Chapter 36
Conversion from Roux-En-Y Gastric Bypass to Sleeve Gastrectomy

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36.1 Introduction

Laparoscopic Roux-en-Y gastric bypass (RYGB) is one of the most common bariatric procedures performed and is reported to offer at midterm percentage of excess weight loss (%EWL) of 43–68.1% [1–3], with improvement of almost all conditions related to obesity (4) Laparoscopic sleeve gastrectomy (SG) became a popular procedure for morbid obesity after the five international consensus summits [4–8], achieving a mean %EWL at year one of 59.3%, at year two of 59.0%, at year three of 54.7%, at year four of 52.3%, at year five of 52.4%, and at year six of 50.6%. SG can be considered as first step of duodenal switch (DS). The %EWL after DS is reported to be 68.9% after more than 10 years [9].

Weight loss issues (either too much weight or too little weight loss) and weight regain after initial successful weight loss are a few of the negative aspects that can affect patients after undergoing bariatric surgery.

The precise mechanisms whereby RYGB achieves sustained weight loss remain unknown, but many of the changes in gastrointestinal hormones, adipokines, and cytokines as well as in hypothalamic neuropeptides and neurotransmitters resemble the changes observed in cachexia rat model [10]. Hence, in humans, RYGB triggers a catabolic state responsible for loss of appetite and prolonged body weight reduction.

Electronic Supplementary Material The online version of this chapter (https://doi.org/10.1007/978-3-030-28936-2_36) contains supplementary material, which is available to authorized users.

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M. Gagner et al. (eds.), *The Perfect Sleeve Gastrectomy*,
https://doi.org/10.1007/978-3-030-28936-2_36

The opposite situation of unsuccessful weight loss after RYGB can be related to technical failures or to new dietary behavior. Technical causes of weight regain can be gastric pouch dilation, gastrojejunostomy dilation, and gastro-gastric fistula's development. Patients who undergo RYGB frequently develop new alimentary habits like hyperphagia, polyphagia, or sweet eating. Hyperphagia, which means volume eating (eating too large meals), will logically be treated by increasing restriction by placement of an adjustable gastric band [11–13] or a nonadjustable ring [14] around the gastric pouch or resizing a dilated gastric pouch [15]. Polyphagia, which means grazing (eating too frequent meals), can logically be treated by conversion of RYGB to a malabsorptive procedure like distal RYGB (DRYGB), or DS performed in two steps (from RYGB to SG first and biliopancreatic diversion after). A new mixed alimentary behavior, characterized by grossly increased caloric intake, will be treated by conversion to SG, leaving the probability of adding a significant malabsorption consequence by the second step of DS. Obviously, the nutritionist's counseling constitutes an important part of the multidisciplinary consultation, since mental disorders, such as binge eating and night eating disorders, must be ruled out.

The multidisciplinary consultation is fundamental for the follow-up of obese patients and for the patients submitted to RYGB because this procedure may lead to some serious problems. One problem associated with RYGB is the dumping syndrome, which is clinically characterized by postprandial sweating, flushing, dizziness, weakness, tachycardia, palpitations, diaphoresis, and lassitude. This can be attributed to the rapid entrance of hyperosmotic foods to the jejunum, which, according to one hypothesis, causes a fall in blood volume and significant sympathetic stimulation from various pressoreceptors [16]. It is also related to the effect of hyperosmolar fluid on the argentaffin cells in the small intestinal mucosa, causing release of vasoactive serotonin and vasomotor effects. A third explanation of the syndrome is hypoglycemia provoked by excessive intake of rapid sugars or foods with high glycemic index because increased insulin sensitivity induces abrupt glucose fluctuations in the blood [17]. In bariatric surgery the dumping syndrome has been considered as a beneficial feature because patients learned to avoid calorie-dense foods and ate less at one time [18].

Despite adequate dietary counseling (small meals, little carbohydrates), patients with RYGB still can fail to comply with restriction caused by the procedure, with subsequent excessive dumping, vomiting episodes, and abdominal pain.

Furthermore, patients with symptoms of postprandial hyperinsulinemic hypoglycemia are characterized by exaggerated insulin and glucagon-like peptide-1 (GLP-1) response compared to asymptomatic operated patients [19]. The counter-regulatory mechanisms responsible for preventing hypoglycemia appear to be altered. The cause of these changes are not entirely understood, and known risk factors are female sex, longer time since surgery and lack of having prior diabetes. Treatment should begin with strict low carbohydrate diet, followed by medication therapy. Therapy with diazoxide, acarbose, calcium channel blockers, and octreotide has been proven to be beneficial, but the response apparently is highly variable and subject to fail [20].

