Journal of Gastrointestinal Surgery
https://doi.org/10.1007/s11605-022-05277-1

ORIGINAL ARTICLE

Adjustable Gastric Banding Conversion to One Anastomosis Gastric Bypass: Data Analysis of a Multicenter Database

Juan Pujol-Rafols[1] · Ozlem Uyanik[2] · Yuhamy Curbelo-Peña[2] · Amr Al Abbas[3] · Stefanie Devriendt[4] · Anabela Guerra[5] · Miguel F. Herrera[6] · Jacques Himpens[4] · Eva Pardina[7] · Sjaak Pouwels[8] · Almino Ramos[9] · Rui J. Ribeiro[10] · Bassem Safadi[3] · Hugo Sanchez-Aguilar[6] · Claire E.E. De Vries[11] · Bart Van Wagensveld[12]

Received: 29 August 2021 / Accepted: 11 February 2022

Abstract

Introduction One anastomosis gastric bypass (OAGB) has been proposed as a rescue technique for laparoscopic adjustable gastric banding (LAGB) poor responders.

Aim We sought to analyze, complications, mortality, and medium-term weight loss results after LAGB conversion to OAGB.

Methods Data analysis of an international multicenter database.

Results One hundred eighty-nine LAGB-to-OAGB operations were retrospectively analyzed. Eighty-seven (46.0%) were converted in one stage. Patients operated on in two stages had a higher preoperative body mass index (BMI) (37.9 vs. 41.3 kg/m^2, $p=0.0007$) and were more likely to have encountered technical complications, such as slippage or erosions (36% vs. 78%, $p<0.0001$). Postoperative complications occurred in 4.8% of the patients (4.6% and 4.9% in the one-stage and the two-stage group, respectively). Leak rate, bleeding episodes, and mortality were 2.6%, 0.5%, and 0.5%, respectively. The final BMI was 30.2 at a mean follow-up of 31.4 months. Follow-up at 1, 3, and 5 years was 100%, 88%, and 70%, respectively.

Conclusion Conversion from LAGB to OAGB is safe and effective. The one-stage approach appears to be the preferred option in non-complicate cases, while the two-step approach is mostly done for more complicated cases.

Keywords LAGB · Gastric banding · One anastomosis gastric bypass · OAGB · Revision · Revisional surgery · Conversion

Introduction

A variable number of patients who have had a laparoscopic gastric banding (LAGB) present with complications directly related to their prosthesis or do not achieve their weight loss

Keypoints OAGB is an acceptable alternative as a rescue technique for LAGB non-responders.

One-stage conversion from LAGB to OAGB can be performed with acceptable morbidity. A conversion surgery in two stages is a good option for LAGB complicated cases.

✉ Juan Pujol-Rafols
juan.pujol.rafols@gmail.com

1 Clínica Mi Tres Torres, Barcelona, Spain

2 Consorci Sanitari Alt Penedès I Garraf, Barcelona, Spain

3 American University of Beirut Medical Center (AUBMC), Beirut, Lebanon

4 Department of abdominal surgery, ZNA, Antwerp, Belgium

5 Centro Hospitalar de Lisboa Central, Lisboa, Portugal

6 Instituto Nacional de Nutrición. Centro Médico ABC, México City, México

7 Departament de Bioquímica I Biomedicina Molecular, Facultat de Biologia, Universitat de Barcelona, Barcelona, Spain

8 Department of Intensive Care Medicine, Elisabeth-Tweesteden Hospital, Tilburg, The Netherlands

9 Gastro-Obeso-Center - Advanced Institute In Bariatric And Metabolic Surgery, Sao Paulo, Brazil

10 Centro Multidisciplinar da Doença Metabólica Grupo Lusiadas Saúde, Hospital Lusíadas Amadora, Lisboa, Portugal

11 Onze Lieve Vrouwe Gasthuis (OLVG)-West, Amsterdam, the Netherlands

12 NMC Royal Hospital, Khalifa City, Abu Dhabi, United Arab Emirates

Published online: 01 March 2022

goals.[1,2] According to data from a 12-year follow-up study, the failure rate of the LAGB after 2, 5, 8, and 10 years is 25.7%, 24.3%, 25.7%, and 31.6%, respectively[2] and as a consequence, between 7.5 and 71% of the LAGB patients may require removal of the band and conversion to another bariatric technique.[1–10]

LAGB conversion surgery is usually a complex procedure, which may be associated with a significant rate of complications.[11] Therefore, any technical option that could help to reduce the surgical risk must be taken into account.

