



Editorial

# Weight Regain after Bariatric Surgery

Lara Ribeiro-Parenti <sup>1,2,3</sup>, Clement Baratte <sup>1,2,3</sup> and Tigran Poghosyan <sup>1,2,3,\*</sup> 

<sup>1</sup> Service de Chirurgie Digestive, Œsogastrique et Bariatrique, Hôpital Bichat—Claude-Bernard, Assistance Publique-Hôpitaux de Paris, 75018 Paris, France

<sup>2</sup> UMR-S 1149 Centre de Recherche sur l'Inflammation, INSERM, 75018 Paris, France

<sup>3</sup> Université Paris Cité, 75006 Paris, France

\* Correspondence: tigran.poghosyan@aphp.fr

Bariatric surgery (BS) is currently the most effective treatment for obesity, with long-lasting weight loss and improvement of related co-morbidities. BS is considered successful mainly based on resolution of co-morbidities and improvement of quality of life.

Unlike weight loss outcomes in BS (mean BMI of the cohort, change in BMI, percent of total weight loss (%TWL), percent excess BMI loss (%EBMIL) and/or percent excess weight loss (%EWL) in which ideal weight is defined by the weight corresponding to a BMI of 25 kg/m<sup>2</sup>) [1], weight regain (WR) is not well defined. The weight nadir is mostly reached within 12 to 18 months after surgery, followed by weight stabilization [2]. Weight regain, which is different from insufficient weight loss, can be observed after any type of bariatric surgery [3]; however, WR rate may be lower after gastric bypass than after sleeve gastrectomy [4].

WR after bariatric surgery is a serious issue, since it is often associated with comorbidity recurrence, and deterioration of both quality of life and self-esteem. WR is often poorly reported due to a lack of very long-term follow-up sessions but also for lack of standardized definitions. Lauti et al. [5] reported rates ranging from 9 to 91% just by using different WR definitions on the same cohort.

Exploration of WR cases is mandatory. Surgical factors are often debated: a small gastric volume appears to be a key factor to reach and maintain long-term weight loss [6]. Therefore, in the case of sleeve gastrectomy, bougie size should range from 32 to 36 F [7]. The distance between the pylorus and the first staple line should be as short as possible to have effective gastric emptying and a minimal reservoir. Secondary gastric dilatation after bariatric surgery seems to influence WR, especially after gastric bypass but also after sleeve gastrectomy [8,9]. Except in case of gastrojejunal anastomotic stricture or gastric stenosis, we question whether dilatation is a consequence or cause of eating disorders.

Several eating disorders, such as grazing [10], binge eating, loss of control, and night eating syndrome, have been reported after different bariatric procedures [11] and can lead to WR. Changes in eating behaviors must be accompanied with regular physical activity for long-lasting weight loss.

Patient's compliance to care is also a corner stone of weight maintenance. Unfortunately, only a few patients follow the dietary and physical activity recommendations [12], even in the short term, or go to post-operative visits. The lack of follow-up session may also be associated with WR [13].

Intestinal adaptation after BS can also lead to WR. It is known that the release and response to gastro-intestinal or adipogenic hormones, such as ghrelin, glucagon-like peptide 1, peptide YY, and leptin, change after bariatric surgery which could participate in WR [14].

Currently, 10 to 20% of patients undergo revisional surgery for WR [15].

The results of revisional surgery, such as gastric pouch resizing or changes to bile or alimentary loop lengths, are relatively disappointing with variable weight loss results. The promising role of GLP-1 agonists in the management of WR after bariatric surgery has to be assessed on a wider scale [16,17].



**Citation:** Ribeiro-Parenti, L.; Baratte, C.; Poghosyan, T. Weight Regain after Bariatric Surgery. *J. Clin. Med.* **2023**, *12*, 3265. <https://doi.org/10.3390/jcm12093265>

Received: 22 February 2023

Accepted: 21 April 2023

Published: 4 May 2023



**Copyright:** © 2023 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

As WR is multifactorial, everyone has a key role: surgeons must perform a perfect procedure that best suits the patient. Patients must comply with post-operative recommendations and attend regular and long-term follow-up sessions, as prevention is better than curative. The place of drug therapy must be specified. Revisional surgery should be at last resort. Furthermore, a universal definition of WR is needed in order to facilitate comparisons across studies and different surgical procedures.

**Author Contributions:** Writing—original draft preparation, L.R.-P.; writing—review and editing, T.P., C.B. and L.R.-P.; supervision, T.P. All authors have read and agreed to the published version of the manuscript.

