

Laparoscopic sleeve gastrectomy for morbid obesity

Our initial experience



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AIM OF THE STUDY: *The outcomes and initial results of laparoscopic sleeve gastrectomy (LSG) were evaluated at our Institution.*

METHODS: *A retrospective analysis of the initial 6 patients who underwent laparoscopic sleeve gastrectomy (LSG), between November 2006 and May 2008, was performed. The aim of this study was to assess the safety and short-term efficacy of LSG as a treatment option for weight reduction. Data collected included operative time, postoperative complications, length of hospital stay and degree of weight reduction.*

RESULTS: *Our 6 morbidly obese patients, who underwent LSG had an average preoperative BMI 58.2 kg/m². There were 2 women and 4 men, with mean age 45 (range 41 to 55 years). Indication for LSG was related to BMI, high perioperative risk, and body habitus for five patients. One patient underwent LSG as an alternative to laparoscopic adjustable gastric banding (LAGB). Mean operative time was 2 hours (range 1.5-2.5). We had no conversion to open procedure. There were neither postoperative complications nor mortality. Median hospital stay was 2 days. For our first 4 patients Average %EWL and BMI were 24 % and 44.5 kg/m² at 6 months and % 31.2 and 41.2 kg/m² at 1 year respectively. No patients have subsequently undergone a second-stage procedure.*

CONCLUSIONS: *In our initial experience, LSG is a safe and effective treatment option for the high-risk and super super-obese patient. Follow-up will be necessary to evaluate long-term results when performed as single stage operation for morbid obesity.*

KEY WORDS: Bariatric surgery, Ghrelin, Glucagon-like peptide 1, Morbid obesity, Peptide YY, Sleeve gastrectomy, Surgery, Weight loss.

Introduction and Background

In recent years there has been a strong interest in the surgical treatment of morbid obesity in concomitance with the epidemic of obesity. Bariatric surgery proved effective in providing weight loss of large magnitude, correction of comorbidities and excellent short-term and long-term outcomes, decreasing overall mortality and providing a marked survival advantage.

Laparoscopic Roux-en-Y gastric bypass (LRYGBP) and laparoscopic adjustable gastric banding (LAGB) are the most commonly performed surgical procedures for weight reduction in the United States ². Super-superobese patients (body mass index >60 kg/m² present a special subgroup among the obese population due to the higher incidence of severe comorbidities and increased technical difficulties in perioperative management ³.

The optimal surgical approach still remains controversial.

Laparoscopic biliopancreatic diversion (LBDP) with distal gastrectomy (DG), Laparoscopic Roux-en-Y gastric bypass (LRYGBP) and Laparoscopic sleeve gastrectomy (LSG) with duodenal switch (DS) are good options in these super-superobese patients ⁷.

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TABLE I

Preoperative Weight(Kg)/ preoperative BMI	3 months f/u Weight(Kg)/ BMI	6 months f/u Weight(Kg)/ BMI	9 monthsf/u Weight(Kg)/ BMI	12 months f/u Weight(Kg)/ BMI
199.5/81.9	167/68.6	156/64.1	151/62	145/59
220/69.4	169.6/53.5	159/50.1	154/48.6	149/47
108/34.5	85.2/29.1	76.7/26.2	71/24.2	67.7/23.1
154.6/49.3	129.5/41.3	118.9/37.9	114.5/36.5	113.5/36.2
n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a

The Laparoscopic sleeve gastrectomy (LSG) is being performed more frequently by bariatric surgeons. LSG as the sole bariatric operation has been reported for high-risk super-obese patients or as first-step followed by Roux-en-Y gastric bypass (RYGBP) or duodenal switch (DS) in super-superobese patients. There are hormonal modifications induced by LSG that differ from those found after a purely restrictive procedure, involving Ghrelin, Glucagon-like peptide 1, Peptide YY and oxyn-tomodulin.

Patients and methods

PATIENTS

From November 2006 to May 2008, 6 patients underwent laparoscopic sleeve gastrectomy (LSG). There were 2 women (33%) and 4 men (66.6%), with a mean age 45 (range 41 to 55 years).

Average preoperative BMI was 58.2 kg/m² (Tab. I). 1 patient, who underwent LSG as an alternative to laparoscopic adjustable gastric banding (LAGB), had a preoperative BMI 32.

Four (4) patients previously had a temporary use of the BioEnterics Intra-gastric Balloon (BIB): 1 patient lost 18 kg, 1 patient lost 8 kg and 2 patients had failed treatment.

