

CASE SERIES

Laparoscopic Greater Curvature Plication for Morbid Obesity: Indications, Results, Perspectives

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Morbid obesity is an important health problem of our century. It is managed by diet, lifestyle changes and medication and surgery. Weight-loss surgery is the most effective treatment for morbid obesity, producing durable weight loss, improvement or remission of comorbid conditions and longer life. Bariatric surgery provides the best results in up to 75% of cases of severe obesity and obesity comorbidities. In the United States, over 200 000 patients benefit every year from bariatric procedures. That means there is a continuous evolving of the bariatric surgery. Bariatric surgery is metabolic surgery because it resolves or alleviates Type2 Diabetes, hyperlipidemia and hypertension. The most employed bariatric operations are Roux -en- Y gastric by-pass, adjustable gastric banding, biliopancreatic diversion and sleeve gastrectomy, each of them having shortage of long term results and safety. In the last eight years was introduced a new bariatric procedure, the gastric plication, in an effort to obtain similar weight loss with lesser complications and costs. We present our initial experience with 30 morbid obese patients who undergone laparoscopic gastric plication in our institution. The mean % Excess Weight Loss was 50% at 6 month and 65% at 12 month with important alleviation of comorbidities. The complications rate was 6.6% for major complications (but only in the first 6 cases) and 10% for minor complications.

Keywords: laparoscopic greater curvature plication, morbid obesity, sleeve gastrectomy, bariatric and metabolic surgery

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Introduction

There are six main bariatric procedures employed over the time: jejunoileal by-pass, Roux-en-Y gastric by-pass(RYGB), vertical banded gastroplasty, biliopancreatic diversion and duodenal switch, adjustable gastric banding and sleeve gastrectomy (SG). Biliopancreatic diversion and duodenal switch offers, in experienced hands, the best results in terms of excess weight loss (1), but also has a higher incidence of complications. Today RYGB and SG are the leading bariatric operations because they achieve 70-75% Excess Weight Loss (EWL) for RYGB and 65% for SG (2). In the last 10 years SG became approved as a primary bariatric procedure and as first stage procedure for super obese patients. In 2013-2014 SG represented the most performed bariatric operation in the United States (1). Also, a rival and a potential alternative to SG is the gastric plication or laparoscopic greater curvature plication (LGCP) (3), which was imagined and realized in developing countries as a cheaper version of the SG.

This operation was pioneered by the work of Wilkinson [3] and introduced in 2007 by Talebpour (4) in Iran. Animal experiments with gastric plication were done by Fusco (5) and Menchaca (6). LGCP is mimicking SG to obtain gastric restriction without resection and stapling. This is achieved by folding inwards the greater curvature using 2 or more rows with interrupted or running sutures.

Material and methods

Between 2013-2014 we operated 30 patients with morbid obesity. There were 27 women and 3 men, and the mean BMI was 47.65. Obesity comorbidities encountered were: hypertension, T2DM, obstructive sleep apnea, hepatic steatosis, hyperlipidemia. The patients undergone endocrine, gynecologic (females) and diabetes evaluation (multidisciplinary evaluation). We performed abdominal ultrasound examination but gastroscopy was not used routinely. All patients were informed about SG and LGCP and they chose to undergo the LGCP procedure. They received anticoagulants before the operation and one dose of antibiotic at the onset of the procedure. We applied the 2 row technique of gastric imbrication using a calibration probe of 36Fr. On the first postoperative day the patients run a gastrografin meal. They were discharged after 48-72 hours.

Surgical procedure

The position of the patients was in the so-called "French position", with the legs apart, the surgeon in between the legs and the assistants on each side of the legs. After using 5 trocars, the patients were placed in reverse Trendelenburg position, a position that provides a good access to the unfolded stomach (Figure 1). The procedure began with skeletonizing the great curvature of the stomach, on its first upwards and then downwards till 3-4 cm from the pylorus, using instruments like Ligasure or Enseal in order to facilitate a bloodless dissection. During the procedure, in order to avoid any accidental lesion of the gastric wall with subsequent perforation, it is extremely important to maintain a safety margin from the great curvature (Figure 2). Spleen