Some authors have proposed one anastomosis gastric bypass (OAGB) as a salvage alternative toRoux-en-y gastric bypass (RYGB) or sleeve gastrectomy arguing that it is simpler to perform. Proponents of this approach argue that there is only one anastomosis, away from the scar tissue area, and they highlight the good results that can be obtained, in terms of weight loss and resolution of comorbidities, because of the greater malabsorptive component of OAGB.[12–15] Besides, there is still controversy about whether the full procedure (LAGB removal and conversion to OAGB) should be done altogether, during the same surgical procedure, (in one stage) or in two separate phases, first performing the removal of the band and performing the rescue technique at a later time (in two stages). While some authors fear that the probability of complications when converting in one stage could be higher than if done in two stages,[13] others claim that a one-stage conversion strategy is safe, provided there is neither much damage to the gastric fundus, nor considerable inflammation, and/or big gastric dilation.[15]

The aim of the present study is to analyze short-term complications and mortality rates and mid-term weight loss outcomes after LAGB conversion to OAGB. A second objective is to analyze the reasons that lead the surgeon to convert in one stage or in two stages.

Material and Methods

In 2018, seven different centers around the world, with extensive experience in bariatric surgery, were asked to participate in the construction of a unique database by joining their individual prospectively collected registries. They were asked to provided data on all consecutive patients who had had a revisional bariatric surgery due to LAGB unsatisfactory results. The pooled data were merged in a single electronic database which managed to contain more than 1219 revisional procedures after LAGB, 189 of which (15.5%) underwent conversion to OAGB.[16,17]

The aforementioned database includes demographic and medical data such as patient's age, gender, height, preoperative weight (before LAGB), date of LAGB placement, cause of conversion, date of LAGB removal, revisional procedure date, weight immediately before conversion to OAGB, and last weight recorded during follow-up.

It also includes basic information about the cause of the banding revision which could be either due to poor results in terms of weight loss or due to technical problems with the prosthesis. (such as band slippage or erosion). In the case of a patient experiencing both a technical problem and unsatisfactory weight loss, the surgeon who collected the data was requested to select the clinically most relevant.

Major complications defined as any complication that resulted in a prolonged hospital stay (> 7 days), anticoagulant treatment, reoperation, or reintervention (based on the recommendations of the American Society for Metabolic and Bariatric Surgery Clinical Issues Committee[18]) were also recorded. Special emphasis was made to identify leaks (defined as effluence of gastrointestinal content through a suture line that may be contained near the anastomosis or exit through the abdominal wall or the drain), hemorrhage (clinically relevant when patients required transfusion or reoperation), and operative mortality (any death, aside from the cause, within 30 days after surgery).

For the present study, we retrospectively analyze those patients who underwent conversion from LAGB to OAGB from the aforementioned database.

Surgical Technique

All revisional LAGB to OAGB operations were performed laparoscopically. The procedure began by opening the entire anterior gastro-gastric plication that covered the band followed by removing the band. A 32- to 36-Fr Bougie was placed inside the stomach for the conversion to OAGB; the lesser curvature was partially divided horizontally below the *incisura angularis* and then transected vertically against the Bougie tube until it reaches the angle of Hiss, creating a long gastric pouch. Loop gastrojejunostomy was performed 150 to 250 cm distal to Treitz ligament.

The plan to perform the procedure in one or two stages was usually decided by the surgeon preoperatively, depending on individual and institutional preferences.

Weight Loss Measures

For the present study, initial body mass index (iBMI), final body mass index (fBMI), change in BMI (ΔBMI), percentage of excess BMI loss (%EBMIL), and percentage of total weight loss (%TWL) have been calculated taking the weight and height data from the aforementioned database and based on the following formulas:

$$\text{iBMI} = \text{weight before banding}/\text{height}^2$$

$$\text{fBMI} = \text{Last weight recorded}/\text{height}^2$$

$$\Delta\text{BMI} = (\text{iBMI}) - (\text{fBMI})$$

$$\%\text{EBMIL} = \left[\Delta\text{BMI}/(\text{iBMI} - 25)\right] \times 100$$

$$\%\text{TWL} = \left[(\text{initial weight} - \text{final weight})/\text{initial weight}\right] \times 100$$

The percentage of patients achieving %EBMIL > 50 (according to Reinhold criteria[19]) and the percentage of patients with %TWL < 20 were also calculated to evaluate efficacy in terms of weight loss.