Because of these challenges, the procedure of RYGB has not been considered as nonreversal [21], and a laparoscopic conversion of RYGB to SG can be an option. Moreover, this conversion can also constitute the first step of the DS procedure, leaving the patients in better conditions.

36.2 Surgical Technique

The patient is positioned supine with the legs and both arms in abduction (French position). The surgeon stands between the patient's legs, the camera person to the patient's right, and the assistant to the patient's left. The procedure starts by inserting the first 12-mm trocar, using the Hasson technique, on the midclavicular line in the left upper quadrant. Four additional trocars are placed under direct intraperitoneal view, usually at the same position, as for the original surgery: a 5-mm trocar on the left anterior axillary line at 5 cm distal to the costal margin, a 10-mm trocar at some 20 cm below the xiphoid process, a 12-mm trocar on the right midclavicular line on the same horizontal line, and a 5-mm trocar just distal to the xiphoid process. Another option consists into perform a reduced scar laparoscopy like represented in the video attached to this chapter. The alimentary loop is identified, and adhesions between the parietal peritoneal sheet and the greater omentum and/or small bowel, and between the left liver lobe and the gastrojejunostomy are severed. Great care is taken to prevent damage to the glissonian hepatic capsule. At this stage, both the diaphragmatic crura are clearly identified. In case of crural diastasis or incipient hernia, hiatoplasty is performed by passing 1 polypropylene one or two figure-of-eight sutures. The gastric remnant is separated from the adhesions with the gastric pouch and gastrojejunostomy by coagulating hook or thick stapling. The gastric pouch is sectioned by a firing of linear stapler, just proximal to the anastomosis in healthy tissue, and extreme care is taken not to devascularize the little stomach pouch, since it usually survives on just one or two branches of the left gastric artery (Fig. 36.1). Then, the gastrojejunostomy is separated by the proximal end of the alimentary limb by a firing of stapler. The fundus of the gastric remnant is subsequently freed from top to bottom along the greater curvature, down to the level of the body of the stomach. At this level, the body of the gastric remnant is transected from lateral to medial by firings of linear stapler (Fig. 36.2). The gastric pouch is opened on its posterior side and the remaining upper pole of gastric remnant on its anterior side (Fig. 36.3) in order to accommodate a 34-Fr orogastric bougie, pushed down at this time by the anesthesiologist. The orogastric bougie is advanced toward the pylorus, permitting to complete the SG, by stapling the antrum with multiple firings of linear stapler alongside the tube (Fig. 36.4). After this step, the continuity of the stomach is established by a manual gastrogastrostomy between the gastric pouch and the gastric remnant, using two 1 polydiaxone (PDS) running sutures (Fig. 36.5). The good

Fig. 36.1 Dismantling of the previous gastrojejunostomy

vascularization of the gastric pouch and of the distal sleeve can be checked by the contrast-enhanced indocyanine green perfusion (like in the video attached to this chapter). The jejunojejunostomy is localized, and the alimentary, biliary, and common limbs are identified. The anastomosis is dismantled by firings of linear stapler, in an attempt to duplicate the original staple line and not to impinge on the distal end of the alimentary limb (Fig. 36.6). A linear stapler anastomoses the proximal end of the alimentary limb and the distal end of the biliary limb, and the enterotomy is closed by two 2-0 PDS running sutures (Fig. 36.7). The blind loop of the biliary and alimentary limbs is resected after completion of the new jejunojejunostomy, if necessary. The mesenteric window, created at the time of RYGB, is closed using purse string of 1 polypropylene, thereby reestablishing the original anatomy. The gastrointestinal continuity is checked by insufflation of compressed air through the orogastric bougie. A drain is left in the abdominal cavity near the gastrogastrostomy and the body of the stomach. The specimens (gastric remnant, gastrojejunostomy) are retrieved from the abdomen by enlarging the left 12-mm upper quadrant trocar, which is subsequently closed in layers.

Fig. 36.2 Fundectomy of the gastric remnant

36.3 Postoperative Care

A methylene blue swallow is realized on the first postoperative day, and if negative, a liquid diet is started on the second postoperative day. The patient is discharged on a pureed diet on the fifth/sixth postoperative day, and a normal diet is started at the third postoperative month. Thereafter, the usual multidisciplinary follow-up is adopted.