In 5 patients the body habitus was characterized by an enormous abdominal wall fat distribution. Patient's comorbidities included sleep apnea in 5 patients (83%), hypertension in 3 patients (50%), NIDDM in 3 patients (50%) and hypertriglyceridemia in 1 patient (16%).

TECHNIQUE

Patient is given I.V. antibiotic prophylaxis and low-molecular weight heparin 40 mg in the holding area. The procedure is performed with the patient supine, with a foot board. Foley catheter and Orogastric tube after intubation.

PORTS PLACEMENT

1. 15 mm port

Placed about 4 cm to the left of midline between xiphoid and umbilicus just above the level of the 15- mm port. Under direct vision.

TABLE II

Study	No. Pts.	WL Loss %
Voellinger (Gagner) 2002 60 Fr bougie	24	23% at 3 m 32% at 6 m
Elariny 2002 60 Fr bougie	30	20lbs at 1m
Crookes 2003 48Fr bougie, open	14	47% at 1 y
Cottam (Schauer) 2003 48Fr bougie, lap	102	46% at 1 y
Johnston 2003 M&M, 32 Fr bougie, open	230	63% at 1 yr
Adamo 2003 32 Fr bougie, open/lap	25 VG 6 M&M	63% at 1 yr 73% at 18m
Lee 2004 32 Fr bougie	68	44% at 6 m 55% at 1 y

2. 5 mm port

Placed just below left costal angle as laterally as possible in the sterile field. Under direct vision.

3. 12 mm port

Placed 2 cm to the right of the midline about halfway between the xiphoid and umbilicus.

This is the first port we introduce. We usually use an Optiview (12 mm) first with a 10mm/zero degree scope through the port. Otherwise, CO₂ pneumoperitoneum with Verres needle and then trocar placement.

4. 5 mm port

Placed to the left of the 15 mm port and at 45 degree angle between that port and the costal margin. Under direct vision.

5. 10 mm port

Placed laterally just below the right costal angle. Under direct vision.

PROCEDURE

First, a liver retractor is inserted to expose the stomach. The omental bursa is entered sectioning the greater

TABLE III

% EWL (kg)	3 months f/u	6 months f/u	9 monthsf/u	12 months f/u
	16,2	21,8	24,3	27,3
	22,9	27,7	30	32,2
	15,4	23,9	29,5	32,8
	16,2	23	25,9	26,5
	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a

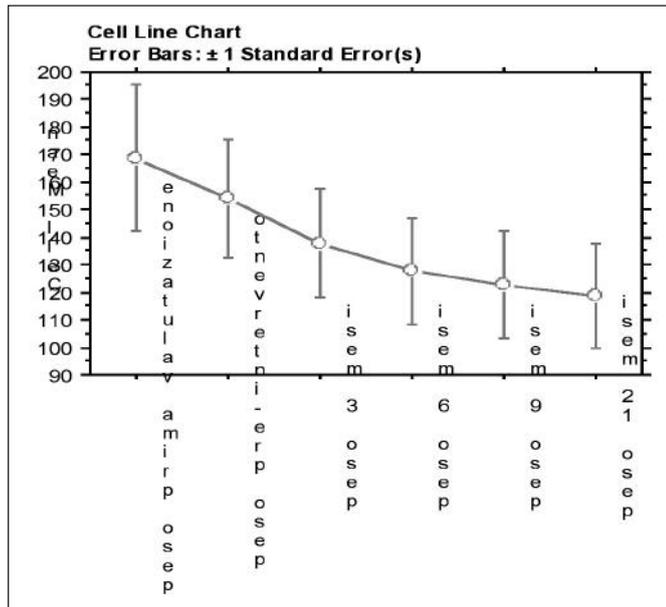


Fig. 1

omentum with a sealer and divider tool. Dissection is started in the greater curvature at a point located 6 cm from the pylorus and continued to the angle of His. Once the greater curvature and the short gastric vessels are completely mobilized, the orogastric tube is removed and an esophageal dilator (Bougie) 40 Fr. is inserted transorally. The bougie size does correlate with postoperative weight loss (Tab. III). A sleeve gastrectomy is performed using a laparoscopic linear cutting stapler (green load). We carefully staple the stomach right to the bougie to allow an 80% gastrectomy and a linear gastric tube. We reinforce the suture line with 3-0 PDS intracorporeal sutures or endostich. We test the gastric tube under saline insufflating the stomach with air via an orogastric tube. The specimen is taken out through the 15mm port site. The liver retractor and the other ports are removed and closed with 2-0 PDS sutures. The skin is closed with 4-0 intradermic absorbable sutures.

