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Research Article

The Effect of Laparoscopic Greater Curvature Plication on Weight Loss and Type 2 Diabetes

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Abstract

Background: The field of bariatric surgery is continually evolving. Laparoscopic greater curvature plication (LGCP) is a new surgical technique that falls into the restrictive procedure category & has quickly gained interest in the bariatric community.

Objectives: In the present study, we aimed to demonstrate the feasibility, safety, and efficacy of laparoscopic gastric plication as restrictive procedure on weight loss and type 2 diabetes.

Patients and Methods: This is a prospective study included Fourty obese patients (22 females and 18 males aged 29-50) were enrolled in this study and they were subjected to LGCP. The study was carried out in the surgical department of El Fayoum University Hospital from September 2013 to July2016. The study comprises 40 morbidly obese patients (BMI 42-57). LGCP offers rapid weight loss without gastric resection or an implanted device, and this is likely to appeal to many patients.

Results: The patients mean preoperative BMI was 44.3 ± 5.5 kg/m^2 , the mean oprative duration was 66 ± 15.2 min, the mean length of hospital stay was 48.2 ± 2.5 h, and the average BMI at 6 months was 22.3 ± 2.5kg/m^2. Of 22 type II diabetes mellitus patients, 18 (81.8%) became normoglycemic.

Conclusion: LGCP is feasible, safe, and effective in the short term as a promising bariatric procedure, with high rate of success & improvement of co-morbidities like type 2 diabetes & low rate of complications.

Introduction

It has been found that loss of weight is associated for T2DM resolution in purely restrictive bariatric surgery [1,2].

In 2006 Laparoscopic greater curvature plication (LGCP) was introduced by Talebpour and Amoli [3] in Iran. In 2012 Kourkoulos, et al. [4] and Talebpour, et al. [5] believed that laparoscopic gastric plication (LGP) is less invasive and more conservative, with lower risk for complications such as leakage compared with stapler resection procedures and with reversible potency.

The aim of the current study was to investigate the impact of weight loss following laparoscopic greater curvature plication (LGCP) on type 2 diabetes.

Patient and Methods

This is a prospective study included Fourty obese patients (22 females and 18 males aged 29-50) were enrolled in this study and they were subjected to LGCP. The study was carried out in the surgical department of El Fayoum University Hospital from September 2013 to July 2016. The study comprises 40 morbidly obese patients (BMI 42-57) indicated . All surgical procedures were carried out according to the National Institute of Health's (NIH) inclusion criteria for bariatric surgery (cases with BMI > 40 kg/m^2 or over 35 kg/m^2 with at least one comorbidity) and signed approvals were taken from all patients. Steady body weight for all patients was confirmed for 4 months before the study. We included patients who are psychologically stable with no endocrinal causes for obesity and accepting surgery, we excluded pregnant or breast feeding females, psychologically unstable patients and any patient suffers from significant long standing heart/lung disease or other severe systemic disease.

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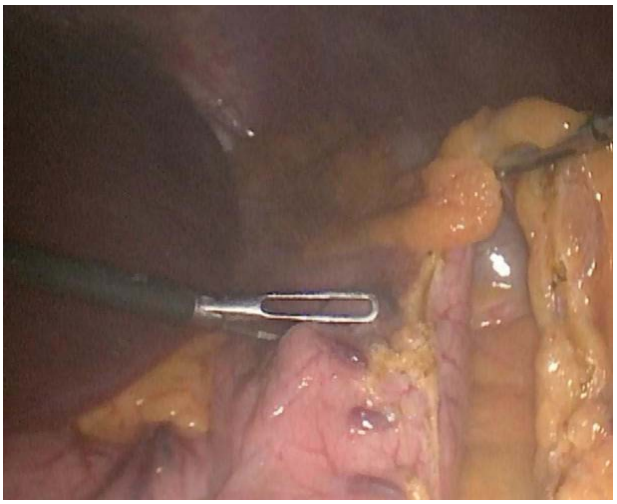

Figure 1: Showing division of the vascular supply of the greater curvature of the stomach