Lost to follow-up was defined as those patients who failed to attend two consecutive medical appointments. The last registered weight was considered final weight for those who were lost during the follow-up before their final time-point.

Statistical Analysis

Data were expressed as mean ± standard deviation for continuous variables and as the total number of events and percentages for qualitative ones. Unpaired *t*-test was used to compare continuous variables and chi-squared test was used for the categorical variables. $P < 0.05$ was considered significant in both cases. Statistical analysis was accomplished using GraphPad Prism (version 8, San Diego, CA, USA).

Results

Demographic Data

A total of 189 patients underwent laparoscopic revision from LAGB to OAGB from December 2003 to January 2018. The cohort consisted of 170 (89.9%) females and 19 (10.1%) males. Eighty-seven (46%) of the cases were done in one stage and 102 (54%) were done in two stages. In case of two-stage approach, the mean time from the removal of the band to the final conversion to OAGB was 28.5 ± 23.3 months. Overall, the mean follow-up time from conversion to the last control was 31.4 ± 24 months. Follow-up at 1, 3, and 5 years was 100%, 88%, and 70%, respectively.

Mean age at the time of LAGB was 40.7 ± 11.2 years and at the time of conversion was 47.2 ± 11.2 years. Mean initial weight (when LAGB was performed) was 118.3 ± 19.8 kg referring a mean initial BMI of 44.3 ± 6.7 kg/m^2. Mean weight and mean BMI at the time of conversion to OAGB were 106.2 ± 20.6 kg and 39.8 ± 6.9 kg/m^2, respectively. There were no statistical differences with respect to gender, age, initial weight, and initial BMI between those patients who were converted in one stage and in two stages. However, patients who were converted in two stages had significantly higher weight and higher BMI at the time of conversion (Table 1).

Table 1 Demographic data

	One-stage	Two-stage	*p*
N	87	102	
Age at LAGB	42.3 ± 11.4	39.3 ± 10.9	0.0664
Age at OAGB	48.3 ± 11.9	46.3 ± 10.6	0.2233
Gender (male/female)	10.3%/89.7%	9.8% / 90.2%	0.9019
Initial weight at LAGB	115.4 ± 19.4	120.8 ± 20.0	0.0628
Initial BMI at LAGB	43.5 ± 6.7	45.1 ± 6.7	0.1042
Weight at OAGB	100.8 ± 19.5	110.8 ± 20.4	0.0008
BMI at OAGB	37.9 ± 6.6	41.3 ± 6.8	0.0007

BMI body mass index, *LAGB* laparoscopic adjustable gastric band, *OAGB* one anastomosis gastric bypass

Causes of Conversion

A definitive reason for the revisional surgery was described for 186 patients (98.4%). One hundred and ten (59.1%) patients had to be converted due to technical problems with the band, and 76 (40.9%) patients had to be converted due to unsatisfactory weight loss.

Most of the patients who had to undergo surgery due to technical problems with the band (71.8%, 79 patients) were converted in two stages; only 28.2% of them (31 patients) were converted in one stage.

Hence, in the two-stage group, there was a significantly higher proportion of patients with technical problems than in the one-stage group (Table 2).

Complications and Mortality

A total of 9 patients (4.8%) presented postoperative complications, 4 (4.6%) in the one-stage group, and 5 (4.9%) in the two-stage group. The leak rate was 2.6 (5 patients), 1.1% (1 patient), and 3.9% (4 patients) in the one-stage and the two-stage group, respectively. The bleeding rate was 0.5% overall, 1.1% (1 patient), and 0% (0 patients) for the one-stage and the two-stage groups, respectively. One patient died in the two-stage group after an anastomosis leak (1%) (Table 3).

