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Original article

Laparoscopic greater curvature plication: surgical techniques and early outcomes of a Chinese experience

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Abstract

Background: Laparoscopic greater curvature plication (LGCP) is a novel restrictive bariatric procedure that can reduce the gastric volume by infolding the gastric greater curvature without gastrectomy. The objective of this study was to describe the surgical technique of LGCP and validate the efficacy and safety of LGCP for the treatment of obesity in obese Chinese patients with a relatively low body mass index (BMI).

Methods: Twenty-two obese patients (mean age 33.8 ± 6.0 years; mean BMI 37.0 ± 7.0 kg/m^2) underwent LGCP between September 2011 and September 2012. After dissecting the greater omentum and short gastric vessels, the gastric greater curvature plication with 2 rows of non-absorbable suture was performed under the guidance of a 32-F bougie. The data were collected during follow-up examinations performed at 1, 3, 6, and 12 months postoperatively.

Results: All procedures were performed laparoscopically. The mean operative time was 84.1 minutes (50–120 min), and the mean length of hospital stay was 3.8 days (2–10 d). There were no deaths or postoperative major complications that needed reoperation. The mean percentage of excess weight loss (% EWL) was 22.9% ± 6.9%, 38.6% ± 9.8%, 51.5% ± 13.5%, and 61.1% ± 15.9% at 1, 3, 6, and 12 months postoperatively. At 6 months, type 2 diabetes was in remission in 2 (50%) patients, hypertension in 1 (33.3%) patient, and dyslipidemia in 11 (78.6%) patients. Decreases in the index for homeostasis model assessment of insulin resistance (HOMA-IR) and in insulin and glucose concentrations were observed.

Conclusions: The early outcomes of LGCP as a novel treatment for obese Chinese with a relatively low BMI are satisfactory with respect to the effectiveness and low incidence of major complications. Additional long-term follow-up and prospective, comparative trials are still needed. (Surg Obes Relat Dis 2013;▮:00-00.)

Keywords: Greater curvature plication; Laparoscopic bariatric surgery; Morbid obesity; Restrictive procedure

It is estimated that >1.7 billion people in the world are overweight and obese. Because of a considerable socio-economic transition in the past 3 decades, many developing countries also face a growing concern with obesity and related diseases. Morbid obesity is the harbinger of many other diseases that affect essentially every organ system and reduce life expectancy [1]. In addition, Asian populations have been shown to have an elevated risk of type 2 diabetes

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mellitus (T2 DM), hypertension, and hyperlipidemia at a relatively low level of body mass index (BMI) [2].

Laparoscopic greater curvature plication (LGCP) is an emerging restrictive bariatric procedure and has shown promise for the treatment of obesity [3]. Subgroup analyses of prior LGCP studies [4,5] have shown that the preoperative body mass index (BMI) is a predictor of weight loss. It was found that patients with a lower BMI lost more weight and had a higher percentage of excess weight loss (%EWL) compared with those with a higher BMI. Current evaluation of the benefits of weight-reduction surgery remains at the level of whether it is effective for all grades of obesity. However, risks and benefits of bariatric surgery are different in patients with different grades of obesity. It is, therefore, worth considering whether it is possible to use different surgical bariatric procedures for patients with different grades of obesity to achieve the maximum cost-effectiveness. LGCP is relatively inexpensive, because it does not need an implant or require gastric stapling. However, previous studies [4,5] found that LGCP was not as effective in obese patients with a relatively high BMI as in those with a relatively low BMI. This article reports the surgical technique and early outcome of LGCP as a primary restrictive procedure in an obese Chinese population with a relatively low BMI.

Methods

Patients

The inclusion criteria were patients with BMI >35 kg/m^2 who had no co-morbidities or patients with BMI >30 kg/m^2 with inadequately controlled T2 DM or the metabolic syndrome. The upper limit of BMI was set at <45 kg/m^2. Patients were invited to attend preoperative seminars conducted by our surgeons. All patients underwent a multidisciplinary evaluation including internists, psychiatrists, and surgeons. Blood tests, abdominal ultrasonography, and upper endoscopy were performed preoperatively. The study design was a noncomparative case series that received approval from the hospital ethics committee. All patients gave written informed consent and acknowledged the study and the risks as well as benefits of the procedures.

There were 22 patients (16 female and 6 male) enrolled between September 2011 and September 2012, with a mean age of 33.8 $\pm$ 6.0 years and a mean BMI of 37.0 $\pm$ 7.0 kg/m^2 (40.9% <35 kg/m^2; 36.4% ≥ 35 kg/m^2 but <40 kg/m^2; 22.7% ≥ 40 kg/m^2 but <45 kg/m^2). Preoperative co-morbidities included 4 patients with T2 DM, 3 with hypertension, 14 with dyslipidemia, and 1 with sleep apnea (Table 1). The median T2 DM duration was 2 years (range1–4). Of these 4 patients, 4 required oral hypoglycemic agents and none required insulin treatment.

Surgical procedures

The patient's position and trocar placement were previously described [6]. Using a Harmonic Scalpel (Ethicon Endosurgery, Cincinnati, OH), the omentum and the gastroepiploic vessels were dissected from the greater curvature, starting at 3–4 cm from the pylorus and continuing up to the left crus of the hiatus. The short gastric vessels, posterior gastric vein, and posterior gastric attachments were carefully divided. The anesthesiologist passed a 32-F bougie toward the pylorus, under the guidance of which a row of 8–10 extramucosal interrupted stitches of 2-0 Ethibond (Ethicon, Inc., Somerville, NJ) sutures was placed just below the angle of His and continued distally to 3–4 cm of the pylorus. The second row of an extramucosal running suture line of 2-0 Prolene (Ethicon, Inc., Somerville, NJ) was used to further invaginate and narrow the stomach (Fig. 1). A regular gastric tube (12-F) replaced the 32-F bougie at the end of the operation.

Table 1
Preoperative patient characteristics

Characteristics	Value, mean $\pm$ SD (N = 22)
Age (yr)	33.8 $\pm$ 6.0
Gender (n, %)	
Male	6 (27.3)
Female	16 (72.7)
BMI (kg/m^2)	37.0 $\pm$ 7.0
BMI ≥ 30, and <35, n (%)	9 (40.9)
BMI ≥ 35, and <40, n (%)	8 (36.4)
BMI ≥ 40, and <45, n (%)	5 (22.7)
Comorbidities (n, %)	
Type 2 diabetes mellitus	4 (18.2)
Hypertension	3 (13.6)
Dyslipidemia	14 (63.6)
Sleep apnea	1 (4.5)

BMI = body mass index.

Postoperative course

Antispasmodic hyoscine, antiemetics, and proton-pump inhibitor were administered intravenously postoperatively. Ambulation was encouraged, and chest physiotherapy instituted in the immediate postoperative period. Clear liquids were started on the second postoperative day, and the nasogastric tube was removed when the patient no longer vomited after clear liquids.

The patient was discharged when an oral intake of 2000 mL every 24 hours was established. Discharge orders included dietary progression to a semi-liquid diet after 15 days and solid food after 30 days, and a daily single-dose proton pump inhibitor for 30 days.

Follow-up

All patients were scheduled for follow-up at 1, 3, 6, and 12 months postoperatively. Data on postoperative complications, feeling of hunger, BMI loss, %EWL, and improvement in insulin resistance and co-morbidities were analyzed. Examinations of insulin, glucose, total cholesterol (TC), triglycerides (TG), HDL, and LDL were performed at 6