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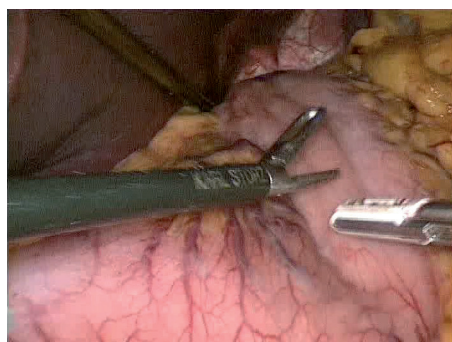


Fig. 1. The stomach unfolded (reproduced with permission from www.tratamentobezitate.ro)

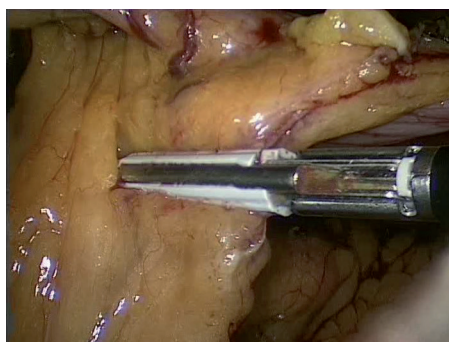


Fig. 2. Safety margin on the greater curvature (reproduced with permission from www.tratamentobezitate.ro)

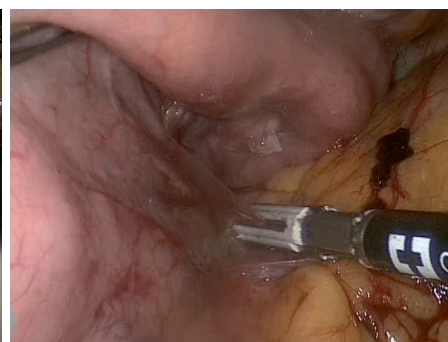


Fig. 3. Dissection of the posterior wall (reproduced with permission from www.tratamentobezitate.ro)

is another organ close to the operating field and avoidance of any lesion of the spleen, using a superior limit of the dissection at 2 cm from the angle of Hiss, is also necessary during the severance of the short gastric vessels.

The plication is performed at 2 cm from the angle of Hiss (Figure 3), to preserve the anti reflux anatomy and to prevent the obstruction of the cardia by the gastric fold (Figure 4). The great curvature of the stomach was than imbricated and the suture points were placed at 2cm distance each (Figure 5). The first row ends at 4 cm from the pylorus and after the second row we obtain an aspect similar to GS, however with a significantly more pronounced stability (Figure 6), without requiring any fixation to the omentum. The leak test with methylene blue is performed at the end of the procedure, to check the results, and a thin naso-gastric tube is placed together with a drain at the left side of the stomach. Postoperatively, the patient follows a dietary plan according to the recommendations of the nutritionist.

Results

A total of 30 patients (27 women and 3 men) were operated between 2013-2014. The mean BMI was 47.65 (36-72). Comorbidities encountered: hypertension, T2DM, obstructive sleep apnea, hepatic steatosis, hyperlipidemia. The inclusion criteria were: BMI > 40 or BMI > 35 with one or more comorbidities. The mean operative time was 95 min. Major complications, leak from gastric perforation with peritonitis in 1 case and obstruction at the *incisura*

angularis in 1 case (6.6%), needed reoperation. These complications occurred only in the first six patients (learning curve). In the case of the gastric perforation the patient was a male who disobeyed the recommendations and eat solid food in postoperative day 2, followed by severe vomiting. It needed reoperation, suture of the perforation and partial reversion of the plication. In the second case the last imbricating suture produced an obstruction at the antrum (*incisura angularis*), causing prolonged vomiting and lack of evacuation on the gastrografen meal. The problem was solved laparoscopically by cutting off the last stitch. No major complications occurred in the following 24 cases. Minor complications (10%) were nausea and vomiting - 2 cases, gastrointestinal bleeding - 1 case, all being treated conservatively. In terms of mean %EWL, the result at 6 month was 50% and 65% at 12 month with important alleviation of comorbidities.