Weight Loss Outcomes

Overall, the mean weight decreased from 106.2 ± 20.6 kg at the time of conversion to 80.5 ± 15.4 kg and the mean BMI from 39.8 ± 6.9 to 30.2 ± 5.4, after a mean follow-up of 31.4 ± 24.0 months. One hundred and sixty patients

Table 2 Reasons for conversion

	One-stage	Two-stage	*p*
IWL/tech. problems	63.5% (54)/36.5% (31)	21.8% (22)/78.2% (79)	< 0.0001

Data is expressed in percentages and in absolute values: % (*n*)

IWL insufficient weight loss, *tech.* technical

Table 3 postoperative complications

	One-stage	Two-stage	Total
Complication rate	4/87 (4.6%)	5/102 (4.9%)	9/189 (4.8%)
Leaks	1/87 (1.1%)	4/102 (3.9%)	5/189 (2.6%)
Bleeding	1/87 (1.1%)	0/102 (0.0%)	1/189 (0.5%)
Mortality	0/87 (0.0%)	1/102 (1.0%)	1/189 (0.5%)

Table 4 Weight loss outcomes at a mean follow-up of 31.4 ± 24.0 months

	Total
Final weight	80.5 ± 15.4
%EBMIL	74.6 ± 29.0
%TWL	31.1 ± 11.7
*f*BMI	30.2 ± 5.4
N (%) cases with %EBMIL > 50	160 (85)
N (%) cases with %TWL < 20	29 (15.4)

%EBMIL percent excess body mass index loss, *%TWL* percent total weight loss, *fBMI* final body mass index (kg/m^2)

(85%) reached %EBMIL > 50. Overall, twenty-nine patients (15.4%) did not reach %TWL > 20 (Table 4).

Figure 1 presents weight loss outcomes per time interval (the ratio reflects the number of patients available over the total number of patients in each time interval).

Discussion

The present study analyzes data from a multicenter database of 189 consecutive patients who underwent conversion from LAGB to OAGB.

It has been found that patients who were operated on in one stage had significantly lower mean preoperative weight (100.8 ± 19.5 vs. 110.8 ± 20.4 kg) and lower mean preoperative BMI (37.9 ± 6.6 kg/m^2 vs. 41.3 ± 6.8 kg/m^2). Moreover, the one-stage approach was mainly performed in patients without band-related technical problems. This goes in line with previous studies that suggested that the one-stage approach may be beneficial in less complicated cases, in order to prevent further increase of weight during the time gap between the band removal and the revisional surgery and to avoid a second general anesthesia.[15]

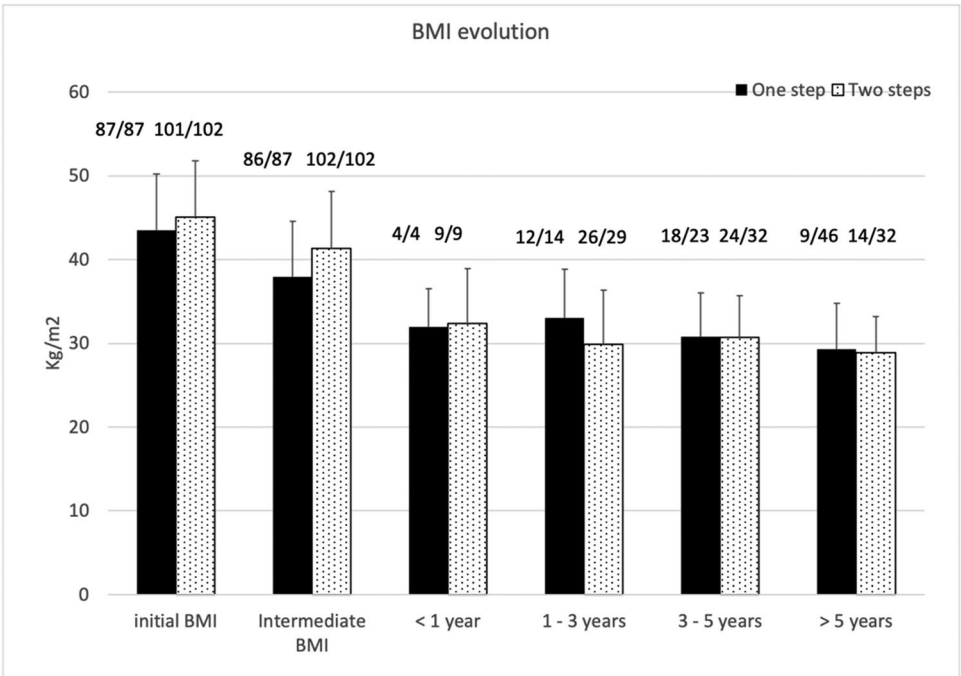

Fig. 1 Mean BMI over time grouping patients according to time since conversion surgery (the ratio reflects the number of patients available over the total number of patients in each time interval)

