ELSEVIER

CrossMark

Surgery for Obesity and Related Diseases 12 (2016) 1305–1311

SURGERY FOR OBESITY AND RELATED DISEASES

Original article

Effectiveness of laparoscopic sleeve gastrectomy for weight loss and obesity-associated co-morbidities: a 3-year outcome from Mainland Chinese patients

Xin Wang[a,b,1], Xu-sheng Chang[c,1], Lin Gao[d,1], Cheng-zhu Zheng[a], Xin Zhao[a], Kai Yin[a,*], Guo-en Fang[a,*]

[a]*Department of General Surgery, Changhai Hospital, The Second Military Medical University, Shanghai 200433, China*
[b]*Department of Gynaecology and Obstetrics, The 306 Hospital of PLA, Beijing 100037, China*
[c]*Department of General Surgery, Yancheng City First People's Hospital, Jiangsu 224000, China*
[d]*Department of Pathology and Pathophysiology, Dalian Medical University, Liaoning 10008, China*

Abstract

Background: Laparoscopic sleeve gastrectomy (LSG) is becoming a stand-alone bariatric surgery for obesity, but its effectiveness for Mainland Chinese patients remains unclear.
Objectives: To evaluate the effectiveness and safety of LSG for Mainland Chinese patients
Setting: A tertiary hospital
Methods: Retrospective analysis of patients admitted for LSG between January 2011 and February 2012 was performed. Medium-term outcome measures were: total weight loss (%TWL), excess weight loss (%EWL), co-morbidities, improvement, and complications.
Results: Seventy patients (body mass index [BMI] 40.8 ± 5.9 kg/m^2) underwent LSG, comprising 40 women and 30 men. The most common co-morbidity was diabetes (n = 29, 41.4%). Lost to follow-up rate for weight loss was 15.7%, 31.4%, and 41% at 1, 2, and 3 years. The %TWL was 34.4 ± 6.1, 34.7 ± 6.2 and 33.7 ± 7.1 at 1, 2, and 3 years. The %EWL increased to 77.1 ± 13.0, 77.9 ± 12.2 and 77.2 ± 13.1 at 1, 2, and 3years. The proportions of patients having successful weight loss were 100% or 85% at 3 years according the definition of %TWL >10% or %EWL >50%. Approximately 79.3%, 51.7%, and 44.8% of patients completed follow-up for glycemic control at each time point, respectively. The proportions of patients with optimal glycemic control (fasting blood glucose [FBG] <5.6 mmol/L; hemoglobin A1C [HbA1C] <6.5%) were 47.9%, 60.0%, and 69.2% at 1, 2, and 3years. The weight loss and glycemic control effect may be greater in the high BMI group (≥40 kg/m^2). Early and late complications occurred in 8.6% and 7.1% of patients during follow-up.
Conclusions: LSG is effective in weight loss and glycemic control and is safe for Mainland Chinese obese patients, especially for patients with a BMI ≥40 kg/m^2. (Surg Obes Relat Dis 2016;12:1305–1311.)

Keywords: laparoscopic sleeve gastrectomy; obesity; Mainland Chinese patients

Under the prevailing sedentary lifestyle conditions today, obesity has gradually become a prevalent public health problem worldwide. According to the estimate of the World Health Organization, there are approximately 700 million people who are obese in 2015 [1]. China has also been experiencing a mounting epidemic of obesity, showing a

*Correspondence: Dr. Guo-en Fang and Kai Yin, Department of General Surgery, Changhai Hospital, The Second Military Medical University, Shanghai 200433, China.
E-mail: guodhhdhf@163.com; kyin67@126.com
[1]These authors contributed equally to this work.

http://dx.doi.org/10.1016/j.soard.2016.03.004

rise in incidence from 1.8% in 1981 to 7.5% in 2010 [2]. As obesity increases the likelihood of various common chronic diseases, including type 2 diabetes mellitus (T2DM), hypertension, cardiovascular diseases, and various cancers, ultimately leading to death, an investigation of the approaches to promote weight loss and prevent the disease development has become an issue of broad current interest.

Lifestyle interventions (including diet, physical activity, and behavior therapy) are traditional treatment strategies for obese patients [3]. However, the high failure rate (95%) in the long term contributes to the need for a more effective approach (e.g., bariatric surgery) [4]. Laparoscopic sleeve gastrectomy (LSG) is a bariatric procedure that can induce weight loss mainly by reducing gastric capacity and changing hormone (ghrelin and obestatin) secretion to limit food intake and appetite [5]. LSG was initially performed as the first part of a 2-step approach in super-obese (body mass index, BMI >50 kg/m^2) patients [6]. In recent years, LSG has been established as a primary and reliable bariatric procedure for its favorable outcomes [7–9]. However, reports about the efficacy of LSG in Chinese patients are still few in number [10,11].

