be careful to ensure adoption of techniques and devices is evidence-based and not overzealous if we are to get the balance right and serve our patients best. In the 21st century, when data sharing is ubiquitous, simple and quick, there has never been greater potential to learn from our collective experience as a healthcare community. Although Theodore Roosevelt wisely stated: "The only man who never makes a mistake is the man who never does anything," in the era of evidence-based medicine, we should preferentially heed the advice of his predecessor, George Washington: "To rectify past blunders is impossible, but we might profit by the experience of them."

Vinzens' important paper adds significantly to this discussion, demonstrating that the uptake of LAGB by the bariatric community was, in retrospect, overly broad and rapid. These new data support the argument that, as a stand-alone procedure for long-term weight loss and metabolic health improvement, LAGB is not suitable for all patients who are eligible for bariatric surgery. However, it is important that we do not reject this procedure altogether, but rather establish a clearer understanding of the significant proportion of patients whose experience was good following LAGB, such that future patient selection can be evidence-based.

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