In this subgroup of selected patients, one-stage conversion can be performed with acceptable surgical morbidity. The 4.8% complication rate with just one leak and one bleeding episode out of 87 patients is similar to that observed in series of patients who have undergone primary OAGB surgery.[20,21]

Delaying the rescue surgery, if not necessary, and adding yet another surgical event are not likely to improve surgical conditions. Ghosh et al. claim that there is no theoretical or practical advantage in performing revisional surgery in two stages as when performing the procedure all at once the band itself serves as a guide to better identify anatomy.[15] Probably, each subsequent intervention may further complicate the surgical field with further adhesions. In fact, in an interesting histopathological study on surgical specimens after LAGB-to-sleeve conversion, Tan et al. found that the LAGB changes to the gastric wall do not resolve with time; tissues may never fully recover after LAGB surgery, and hence, a delayed conversion is not likely to improve surgical conditions and will not add any technical advantage.[22]

Conversely, two-stage conversion was the preferred approach for patients with higher BMI (preoperative BMI was significantly higher in this group), and/or with band-related technical problems (72% of the patients with technical problems were operated on in two stages); patients that a priori can be more complex to operate.

By choosing a two-stage approach in those more complex cases, it is possible to keep complication rates at acceptable values (4.9%). It should be noted that there is a trend towards a higher incidence of leakage in the two-stage compared to the single-stage group (3.9% vs. 1.53%); however, this finding is most likely related to the higher BMI and more band-related technical problems in the former group.

Finally, the present study confirms the results of previous studies; because of its significant malabsorptive component, OAGB seems to be an attractive option as a salvage technique after a restrictive procedure, leading to a successful weight loss.[12–16,23]

To the best of our knowledge, there is only one study that compares LAGB conversion to OAGB in one stage versus in two stages[13]; in a multicenter study, Musella et al. analyzed 196 patients who were converted from LAGB to OAGB, 116 of whom were operated on in one stage and 80 were operated on in two stages. Contrary to our findings, In Musella's study, one-stage procedures were associated with a nearly significantly higher early complication rate than the two-stage procedures (9.5% versus 2.5%; $p = 0.05$). However, in the aforementioned study, whether to convert in one stage or two stages was not decided preoperatively but intraoperatively, based on surgical findings. This means that even complicated cases were taken to the operating room with the idea of completing the procedure in a single stage, which could have had an influence on the one-stage group results.

In summary, our findings suggest that the conversion from LAGB to OAGB is an acceptable option with which good weight loss results can be obtained with acceptable morbidity figures. The debate whether it is better to perform the conversion in one stage or in two stages is not well-posed. There is not one better option; both are valid if indicated in the appropriate patient.

The majority of surgeons usually choose the one-stage approach if possible.[12–15,23] Performing the conversion in one-stage has certain advantages: the patient needs to be hospitalized only once; it requires a single anesthetic intervention and a single operation. Importantly, it avoids waiting time and prevents possible weight regain during the time gap between the first and the second operations. In fact, part of the higher preoperative BMI in the two-stage group may reflect weight regain after band removal. Lanthaler et al., for example, reported an increase in the patients' BMI from an initial 29.6 kg/m^2 at band removal to 38.2 kg/m^2 before the conversion operation, after a mean waiting time of 1.2 years.[24] Unfortunately, the examined database does not provide data about weight variation between the removal of the band and the final procedure in case of two-stage conversion.

However, in technically complicated cases, a two-stage strategy might be safer. The persistence in doing the conversion in a single stage can excessively lengthen the surgical time and increase the risk of perioperative complications.

In any case, conversion surgery can be technically demanding and should be performed by experienced teams. The surgeon who decides to convert in one-stage should be cautious and not hesitate to switch to a two-stage approach if the case warrants it.

Finally, we must bear in mind that there could be other variables that determine the surgical strategy. In some occasions, the two-stage conversion is the only possible option because the band has been previously removed elsewhere. In others, patient preferences or bureaucratic reasons such as insurance policies restricting reimbursement for a second operation may play an important role in deciding which strategy to employ.