36.4 Results

Despite RYGB reversal has been increasing [22], conversion of RYGB into SG remains not popular due to its difficulty and association to major complications, like anastomotic leak and stricture [23], and gastroesophageal reflux [24]. However, change in weight loss is present although it remains not high [23, 24].

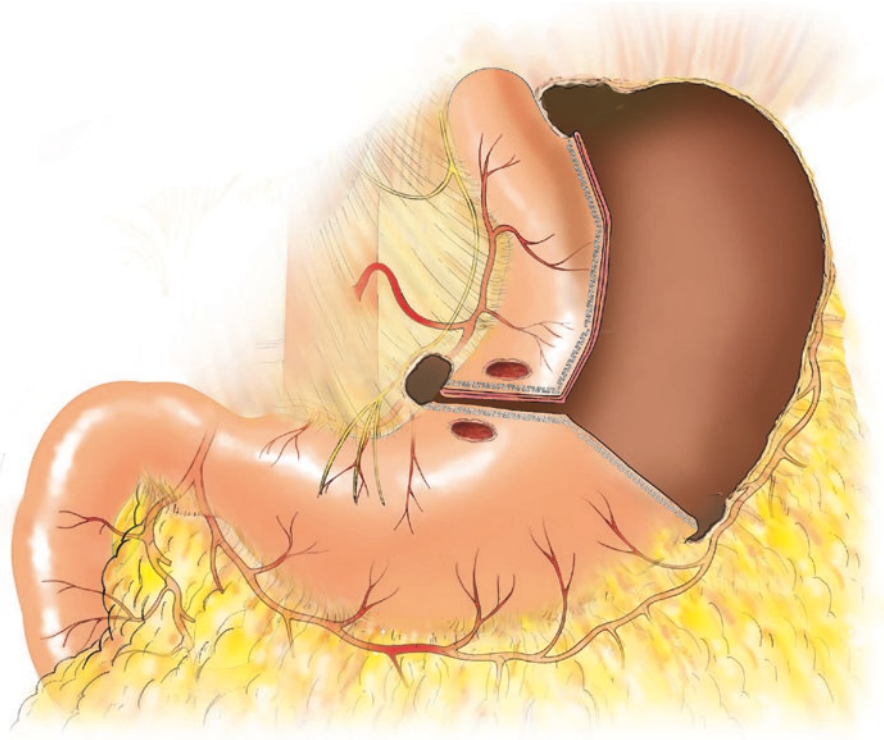

Fig. 36.3 Opening of the gastric pouch and gastric remnant to accommodate the orogastric bougie

Regarding change of hypoglycemia, deconstruction of Roux-en-Y limb and restoration of the gastrointestinal continuity remains an option to offer when the medical treatments fail [20]. Recently, a study confirmed an improvement of symptomatic hypoglycemia in RYGB reversal patients, excluding the origin of the hypoglycemia from the ß-cell hyperplasia or hyperfunction [25]. In this study, weight gain after RYGB reversal was moderate and variable; postprandial glucose, insulin, and GLP-1 excursions were significantly diminished; insulin secretion changed proportional to glucose levels and insulin clearance increased; glucagon/insulin ratios were similar.