The goal of this study was to retrospectively evaluate the medium-term outcomes of Mainland Chinese patients who underwent LSG as a primary bariatric procedure in terms of perioperative outcomes, weight loss, and co-morbidity improvements over 36 months of postoperative follow-up.

Methods

Data collection

After institutional review board approval and written informed consent obtained from all patients, a retrospective review of the electronic database of all morbidly obese patients treated with LSG as a primary bariatric surgery in the General Surgery Department of Changhai Hospital of the Second Military Medical University in China between January 2011 and February 2012 was performed. Eligibility criteria for LSG were as follows: (1) BMI ≥ 30 kg/m^2 without associated co-morbid conditions; (2) BMI >28 kg/m^2 with at least 1 high-risk co-morbidity and unsuccessful medical treatment attempts; (3) having T2DM diagnosed by at least one of the following criteria: fasting blood glucose (FBG) ≥ 7.0 mmol/L; blood glucose after 2 hours ≥ 11.1 mmol/L on oral glucose tolerance test (OGTT); random finger stick glucose ≥ 11.1 mmol/L; glycosylated hemoglobin (HbA1C) $\geq 6.5\%$; (4) age between 16 and 60 years; (5) absence of chronic medical or psychiatric illness, substance abuse, and previous gastrointestinal surgery; and (6) willingness to accept allocation to LSG. The database included patients' preoperative demographic characteristics [age, sex, body weight (BW), BMI (kg/m^2), and obesity-related co-morbidities], operative time, conversion to open technique, surgical complications during or within 30 days after surgery as well as postoperative follow-up data including total weight loss (%TWL), excess weight loss (%EWL), fasting glucose (g/dL) and HbA1C (%) at 1, 3, 6, 12, 24, and 36 months, respectively. The %TWL was calculated using the formula: (weight loss / the initial weight) $\times$ 100. The %EWL was calculated using the formula: (weight loss / baseline excess weight) $\times 100$, where weight loss = preoperative weight $-$ initial weight; baseline excess weight = initial weight $-$ ideal weight (X), and where X = 23 $\times$ m^2. X was calculated using an ideal BMI, as the ideal BMI cutoff point has been demonstrated to be 23 kg/m^2 [12].

Surgical procedure

LSG surgery was performed by 3 surgeons experienced in bariatric surgery using a 5-trocar laparoscopic technique with the surgeon standing on the right side of the patient as previously described [13]. The greater curvature of the stomach was divided using a Harmonic scalpel (Ethicon Endo-surgery, Cincinnati, OH, USA) from the distal antrum (4 cm proximal to the pylorus) to the gastroesophageal junction, taking special care to expose the left crus and completely dissect the gastric fundus. A 36-Fr bougie was inserted transorally along the lesser curvature to calibrate the sleeve. Four to five 60-mm endoscopic staples (Echelon Endopath™ stapler, Ethicon Endo-surgery, Cincinnati, OH, USA) were fired to transect the excess stomach. Green, gold, and blue cartridges were used, depending on the thickness of the stomach. The stapler line was reinforced with a running absorbable suture. The transected gastric specimen was retrieved via a port site. This port site was closed at the sheath with an absorbable multifilament suture. The gastric tube was inserted, and the abdominal cavity drainage tube was placed.

Perioperative management and follow-up

On the second day after surgery, the patients could drink a little water and were administered intravenous rehydration according weight. On the third day, upper gastrointestinal iodine water contrast examinations were performed to exclude abnormalities. The stomach tube was unplugged after that and a liquid diet was administered. The peritoneal drainage tube was removed when the volume of peritoneal drainage was less than 15 mL. After a week, indicators were reviewed including weight, waist and hip circumference, fasting blood glucose, HbA1C, fasting lipids, and serum insulin. After 2 weeks, patients were permitted to eat a semi-solid diet and were gradually advanced to a normal diet over the following 2-4 weeks.

Outpatient follow-up visits were performed at 1, 3, 6, and 12 months after surgery followed by annual follow-up communication via outpatient visit, telephone call, and e-mail.

Statistical analysis

Statistical analysis was performed using SPSS 19.0 for Macintosh (SPSS, Inc., Chicago, IL, USA). Data are