

Clinical Science

# Laparoscopic sleeve gastrectomy for morbid obesity: 5-year results



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## Abstract

**BACKGROUND:** Data concerning the long-term efficacy of laparoscopic sleeve gastrectomy in the treatment of morbid obesity remain scarce. In this retrospective, the authors present 5-year follow-up of 30 patients having undergone laparoscopic sleeve gastrectomy.

**METHODS:** Since 2004, 30 patients underwent laparoscopic sleeve gastrectomy and completed 5 years of follow-up. Five patients were subsequently subjected to laparoscopic Roux-en-Y gastric bypass and were excluded from further analysis. The remaining 25 patients comprised the study population.

**RESULTS:** Mean excess weight loss was  $65.2 \pm 6.1\%$ ,  $64.7 \pm 5.6\%$ ,  $62 \pm 4.9\%$ ,  $58.2 \pm 5.5\%$ , and  $56.4 \pm 5.8\%$  for the first 5 years, respectively. There were no deaths, nor any major morbidity. Remission of comorbidities was observed in 40% to 80.9% of cases.

**CONCLUSIONS:** Laparoscopic sleeve gastrectomy is a safe and effective means of treatment of morbid obesity both in the short and in the long term. More research is needed to better predict which patient will benefit most from this operation.

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Laparoscopic sleeve gastrectomy (LSG) has emerged during the last decade as an effective treatment for morbid obesity, either as a stand-alone procedure or as the first step of a 2-stage weight reduction strategy.<sup>1-3</sup>

Although the ground of this rapid evolution is as solid as the more than acceptable short-term results of the procedure, this same rapid evolution has not allowed the bariatric community to fully evaluate its long-term efficacy. Although on one hand the volume of published data concerning its short-

term results including 1, 2, and 3 years excess body weight loss is more than convincing, on the other hand, only a fistful of reports provide 5-year data concerning excess weight loss (EWL).<sup>2-8</sup> It has already been reported that some patients who have undergone laparoscopic sleeve gastrectomy tend to regain weight after a 3-years period.<sup>5</sup> This observation had also been reported in the past with other restrictive procedures that have become obsolete nowadays.<sup>9</sup>

A number of controversies concerning surgical techniques remain debatable.<sup>10</sup> The pathophysiologic mechanisms explaining laparoscopic sleeve gastrectomy's effectiveness are also still subject to research.<sup>11-15</sup> The long-term progression and effect of these changes in the hormonal milieu of the bariatric patient after laparoscopic sleeve gastrectomy can have potential relations to its long-term effectiveness.

The authors declare no conflicts of interest.

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Another important advantage of laparoscopic sleeve gastrectomy is the high rate of comorbidities remission in the mid-term. While weight loss alone could be an adequate explanation, the coexistence of other pathophysiologic mechanisms cannot be excluded.<sup>12</sup> Their understanding could enhance our knowledge about this procedure and probably drive to the development of modifications toward the perfection of our technique.

The aim of this study was to present our data concerning patients who have undergone laparoscopic sleeve gastrectomy as the sole treatment for morbid obesity and who have completed 5 or more years of follow-up.

## Materials and Methods

From January 2004 to July 2008, a total of 30 morbidly obese patients underwent laparoscopic sleeve gastrectomy at our department. The operations were performed either as the first part of a planned 2-stage weight reduction operative strategy for morbid obesity or as a stand-alone option for the definitive treatment of morbid obesity.

According to our protocol, patients underwent an extensive preoperative workup including blood tests, chest radiograph, abdominal ultrasound, echocardiography, electrocardiography, sleep apnea study, esophagogastrosopy, and endocrinologic and psychiatric tests. Demographic data of the study population are listed in [Table 1](#).

Concerning our surgical technique, it has already been reported elsewhere.<sup>13</sup> The procedure was performed on 6 patients with the use of the Da Vinci robotic system.<sup>14</sup> Our main modification of the so-called “standard technique” is that instead of a bougie, we used an upper gastrointestinal endoscope with diameter 29Fr to calibrate the gastric sleeve.

The endoscope we used was a Fujinon EG-200FP type S (FUJI Photo Optical, Japan, Tokyo). The outer diameter of the scope is 9.8 mm, equivalent to 29Fr bougie, and the working length is 103 cm. The staple line was reinforced

with buttressing material (GORE SEAMGUARD Bio-absorbable Staple Line Reinforcement, W.L. Gore and Associates, Inc, Newark, DE). After the completion of the division of the stomach, the endoscope was pulled slowly outwards to carefully inspect the gastric staple line for any bleeding or disruption points, which were strengthened with clips. Air bubble leakage test was performed after the withdrawal of the scope and the reinsertion of the nasogastric tube.

A leakage test was further performed 48 hours post-operatively with a water-soluble contrast medium study. The patients were allowed a semiliquid diet for the next days and were discharged on the fourth postoperative day. Patients were re-examined in the outpatient clinic after 1 week, 1 month, 3 months, 6 months, and then once yearly. Patients were advised to take oral multivitamin supplement daily according to laboratory results. The follow-up examinations apart from the rest of the tests also included blood tests for calcium, parathormone, vitamin D, folic acid, and vitamin B12.

Weight loss was calculated as the percentage of EWL based on the Metropolitan life tables of height and weight.<sup>15</sup> Remission of comorbidities was defined as follows: (1) blood pressure less than 120/80 mm Hg without medication, (2) hemoglobin A1c <6.5% without drugs, and (3) remission of symptoms of obstructive sleep apnea without continuous positive airway pressure. All statistical analyses were performed using the statistical program SPSS 20.0 (IBM corp, Armonk, NY). Values are expressed as mean  $\pm$  standard deviation.

Informed consent was obtained from the patients and approval was obtained from the designated review board of the institution involved.

## Results

Until July 2013, a total of 150 laparoscopic sleeve gastrectomy procedures have been performed. A total of 30 patients have completed 5 years of follow-up. Five patients have been excluded from the data analysis because they underwent a second-stage laparoscopic Roux-en-Y gastric bypass at various time points after the initial laparoscopic sleeve gastrectomy because of inadequate weight loss.

Patients' demographics and comorbidities are listed in [Table 1](#). Sixty percent of the patients (15/25) had a body mass index (BMI) > 50 kg/m<sup>2</sup>. Two patients had been submitted in the past to a laparoscopic-adjustable gastric banding procedure, and both of them had regained weight. The lap-band was removed simultaneously with the laparoscopic sleeve gastrectomy. Three patients were submitted for a simultaneous cholecystectomy.

The mean operative time was 115.5 minutes (range 90 to 150). All cases were completed laparoscopically and no patient received any blood transfusion. Five patients had to stay overnight in the intensive care unit. The mean hospital stay was 4.5 days (range 4 to 16). There was no mortality in this group of patients. Major postoperative morbidity equaled

**Table 1** Patients' demographics

Variable	Data
Sex (M:F)	7:18
Age (years)	41.3 $\pm$ 2.4
Weight (kg)	153.8 $\pm$ 6.1
Body mass index (kg/m <sup>2</sup> )	55.5 $\pm$ 1.7
Super - obese	15 (60%)
Diabetes	3 (12%)
Hypertension	11 (44%)
Sleep apnea	7 (28%)
Hyperlipidemia	21 (84%)
Other (chronic obstructive pulmonary disease, coronary artery disease, peripheral vascular occlusive disease, etc)	5 (20%)

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