Postoperative care

During the first 24 hours after the operation, all patients receive only intravenous fluids, morphine PCA and low

molecular weight heparin. On postoperative day one, the patients are encouraged to ambulate and start to take liquids, Stage 1 diet, according to our Bariatric diet protocol. On postoperative day 2, the I.V. fluid and morphine PCA are discontinued once the patients tolerate a Stage 2 diet, according to our Bariatric protocol and discharged home on oral pain medication prn. Our surgical follow up is at one week, one month and every three months thereafter, for the first year, then yearly. The patient will see an endocrine and dietician at our Institution 2 weeks postoperatively and follow up with them.

Results

Mean operative time was 2 hours (range 1.5-2.5). We had no perioperative complications and no mortalities. Length of stay was 2 days in all patients.

Weight (Kg) and BMI: All patients were followed for at 3 month intervals for the first year (Tab. III). Postoperatively, all six patients presented minimal abdominal pain. All of them reported great reduction in total daily ingestion and early and prolonged satiety. All patients returned to their regular activities within 4 weeks postoperatively. At one year follow-up, the comorbidities detected before surgical treatment showed clinical resolution or improvement.

Two patients did not return for their regular follow-up at our Institution for geographic reasons.

At one year follow-up visit, the other four patients had no complaints. % EWL at 3, 6, 9, 12 month follow-up is shown in Tab. III

Discussion

Laparoscopic sleeve gastrectomy (LSG) as the sole bariatric operation has been reported for high-risk super-obese patients or as first-step followed by Roux-en-Y gastric bypass (RYGBP) or duodenal switch (DS) in super-super obese patients⁷. Laparoscopic Roux-en-Y gastric bypass (LRYGBP) and laparoscopic adjustable gastric banding (LAGB) are the most commonly performed surgical procedures for weight reduction in the United States². Super-superobese patients (body mass index >60 kg/m² pre-

sent a special subgroup among the obese population due to the higher incidence of severe comorbidities and increased technical difficulties in perioperative management³. The optimal surgical approach still remains controversial⁹. Purely restrictive procedures like vertical banded gastroplasty (VBG) and laparoscopic adjustable gastric banding (LAGB) have had disappointing result in super-superobese patients (body mass index >60 kg/m²), particularly in the long-term. Laparoscopic sleeve gastrectomy seems a good option as the first step of a staged approach in high-risk and super super-obese patients (1, 4, 8); the second procedure can be done when the weight loss reaches a plateau, in the case of weight regain or simply when the patient can undergo more safely the second step regardless of weight loss stabilization or regain. The possible mechanisms that account for the limited weight loss or weight regain include a technical problem, such as an incomplete resection of the fundus of the stomach where the ghrelin producing cells are located⁵. For this reason there is a tendency to use smaller calibre calibration tubes. Gastric dilatation has been evocated as being responsible for poor weight loss after LSG with or without DS. As a matter of fact, LSG may have a limited potential for weight loss as do most restrictive procedures. Further studies are needed to evaluate long-term effects on weight loss to definitely consider LSG a single stage procedure. We inform our patients about the risks and benefits of the procedure and anticipate the possibility of a second stage operation in case of weight regain. To date, none of our 6 patients required any further intervention. LSG seems a safe operation for the high-risk and super super-obese (body mass index >60 kg/m² patients and an alternative for the super obese (BMI 50-60) and morbid obese (BMI 35-40) patients.

Conclusion

Laparoscopic sleeve gastrectomy (LSG) seems a safe alternative treatment option for the high-risk and super super-obese patient and as a one stage procedure for the morbidly obese patients. Our initial experience is very limited and further studies are necessary to evaluate its long-term effects.

Riassunto

La gastrectomia *tipo sleeve* per via laparoscopica costituisce una tecnica molto utile nei pazienti affetti da obesità patologica, soprattutto come primo tempo ad un successivo intervento di Bypass gastrico o Diversione biliopancreatica. Recentemente, la gastrectomia tipo slee-

ve viene adottata anche come unico intervento con risultati incoraggianti a breve e medio termine.

Questo intervento per via laparoscopica è ovviamente di più facile esecuzione e riduce notevolmente i tempi ed i rischi intraoperatori; ciò risulta utile nel trattamento dei pazienti superobesi che si caratterizzano da comorbidità importanti.

Il ruolo che la gastrectomia *tipo sleeve* ha come intervento in unico tempo non sembra essere di tipo solamente restrittivo ma coinvolge alcuni ormoni come la grelina, il GLP-1 (Glucagon-like peptide 1), il Peptide YY e l'oxintomodulina.

Ovviamente, gli effetti a lungo termine di questo intervento necessitano ulteriori studi clinici.

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