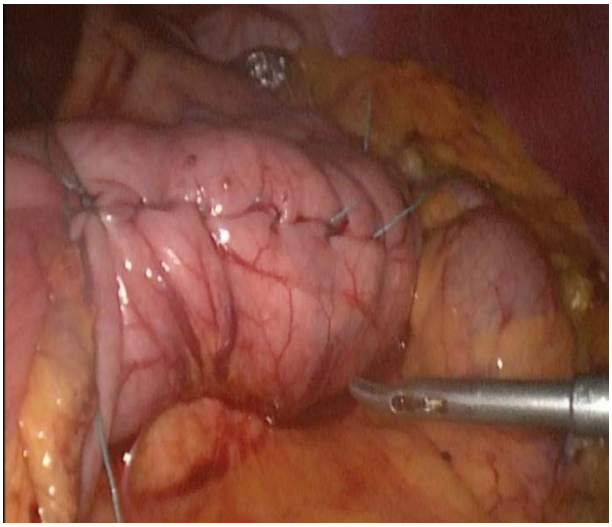

Figure 2: The stomach after plication

Surgical technique

The LGCP procedure was done under general anesthesia. The procedure was initiated by dividing the greater curvature blood supply by the Harmonic scalpel distally until reaching the pylorus and then proximally until reaching the angle of his**.** A window was dissected at the junction of the greater curvature and the greater omentum, division of the gastroepiploic, short gastric (1cm) away from greater curvature of the stomach; and posterior fundic vessels was done starting at 4 cm proximal to the pyloric ring all the way until the angle of His using the ultracision Harmonic scalpel (Harmonic; Ethicon Endosurgery, Cincinnati, OH, USA) (Figure 1).

Afterwards, folding of the stomach into itself over a 36-Fr bougie was introduced orally by the anesthesiologist through the esophagus and inside the stomach .The surgeon then guided it along the lesser curvature and into the pyloric channel and duodenal bulb.

Then, applying a first row of extramucosal stitches of 2-0 Ethi bond (ETHIBOND® EXCEL Polyester Sutures, ETHICON). This first row was used as a guide for the creation of another one with extramucosal running suture lines of 2-0 Ethi bond (Figure 2). We injected intraoperatively methylene blue (through the nasogastric tube) to check for any leakage.

The patients were on intravenous fluids for the first 24hours, on clear fluids for 1 week and semiliquids for 3 weeks, solid food was allowed after 4 weeks postoperatively and a further follow-up was carried out. Blood samples for the measurement of FBS, HbA1C preoperatively and postoperatively with follow up for 6 months.

Statistical analysis

Differences between means and the effects of treatments were determined by one-way ANOVA using Tukey's test, $P<0.05$ was considered statistically significant.

Results

The patients mean preoperative BMI was 44.3 ± 5.5 kg/m^2 (range 37.5-67.2 kg/m^2), the mean oprative duration was 66 ± 15.2 min, the mean length of hospital stay was 48.2 ± 2.5 h, and the average BMI at 6 months was 22.3 ± 2.5kg/m^2 (range 20.5 - 28.2 kg/m^2). Of 22 type II diabetes mellitus patients, 18 (81.8%) became normoglycemic. Mean pre operative HbA1C for 22 patients 8.4 ± 9.22 range (7.9-10.5%) Mean post operative HbA1C for 18 patients 4.6 ± 16.2range (3- 6%) $p<0.05$ with resolution of diabetes in 18 patients (81.8%), 13 of them were receiving insulin only, 9 were controlled with oral hypoglycemic medications only. Of the 13 patients receiving insulin, 11 showed a return to normal glucose level without any medication at 6months after surgery. Of the 9 patients receiving oral medications, 7 became normoglycemic without medications. Oral glucose tolerance test was performed for the normoglycemic patients after 6 months postoperatively and was negative. In four diabetic patients a better glycemic control at the 6-months and 12-months visits (Table 1). Minor postoperative complications in the form of nausea and vomting in 6 % of patients which were treated medically. No nutritional deficiencies or anemia was reported in this study.

BMI (preoperative) [kg/m^2]	44.3 ± 5.5 kg/m^2 (range 37.5-67.2 kg/m^2).
BMI (postoperative) [kg/m^2]	22.3 ± 2.5 kg/m^2 (range 20.5-28.2 kg/m^2).
Weight loss [%] after 6 months	58.2 ± 3.2 (range 41.3-62.2%).
Mean (preoperative) HbA1C (%)	8.4 ± 9.22 range (7.9-10.5%)
Mean ((postoperative) HbA1C (%)	4.6 ± 16.2 range (3-6%)

Data are expressed as mean values ± SD (standard deviation).

Table 1: Patients characteristics

Discussion

Obesity is a multifactorial disease that is associated withincreased risk of numerous chronic d iseases including Type2 diabetes and cardiovascular disease [6].

In our study, LGCP showed satisfactory weight loss, which is consistent with other findings [7]. Moreover, there were no major complications, contrasting with other surgical procedures which showed leakage and bleeding [7,8].

In our study the EWL% for the patients at 3months was 40

± 5.4% and at 6 months was 58.2 ± 3.2%. Talebpour and Amoli [7], Ramos, et al. [4], and Brethauer, et al. [9] reported that LGCP provided effective surgical weight loss at 12 months that, on average, was greater than 50% EWL. we discovered that LGCP is accompanied with a high rate of resolution of T2DM at 6 months after surgery; of 22 type II diabetes mellitus patients, 18 (81.8%) became normoglycemic. The effect is caused by a decrease in insulin resistance due to weight loss and also caloric restriction more than due to increase insulin secretion [10]. No nutritional deficiencies or anemia was reported in this study.

LGCP provided effective surgical weight loss at 6 months, especially in those with BMI less than 45.

Conclusion

LGCP- surgery is so effective in short term weight loss and in T2DM resolution.

Acknowledgments

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