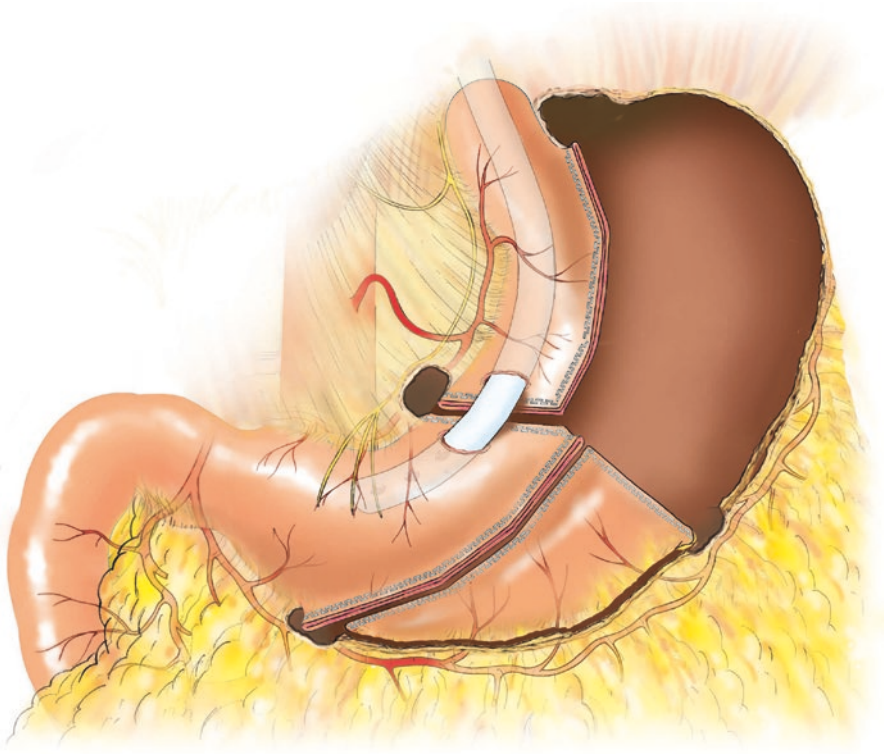

Fig. 36.4 Resection of the gastric antrum to complete the sleeve gastrectomy, after placement of an orogastric bougie and before the restoration of the gastric continuity

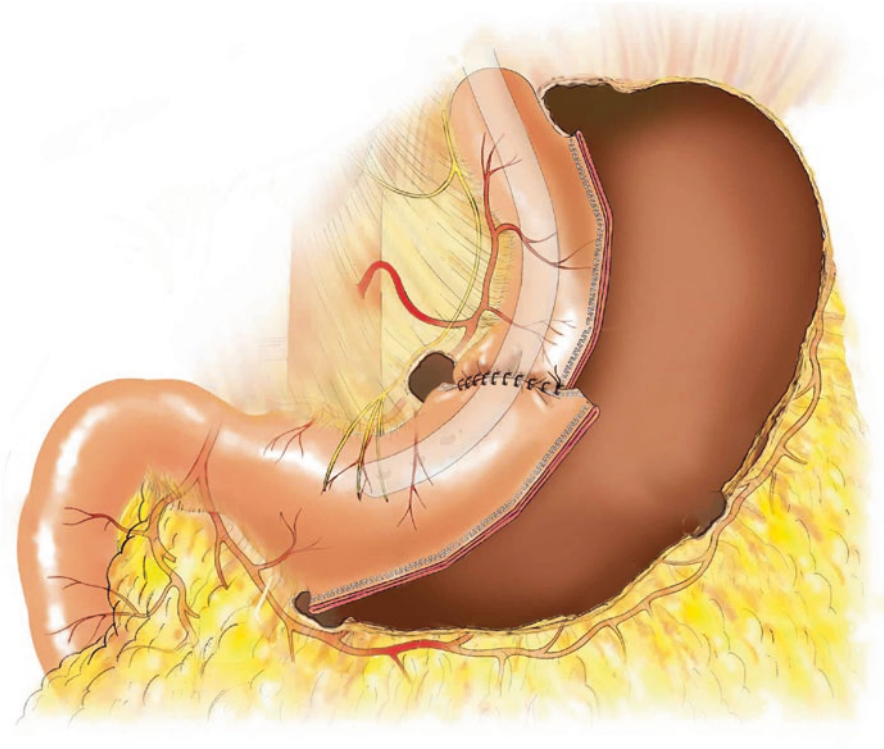

Fig. 36.5 Restoration of the gastric continuity through a manual gastrogastrostomy between the gastric pouch and the gastric remnant