Our study has several weaknesses. Despite the fact that the data was collected prospectively by each participating center, it was analyzed retrospectively. In addition, database used for this study does not specify which kind of technical problem each particular patient had. The fact that it is a multicenter study makes this data collection difficult since different centers may define concepts such as slippage, pouch dilatation, or dysphagia differently. Similarly, this study does not evaluate the comorbidity resolution nor the quality of life improvement. In addition, being a multicenter study, patients with different loop lengths were included in the sample, and the database does not provide information about the BPL length on each single patient. Although there are several

studies focusing on this issue, there is still no consensus on the biliopancreatic limb that should be bypassed during performance of the OAGB and reported lengths of BPL in literature varied widely from 100 to 400 cm.[25–27] Finally, the patients' follow-up rate decreased with time. This is an inevitable flaw in any study analyzing long-term data and could have some influence on weight loss results but hardly skews the post-operative complications' rate. Hence, future-randomized control trials may be necessary to draw final conclusions. Nonetheless, the strength of this study resides in its large sample size, extracted from a multicenter database. This avoids the bias of single-center series and dilutes factors that may be related to a single surgeon.

The results of the present study support the validity of OAGB as a rescue technique after banding. It is not the object of this study to compare it with other technical alternatives for conversion, such as sleeve gastrectomy or Roux-en-Y gastric bypass. Each surgical team should evaluate the most convenient in each individual case according to its particular characteristics and its own surgical experience.

Conclusions

Conversion from LAGB to OAGB seems safe and effective. The one-stage approach seems to be a good option for managing non-responders in the absence of major technical problems. Two-stage conversion strategy is a good alternative when facing patients with higher BMI, or in complicated cases, such as band slippage or erosion. Selecting one-stage or two-stage strategy according to the patient's features can lead to good results, with reasonable surgical morbidity and successful weight loss. However, longer-term studies are needed to ascertain longer term results.

Acknowledgements The authors would like to thank Dr. Oscar V. Cisneros for his invaluable help in reviewing this manuscript.

All procedures performed in the present study were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. For this type of study, formal consent is not required.

Declarations

Conflict of Interest J. Himpens receives consulting fees from Ethicon Endosurgery and Medtronic.
B. Van Wagensveld is a consultant for Obesitas International, a strategic alliance partner of Medtronic.
All other authors declare that they have no conflict of interest.

References

1. Himpens J, Cadière GB, Bazi M, et al. Long-term outcomes of laparoscopic adjustable gastric banding. Arch Surg 2011;146; 7:802-7.
2. Naef M, Mouton W, Naef U, et al. Graft survival and complications after laparoscopic gastric banding for morbid obesity—lessons learned from a 12-year experience. Obes Surg 2010; 20 (9):1206–14.
3. O'Brien, P.E., Hindle, A., Brennan, L. et al. Long-Term Outcomes After Bariatric Surgery: A Systematic Review and Meta-analysis of Weight Loss at 10 or More Years for All Bariatric Procedures and a Single-Centre Review of 20-Year Outcomes After Adjustable Gastric Banding. Obes Surg 2019;29: 3-14.
4. Vijgen GH, Schouten R, Pelzers L, et al. Revision of Laparoscopic Adjustable Gastric Banding: Success or Failure? Obes Surg. 2012;22:287–92.
5. Favretti F, Segato G, Ashton D, et al. Laparoscopic adjustable gastric banding in 1,791 consecutive obese patients: 12-year results. Obes Surg 2007;17(2):168–75.
6. Stroh C, Hohmann U, Schramm H, Meyer F, Manger T. Fourteen-year long-term results after gastric banding. J Obes 2011;2011:128451.
7. O'Brien P, MacDonald L, Anderson M, Brennan L, Brown WA. Long-term outcomes after bariatric surgery: fifteen-year follow-up of adjustable gastric banding and a systemic review of the bariatric surgical literature. Ann Surg 2013;257(1):87–94.
8. Vinzens F, Kilchenmann A, Zumstein V, et al. 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. Surg Obes Relat Dis 2017; 13: 1313-1320.
9. Miller K, Pump A, Hell E. Vertical banded gastroplasty versus adjustable gastric banding: prospective long-term follow-up study. Surg Obes Relat Dis. 2007; 3: 84-90.
10. Tolonen P, Victorzon M, Mäkelä J. 11-year experience with laparoscopic adjustable gastric banding for morbid obesity—what happened to the first 123 patients? Obes Surg. 2008;18: 251-255.
11. Berende CAS, de Zoete JP, Smulders JF, et al. Laparoscopic Sleeve Gastrectomy Feasible for Bariatric Revision Surgery. Obes Surg. 2012; 22:330–334
12. Rutledge R. Revision of failed gastric banding to mini-gastric bypass. Obes Surg. 2006;16(4):521–3.
13. Musella M, Bruni V, Greco F, et al. Conversion from laparoscopic adjustable gastric banding (LAGB) and laparoscopic sleeve gastrectomy (LSG) to one anastomosis gastric bypass (OAGB): preliminary data from a multicenter retrospective study. Surg Obes Relat Dis. 2019;15(8):1332–9.
14. Piazza L, Di Stefano C, Ferrara F, et al. Revision of failed primary adjustable gastric banding to mini-gastric bypass: results in 48 consecutive patients. Updates Surg. 2015;67(4):433–7.
15. Ghosh S, Bui TL, Skinner CE, et al. A 12-Month Review of Revisional Single Anastomosis Gastric Bypass for Complicated Laparoscopic Adjustable Gastric Banding for Body Mass Index over 35. Obes Surg. 2017;27(11):3048–54.
16. Pujol Rafols J, Al Abbas AI, Devriendt S, Guerra A, Herrera MF, Himpens J, et al. Roux-en-Y gastric bypass, sleeve gastrectomy, or one anastomosis gastric bypass as rescue therapy after failed adjustable gastric banding: a multicenter comparative study. Surg Obes Relat Dis. 2018;14(11):1659–66.
17. Pujol-Rafols J, Al Abbas AI, Devriendt S, Guerra A, Herrera MF, Himpens J, et al. Conversion of Adjustable Gastric Banding to Roux-en-Y Gastric Bypass in One or Two Stages: What Is the Best Approach? Analysis of a Multicenter Database Concerning 832 Patients. Obes Surg. 2020; 30:5026-32.

