

## Laparoscopic conversion of Roux-en-Y gastric bypass to biliopancreatic diversion

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### Abstract

**Background** This report describes the laparoscopic conversion of a Roux-en-Y gastric bypass (RYGBP) to biliopancreatic diversion (BPD).

**Case report** In January 1995, a 47-year-old woman with a body mass index (BMI) of 54 kg/m<sup>2</sup> benefited from a silicon ring vertical banded gastroplasty (SRVBG) for morbid obesity. She showed significant weight loss and reached a BMI of 30 kg/m<sup>2</sup>. After 7 years, she experienced weight regain (BMI, 34.5 kg/m<sup>2</sup>), so a laparoscopic conversion to RYGBP was proposed. The patient again had a successful weight loss (BMI, 26 kg/m<sup>2</sup>), but 6 years later, she mentioned a weight regain (BMI, 33 kg/m<sup>2</sup>) with invalidating retrosternal pain. The nutritionist's analysis of the patient showed a certain modification of the alimentary character with frequent meals (grazing/polyphagia), and the psychologist's consultation identified an important binge-eating disorder. A laparoscopic conversion of RYGBP to BPD was proposed. The procedure consisted of (1) adhesiolysis and reduction of a hiatal hernia, (2) sectioning of the gastric pouch proximally to the gastrojejunostomy, (3) resection of the fundus of the gastric remnant excluded by the previous SRVBG, (4) restoration of the continuity of the stomach between the gastric pouch and the gastric remnant, (5) resection of the gastric antrum and pylorus,

(6) deconstruction of the previous jejunojejunostomy, (7) restoration of the continuity of the small bowel, (8) measurement of the new common and alimentary limbs and construction of the jejunoileostomy, (9) closure of the mesenteric defect, (10) construction of the gastroileostomy, (11) closure of Petersen's space, and (12) repair of the hiatal hernia followed by a leak test.

**Results** The operative time was 320 min, and the blood loss was 380 ml. The patient had an uneventful recovery and was discharged on postoperative day 5. Her BMI was 30.5 kg/m<sup>2</sup> after 3 months and 26 kg/m<sup>2</sup> after 6 months. The barium swallow showed good transit through the gastrointestinal tract.

**Conclusions** The laparoscopic conversion of RYGBP to BPD is technically feasible and effective during the short term for cases of repeated weight regain.

**Keywords** Biliopancreatic diversion · Conversion · Gastric bypass · Weight regain

The increasing prevalence of excessive weight gain and obesity [1] is matched by an increasing number of surgical procedures to treat morbid obesity. Bariatric surgeons often are confronted with persistently obese patients after bariatric surgery who need revisional surgery for numerous reasons including inadequate weight loss or weight regain [2]. However, revisional procedures are associated with a higher risk of complications [3, 4].

The feasibility and safety of laparoscopy for revisional surgery have been documented [5], including laparoscopic conversion of Roux-en-Y gastric bypass (RYGBP) to original anatomy [6], or to other bariatric procedures such as duodenal switch (DS) [7]. Weight regain after RYGBP can be due to an increased volume intake because of gastric

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pouch dilation, gastrojejunostomy dilation, the appearance of gastrogastic fistula, enhanced capacity of the alimentary limb, or changes in eating behavior.

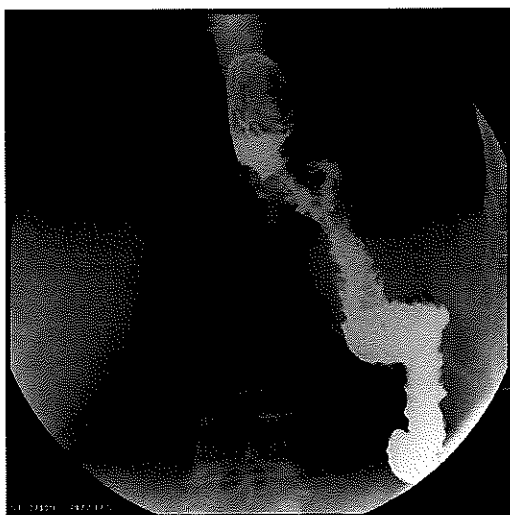
We report a laparoscopic conversion of RYGBP to biliopancreatic diversion (BPD) for a patient with weight regain due to a change in eating behavior.