**Conflicts of Interest:** The authors declare no conflict of interest.

## References

1. Brethauer, S.A.; Kim, J. Standardized outcomes reporting in metabolic and bariatric surgery. *Surg. Obes. Relat. Dis.* **2015**, *11*, 489–506. [[CrossRef](#)] [[PubMed](#)]
2. Sjostrom, L.; Narbro, K. Effects of Bariatric Surgery on Mortality in Swedish Obese Subjects. *N. Engl. J. Med.* **2007**, *357*, 741–752. [[CrossRef](#)] [[PubMed](#)]
3. Sjostrom, L. Review of the key results from the Swedish Obese Subjects (SOS) trial—a prospective controlled intervention study of bariatric surgery. *Intern. Med.* **2013**, *273*, 219–234. [[CrossRef](#)] [[PubMed](#)]
4. Jammu, G.S.; Sharma, R.A. 7-year clinical audit of 1107 cases comparing sleeve gastrectomy, Roux-en-Ygastric bypass, and mini-gastric bypass, to determine an effective and safe bariatric and metabolic procedure. *Obes. Surg.* **2016**, *26*, 926–932. [[CrossRef](#)] [[PubMed](#)]
5. Lauti, M.; Lemanu, D. Definition determines weight regain outcomes after sleeve gastrectomy. *Surg. Obes. Relat. Dis.* **2017**, *13*, 1123–1129. [[CrossRef](#)] [[PubMed](#)]
6. Weiner, R.A.; Weiner, S. Laparoscopic sleeve gastrectomy—Influence of sleeve size and resected gastric volume. *Obes. Surg.* **2007**, *17*, 1297–1305. [[CrossRef](#)] [[PubMed](#)]
7. Rosenthal, R.J. International Sleeve Gastrectomy Expert Panel. International Sleeve Gastrectomy Expert Panel Consensus Statement: Best practice guidelines based on experience of 12,000 cases. *Surg. Obes. Relat. Dis.* **2012**, *8*, 8–19. [[CrossRef](#)] [[PubMed](#)]
8. Yimcharoen, P.; Heneghan, H.M. Endoscopic findings and outcomes of revisional procedures for patients with weight recidivism after gastric bypass. *Surg. Endosc.* **2011**, *25*, 3345–3352. [[CrossRef](#)] [[PubMed](#)]
9. Felsenreich, D.M.; Kefurt, R. Reflux, sleeve dilation, and Barrett’s esophagus after laparoscopic sleeve gastrectomy. *Obes. Surg.* **2017**, *27*, 3092–3101. [[CrossRef](#)] [[PubMed](#)]
10. Saunders, R. “Grazing”: A high-risk behavior. *Obes. Surg.* **2004**, *14*, 98–102. [[CrossRef](#)] [[PubMed](#)]
11. Nicolau, J.; Ayalaa, L. Postoperative grazing as a risk factor for negative outcomes after bariatric surgery. *Eat. Behav.* **2015**, *18*, 147–150. [[CrossRef](#)] [[PubMed](#)]
12. Sherf Dagan, S.; Keidar, A. Do bariatric patients follow dietary and lifestyle recommendations during the first postoperative year? *Obes. Surg.* **2017**, *27*, 2258–2271. [[CrossRef](#)]
13. Himpens, J.; Dobbelaire, J. Long-term results of laparoscopic sleeve gastrectomy for obesity. *Ann. Surg.* **2010**, *252*, 319–324. [[CrossRef](#)]
14. Dimitriadis, G.K.; Randeve, M.S. Potential hormone mechanisms of bariatric surgery. *Curr. Obes. Rep.* **2017**, *6*, 253–265. [[CrossRef](#)] [[PubMed](#)]
15. Noel, P.; Nedelcu, M. What are the long term results 8 years after sleeve gastrectomy? *Surg. Obes. Relat. Dis.* **2017**, *13*, 1110–1115. [[CrossRef](#)] [[PubMed](#)]
16. Ribeiro-Parenti, L.; Bado, A.; Le Gall, M. What is the role of gastric glucagon-like peptide 1 expressing cells? *Med. Sci.* **2021**, *37*, 966–967.
17. Bretault, M.; Carette, C.; Zaharia, R.; Vychnevskaia, K.; Bouillot, J.-L.; Chernichow, S.; Raffin-Sanson, M.-L. Liraglutide 3 mg as a weight-loss strategy after failed bariatric surgery in a patient with hypothalamic obesity following craniopharyngioma. *Diabetes Metab.* **2020**, *46*, 514–515. [[CrossRef](#)] [[PubMed](#)]

**Disclaimer/Publisher’s Note:** The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.