18. Brethauer SA, Kim J, el Chaar M, Papasavas P, Eisenberg D, Rogers A, et al. Standardized Outcomes Reporting in Metabolic and Bariatric Surgery. Obes Surg. 2015;25(4):587–606.
19. Reinhold RB. Critical analysis of long term weight loss following gastric bypass. Surg Gynecol Obstet. 1982;155(3):385–94.
20. Carbajo MA, Luque-de-León E, Jiménez JM, et al. Laparoscopic One-Anastomosis Gastric Bypass: Technique, Results, and Long-Term Follow-Up in 1200 Patients. Obes Surg. 2017 May 1;27(5):1153–67.
21. Jean Marc Chevallier JM, Arman GA, Guenzi M. et al. One Thousand Single Anastomosis (Omega Loop) Gastric Bypasses to Treat Morbid Obesity in a 7-Year Period: Outcomes Show Few Complications and Good Efficacy Obes Surg. 2015; 25:951–958.
22. Tan M, Pharm B, Yee, G. et al. A histologic evaluation of the laparoscopic adjustable gastric band capsule by tissue sampling during sleeve gastrectomy performed at different time points after band removal. Sur Obes Relat Dis 10 (2014) 620–625.
23. Chansaenroj P, Aung L, Lee WJ, et al. Revision Procedures After Failed Adjustable Gastric Banding: Comparison of Efficacy and Safety. Obes Surg 2017, 27: 2861-67.
24. Lanthaler M, Aigner F, Kinzl J, et al. Long-term results and complications following adjustable gastric banding. Obes Surg. 2010;20:1078-1085.
25. Kermansaravi M, DavarpanahJazi AH, ShahabiShahmiri S, Areas of Non-Consensus Around One Anastomosis/Mini Gastric Bypass (OAGB/MGB): A Narrative Review. Obesity Surgery (2021) 31:2453–2463.
26. Boyle M, Mahawar K. One anastomosis gastric bypass performed with a 150-cm biliopancreatic limb delivers weight loss outcomes similar to those with a 200-cm biliopancreatic limb at 18 -24 months. Obes Surg. 2020;30(4):1258–64.
27. Komaei I, Sarra F, Lazzara C, et al. One anastomosis gastric bypass-mini gastric bypass with tailored biliopancreatic limb length formula relative to small bowel length: preliminary results. Obes Surg. 2019;29(9):3062–70.