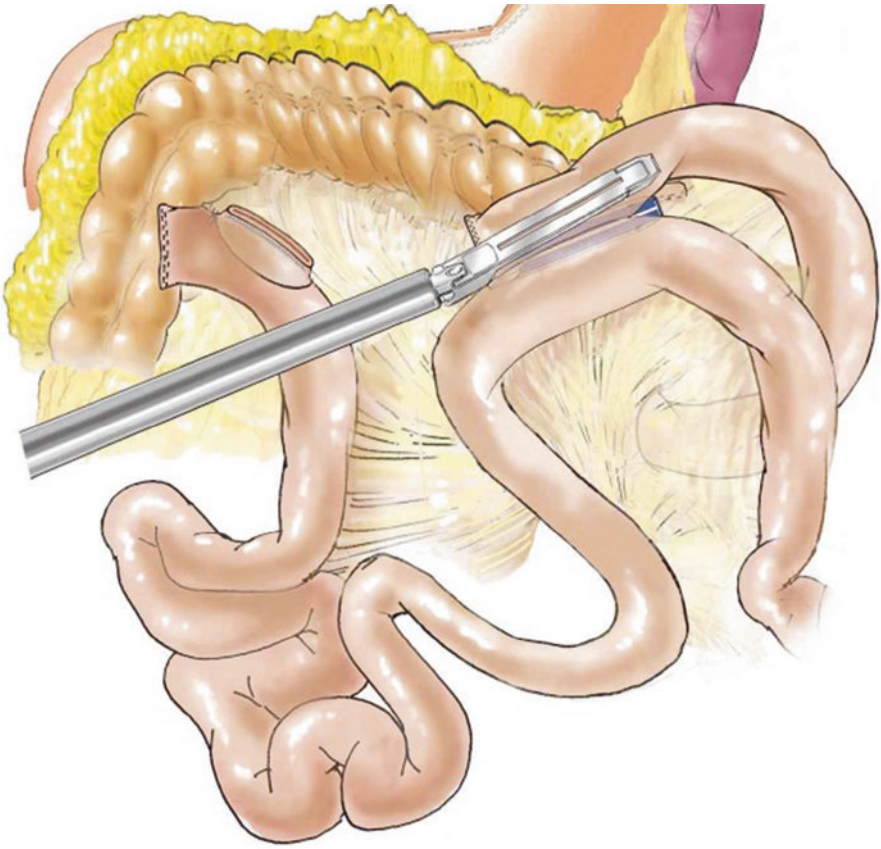

Fig. 36.6 Dismantling of the previous jejunojejunostomy

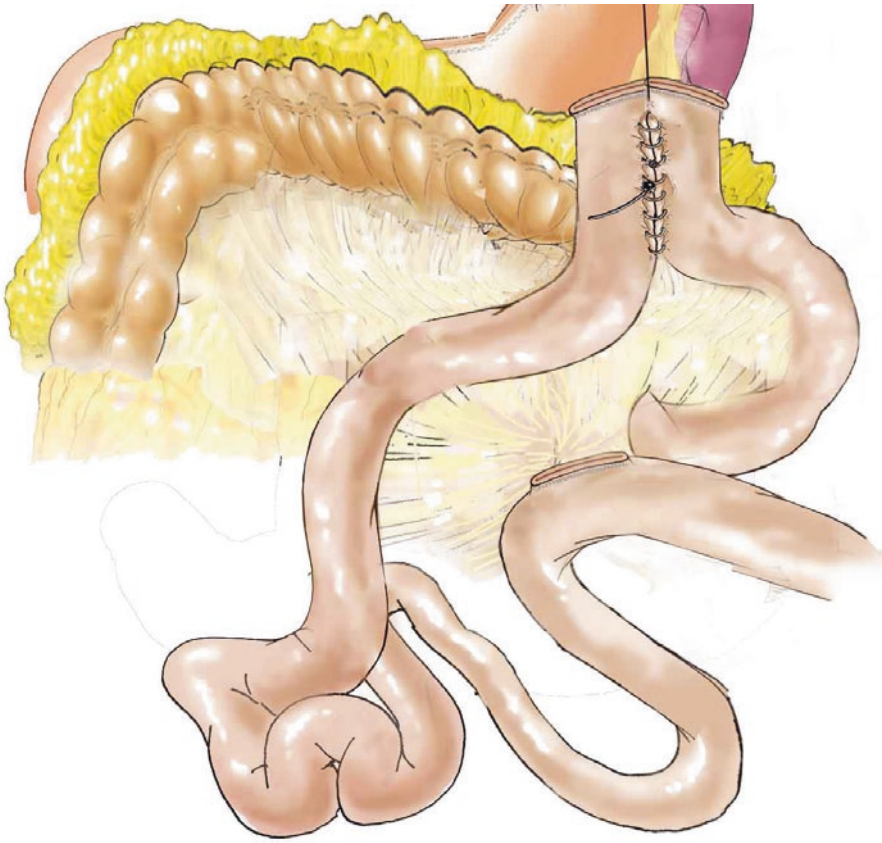

Fig. 36.7 Restoration of the small bowel continuity through a new jejunojejunostomy, performed between the previous alimentary proximal end and the previous biliary distal end

36.5 Conclusions

Laparoscopic conversion of RYGB to SG is a feasible and safe procedure to be considered in front of weight loss issues (either too much weight or too little weight loss), weight regain, dumping syndrome, or hyperinsulinemic hypoglycemia after RYGB. Moreover, this conversion can also be considered as the first step of the DS procedure, leaving the patients in better conditions.

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