Long-Term Effects of Laparoscopic Sleeve Gastrectomy Up To 7 Years of Follow Up

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Background

Laparoscopic vertical sleeve gastrectomy (LSG) has been gaining popularity in the USA and worldwide, in fact it is the most commonly performed bariatric procedure in the USA. However, long-term results remain remarkably sparse.

Objective

To investigate the long-term effects of LSG, beyond 7 years, on % excess body weight loss (EBWL), Body Mass Index (BMI), and resolution of various co-morbidities such as diabetes mellitus (DM), gastroesophageal reflux disease (GERD), obstructive sleep apnea (OSA), hypertension (HTN), and hyperlipidemia (HLD).

Methods

Single center retrospective chart review of 225 patients who underwent LSG as a primary procedure

Study period: 2009 to 2012

Reported % EBWL over:

- < 30 days
- 30 - 90 days
- > 90 days
- 7 years

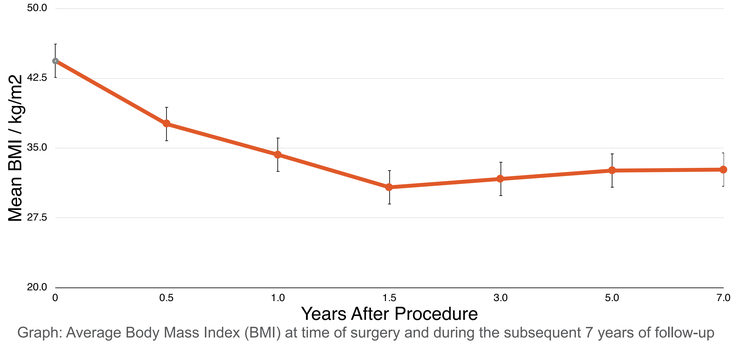
Resolution rate for:

- DM
- HTN
- OSA
- GERD
- HLD

- **Definitions:**
  - Type 2 Diabetes Mellitus (DM): fasting plasma glucose >126 mg/dL or 2-hour plasma glucose >200 mg/dL
  - Hypertension (HTN): systolic blood pressure >140 mmHg or diastolic blood pressure >90 mmHg, or patients taking antihypertensive therapy
  - Obstructive Sleep Apnea (OSA): repeated upper airway occlusions during sleep with or without sleepiness, and high apnea/hypopnea index and need for continuous positive airway pressure during sleep
  - Gastroesophageal Reflux Disease (GERD): patient self-reported symptoms as defined by the Health Related Quality of Life Questionnaire
  - Hyperlipidemia (HLD): fasting triglycerides ≥ 150 mg/dL, fasting LDL cholesterol ≥ 190mg/dL, and fasting HDL < 40 mg/dL

Results

	Pre-sleeve gastrectomy n (%)	7 years post-operatively n (%)	Resolutions of Disease n (%)
Diabetes Mellitus	80 (35.6)	39 (17.3 %)	20 (51%)
Hypertension	64 (28.4%)	35 (15.6%)	19 (54%)
Obstructive Sleep Apnea	93 (41.3%)	15 (6.7%)	77 (82.7%)
Gastroesophageal Reflux Disease	91 (40.4%)	55 (24.4%)	36 (39.6%)
Hyperlipidemia	94 (41.8%)	73 (32.4%)	21 (22.3%)



Graph: Average Body Mass Index (BMI) at time of surgery and during the subsequent 7 years of follow-up

Post-Operative Complications	n (%)	Breakdown	
Immediate	12 (5.4%)	Bleeding	9 (4.0%)
		Leak	1 (0.4%)
		Pneumonia	1 (0.4%)
		Atrial fibrillation	1 (0.4%)
< 30 days	12 (5.4%)	Liver hematoma	2 (0.9%)
		Nausea/vomiting	9 (4.0%)
		Pneumonia	1 (0.4%)
30 - 90 days	20 (8.9%)	Nausea/vomiting	15 (6.7%)
		Stricture	2 (0.9%)
		Leak	1 (0.4%)
		Pneumonia	2 (0.9%)
>90 days	45 (20.0%)	Stricture	7 (15.6%)
		Nausea/Vomiting	15 (33.3%)
		Chest pain	6 13.3%)
		Other	17 (37.8%)

Discussion

Maximal %EBWL occurred at 1.5 years post-procedure, and despite some weight regain, losses were persistent 7 years out. The mean BMI at 7 years was 30.0 kg/m^2; age and sex did not have a significant effect on weight loss. There was an increase rate of weight regain between 5 to 7 years compared to other intervals, this was found to correlate with a pre-operative BMI >50 kg/m^2.

Post-operative de novo GERD was reported at a very low rate of 2.7% (n = 6), while 20% (n = 16) remained on daily proton pump inhibitor (PPI) therapy for GERD symptoms. In this study, 37% of patients underwent hiatal hernia repair, which may play a role in reducing the incidence of de novo GERD, however daily PPI therapy may underestimate the true incidence of de novo GERD.

Conclusion

Even though there is considerable weight regain after 1 year of LSG, results are maintained at 7 years. There is also a significant resolution of associated co-morbidities with limited evidence of increased GERD.

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