### Case report

A 47-year-old obese woman with a weight of 146 kg and a body mass index (BMI) of 54 kg/m<sup>2</sup> underwent a silastic ring vertical banded gastroplasty (SRVBG) in 1995. She had a significant weight loss to 82 kg (BMI, 30 kg/m<sup>2</sup>), but after 7 years, she underwent conversion to a laparoscopic RYGBP because of a weight regain to 94 kg (BMI, 34.5 kg/m<sup>2</sup>). The RYGBP comprised a biliopancreatic limb measuring 75 cm and an alimentary limb measuring 150 cm. The gastric fundus, with the vertical stapling, was not resected but excluded together with the gastric remnant, and the silicon ring was left in place.

During the subsequent follow-up period, the patient lost weight to 70 kg (BMI, 26 kg/m<sup>2</sup>), but after 6 years she presented again with a weight regain to 89 kg (BMI, 33 kg/m<sup>2</sup>), together with degenerative joint disease in both knees. Moreover, she reported severe retrosternal pain. Barium swallow showed a complete migration of the gastric pouch into the mediastinum through a hiatal hernia, with a lifting up of the gastrojejunostomy to the level of the crura (Fig. 1).

A nutritionist's analysis of the patient noted that her weight increase was caused by frequent meals (grazing/polyphagia). The psychologist's consultation demonstrated



**Fig. 1** Preoperative barium swallow showing a complete migration of the gastric pouch and gastrojejunostomy into the mediastinum

an important eating disorder, namely binge-eating disorder [8], which in retrospect was already present at the time of the RYGBP. After multidisciplinary evaluation by the patient's psychologist, nutritionist, and surgeon, a laparoscopic conversion of RYGBP to BPD was proposed. The patient was thoroughly informed of the possible early postoperative complications as well as possible overall late sequelae without appropriate follow-up care, including the uncertainty of long-term weight loss.

### Operative procedure

The patient was positioned face up with legs and arms apart. The surgeon stood between the patient's legs, with the cameraman to the patient's right and the assistant to the patient's left. Six trocars were placed in the abdomen including a 11-mm trocar (for the 30° optical system) 20 cm distal to the xyphoid process, a 5-mm trocar on the left anterior axillary line and 5 cm distal to the costal margin, a 12-mm trocar on the left midclavicular line just between the 1st and the 2nd trocars, a 5-mm trocar on the right midclavicular line, a 5-mm trocar just distal and to the left of the xyphoid process, and a 5-mm trocar on the left side of the linea alba between the umbilicus and the pubis.

The sequence of the operation, as shown on the video, was:

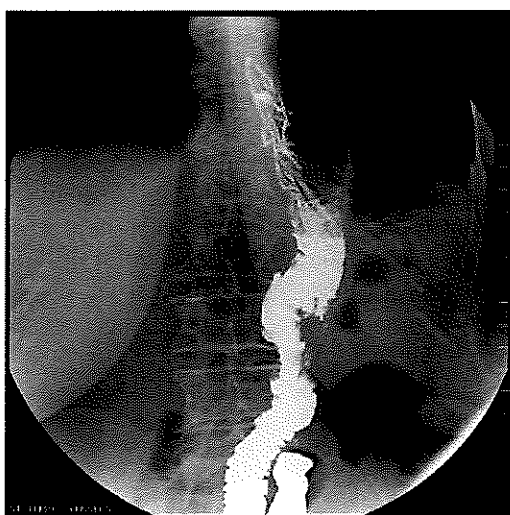
1. Adhesiolysis between the left liver lobe and the previous Roux-en-Y alimentary loop and reduction of the gastric pouch into the abdomen.
2. Sectioning of the gastric pouch proximally to the gastrojejunostomy with a firing of a linear stapler gold cartridge (Echelon 60; Ethicon Johnson & Johnson, Cincinnati, OH, USA).
3. Resection of the fundus of the gastric remnant excluded by the previous SRVBG, with two firings of the linear stapler gold cartridge.
4. Restoration of the continuity of the stomach between the gastric pouch and the gastric remnant through a hand-sewn anastomosis (two 1 polydioxane (PDS) running sutures).
5. Resection of the gastric antrum and pylorus as described in the BPD by Scopinaro et al. [9].
6. Deconstruction of the previous jejunoejunostomy by two firings of the linear stapler blue load.
7. Restoration of the small bowel's continuity by anastomosing the Roux-en-Y alimentary loop to the jejunum at the angle of Treitz using a hand-sewn jejunoejunostomy (two 2/0 PDS running sutures).
8. Measurement of the new common limb (75 cm) and alimentary limb (200 cm) and construction of the new jejunoeileostomy in semimechanical fashion (one

firing of the linear stapler white load and closure of the openings using two 2/0 PDS running sutures).