Discussions

In the recent years although laparoscopic sleeve gastrectomy (SG) tends to be the predominant bariatric operation, a new procedure emerged, named gastric plication (laparoscopic greater curve plication –LGCP), named also as: gastric imbrication, total gastric folds, greater curve inversion surgery or WRAP (weight reduction assistance procedure). After the First International Meeting, Defining the State of the Art (Barcelona, 2011), the most used term for gastric plication is laparoscopic greater curve plication. Its aim is to obtain the good results of SG in terms of weight loss



Fig. 4. First row of plication (reproduced with permission from www.tratamentobezitate.ro)

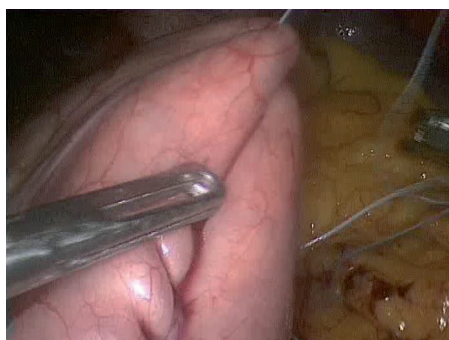


Fig. 5. Second row of plication (reproduced with permission from www.tratamentobezitate.ro)

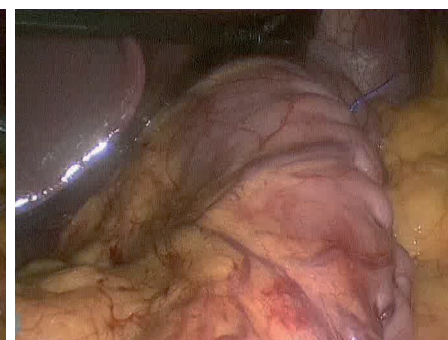


Fig. 6. Final aspect of the imbricated stomach (reproduced with permission from www.tratamentobezitate.ro)

with less complications and lower costs. The main concern regarding SG are the leaks from the stapling line, bleeding and the irreversibility of the procedure, along with the worsening of GERD symptoms. The low rate of complications, lower cost and reversibility after LGCP makes this operation appealing (7). Gastric plication appeared first in the work of Wilkinson and Peloso in 1981 and was popularized by Talebpour in 2007. The feasibility of gastric plication was demonstrated on animal models by Fusco and Menchaca. Since then an increasing number of publications on gastric plication showed the wide spreading of this procedure. After the initial articles of Talebpour, Skrekas (8), Andraos (9), Ramos (10), Lopez-Corvala (11) which described no more than 135 patients each, today we have impressive series of 800-900 and even 1000 patients, published by Talebpour (12), Sales (13) and Fried, Dolezalova (14) in which % EWL is 70% at 24 month and 55% after 5 years (12). The possible advantages of LGCP are: no stapling line, no foreign bodies, no gastric resection (less vitamin deficiency), potentially reversible (at least in the first weeks), less complications. The procedure is cost effective and last but not least, is the patient's option.

An important lesson to be learned from the series yet published, is that the best results are for patients with BMI < 45, women, highly motivated.

In patients with hiatal hernia and BMI between 30 and 35, is possible fundoplication and plication of the rest of the stomach (15).

Complications described in the literature after LGCP are: portomesenteric thrombosis with jejunal necrosis, gastric perforation, gastric obstruction due to herniation of the fundus, micro leak at the suture line, liver hematoma, intragastric seroma with obstruction, gastrointestinal bleeding, non obstructive jaundice, hypocalcaemia, persistent nausea and vomiting, bleeding (9).

Modification of the surgical technique by making two or more folds instead of one can alleviate the vomiting and nausea which can be troublesome (8). Also using devices as Endo-Flip to shape the stomach and suture materials as V-loc can lead to better outcomes and shorter operating times.

Conclusions

Laparoscopic gastric plication (LGCP) is a new and promising bariatric, metabolic, procedure. Selection of the patients for LGCP is very important to achieve good results (BMI<45).

Modification of the surgical technique (2 or more folds) can alleviate the vomiting and nausea which are common after LGCP. Further studies and long term results (5 years) are needed to compare gastric plication with other bariatric operations, especially with gastric sleeve.

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