9. Closure of the mesenteric defect using polypropylene 1 purse-string suture.
10. Construction of an antecolic gastroileostomy in semimechanical fashion (one firing of the linear stapler blue load and closure of the openings with two 1 PDS running sutures).
11. Closure of the Petersen's space using 1 polypropylene purse-string.
12. Repair of hiatal hernia using two polypropylene 1 stitches.
13. Leak test of the gastroileostomy using air insufflated through the orogastric tube.

## Results

The operative time was 320 min, and the estimated blood loss was 380 ml. A nasogastric tube was left in place postoperatively. A liquid diet was started on postoperative day 2, and the patient was discharged on postoperative day 5. Her retrosternal pain was improved with complete resolution at 1 month. After 3 and 6 months, the patient was well, with weights of 80 and 69 kg and BMIs of 30.5 and 26 kg/m<sup>2</sup>, respectively. Appropriate nutritional support was given to the patient, and deficiencies were treated as they appeared according to three monthly blood values. A barium swallow after 6 months showed good transit through the gastrointestinal tract (Fig. 2).



**Fig. 2** Barium swallow at 6 months showing good transit through the gastrointestinal tract

## Discussion

Revisional procedures can be considered with the goal of treating malnutrition or enhancing the percentage of excess weight loss [10]. Changes in the patient's eating behavior are a frequent cause of weight regain after RYGBP. Due to limitations induced by Roux-en-Y construction, the patient in this study had become a grazer with polyphagia. With this clinical picture, the most effective option should be conversion of a hybrid restrictive and malabsorptive RY-GBP procedure to a primarily malabsorptive operation such as BPD, BPD with DS, or distal gastric bypass (DGBP) [11].

The possible conversion of RYGBP to DGBP [12, 13] was not proposed for our patient because obviously and from very beginning, she was affected by binge-eating disorder, which in our opinion precludes safe performance of DGBP. Her weight regain was caused by psychological decompensation, so we did not see maintenance of a small gastric volume as a good solution in this particular case. We did not consider conversion to DS because the vertical stapling of the previous SRVBG was still in place on the gastric remnant, which we thought would prohibit a safe performance of a sleeve gastrectomy [14]. Therefore, conversion of RYGBP to BPD was undertaken after multidisciplinary consultation.

Technically, the philosophy of completing more than one step working with the instruments in the same area guided the performance of the procedure. The continuity of the stomach was restored before resection of the antrum and pylorus, and a hand-sewn anastomosis was preferred due to the small size of the gastric pouch. The size of the stitches and needles used permitted a full-thickness suture without problems of sliding. Restoration of the small bowel's continuity by anastomosing the Roux-en-Y alimentary loop to the jejunum at the angle of Treitz permitted successive measurement of the common and alimentary limbs during the BPD. The jejunojejunostomy was dismantled by firings of the stapler, more of which were required on the biliopancreatic tract than on the alimentary limb because the biliary loop usually is dilated.

Finally the gastroileostomy was performed in an antecolic fashion to decrease traction between the ileum and the stomach. Reduction of the gastric pouch's intrathoracic migration seemed to resolve the patient's retrosternal pain.

The patient's weight loss was encouraging. Long-term follow-up assessment of patient's nutritional status is important due to the potential risk of protein-calorie malnutrition, fat-soluble vitamin deficiencies, and other deficiencies after BPD.

## Conclusions

For the reported patient with RYGBP, weight regain, and retrosternal pain, the laparoscopic conversion of RYGBP to BPD was challenging but technically feasible and effective at least for the short term.

**Disclosures** Giovanni Dapri, Jacques Himpens, and Guy Bernard Cadière have no conflicts of interest or financial ties to disclose.

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