

Relation between weight loss and age after laparoscopic sleeve gastrectomy

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Abstract. – OBJECTIVE: As a bariatric surgery; Laparoscopic Sleeve Gastrectomy (LSG) has gained popularity in recent years. In our study, we aimed to investigate the impact of age on postoperative weight loss at one year after laparoscopic sleeve gastrectomy.

PATIENTS AND METHODS: In our clinic between May 2011 and July 2013, 55 patients who underwent LSG with the diagnosis of obesity were included in the study. Patients were divided into two groups below and over an age of 40. Preoperative and postoperative first year Body Mass Index (BMI), percent of Body Mass Index Lost (% BMIL) and Excess Body Mass Index Lost (% EBMIL) were recorded.

RESULTS: A total of 55 patients with a mean age of 37.2 ± 8.6 years were included in the study. 37 were women. Patients divided into the age below 40 years old (group 1, $n = 29$) and over 40 years old (group 2, $n = 26$). The average age of the groups was 29.9 ± 4.63 and 45.3 ± 7.02 , respectively. Characteristics of patients among groups were similar. The preoperative average BMI of groups were 49.34 ± 5.87 kg/m² and 49.73 ± 5.38 kg/m², postoperative first year mean BMI of groups were 30.05 ± 5.78 kg/m² and 36.15 ± 6.64 kg/m², respectively. Percentage loss in BMI was $19.29 \pm 3.14\%$ and $13.58 \pm 2.96\%$, respectively; and % EBMIL was $82.95 \pm 21.88\%$ and $56.75 \pm 15.90\%$, respectively.

CONCLUSIONS: We suggest that age might be as a major determining factor for weight loss and patients over forty years old undergoing LSG for bariatric surgery should be informed about that they will have a lower weight lost.

Key Words:

Laparoscopic sleeve gastrectomy, Weight loss, Age.

Introduction

Laparoscopic Sleeve Gastrectomy (LSG) was first applied in 2000¹ and gained popularity among surgeons interested in obesity because of its positive results on weight loss, lower comorbidities, its relative technical simplicity and reversal of obesi-

ty-related comorbidities²⁻⁶. Expected excess weight loss may be up to 50-80% after LSG⁷. Previous retrospective studies with large number of patients revealed that older patients lost less weight after several bariatric surgeries, such as gastropasty, gastric banding and bypass⁸.

In the present study we aimed to investigate the impact of age on weight loss at first year in a group of patients undergoing LSG for bariatric surgery.

Patients and Methods

Study Design

55 patients between 18-60 years of age that underwent Classical Laparoscopic Sleeve Gastrectomy (LSG) in the General Surgery Department of Antalya Training and Research Hospital between May 2011 and July 2013 were included in the study. Data were retrospectively analyzed from a prospectively collected data of weight loss at the postoperative first year. Body Mass Index of all the patients was over 40.

Inclusion criteria for LSG was a body mass index (BMI) ≥ 40 kg/m² with or without related comorbidities or a BMI ≥ 35 kg/m² with related comorbidities, such as diabetes mellitus or hypertension.

Exclusion criteria for LSG included the inability to give informed consent, a clinically significant psychiatric disorder that impairs adherence to nutritional guidelines or exercise, the presence of gastroesophageal reflux disease and Barrett esophagus.

Patients were divided into two groups according to age $<$ and ≥ 40 years. Preoperative and postoperative first year body weights, BMI, glucose levels, percent of Body Mass Index Lost (% BMIL) and percent of Excess Body Mass Index Lost (% EBMIL) were evaluated to report excess weight loss.

Surgical Technique

We perform standardized techniques for both groups. The patient was carefully placed and secured to the operation table in supine position, and the legs were separated. A nasogastric drainage tube was inserted and removed after aspiration of gastric content. A Foley catheter was inserted. The patients were dressed with anti-embolic socks. The surgeon stood between the legs of patient, cameraman stood at the right side of the patient, and the first assistant stood at the left side of the patient. A total of 5 trocars were placed: 10 mm trocar from the middle line 25-30 cm below the xyphoid and above the umbilicus, 5 mm trocar from the left anterior axillary line, 12 mm trocar from the left mid clavicular line, 10 mm trocar from the left mid clavicular line, and 5 mm trocar below the xyphoid process. A window to the omentum was opened by laparoscopic Ligasure (Covidien, Minneapolis, MN, USA) approximately 4 cm proximal of pylorus from the greater curvature of the stomach. From this window, the surgeon proceeded by detaching omentum towards proximal of stomach and the mobilisation of the greater curvature of the stomach was finished. Diaphragmatic left crus was revealed. 32 Fr orogastric tube was connected to the stomach up to pylorus by advancing through smaller curvature. Stomach transection was initiated beginning from antrum about 3 cm proximal to the pylorus and was continued to the Hiss angle. Echelon 60 stapler (Ethicon, Juarez, Mexico) was used for closing. First ignition was started with two green cartridges then was proceed with blue cartridge. At proximal, the stomach was detached from the gastroesophageal junction in order to be about 1 cm away without tension. The whole stapler line was checked for any bleeding and gastric leakage. Leakage control was performed with intraoperative methylene blue or air fluid test. The orogastric tube was removed and the nasogastric tube was inserted. For stapler line reinforcement; the whole stapler line was covered with 2 (8 ml) Tisseel fibrin sealant to distal stomach.

Resected stomach was removed from the 12 mm trocar hole. Finally the whole stapler line was washed out with saline and residual fluid was aspirated. A drainage tube was placed throughout the stapler line. To prevent fascial port side hernias, fascia was closed by 2-0 vicryl. Skin was sutured using 3-0 prolene.

Patients were mobilized on the first postoperative day. The nasogastric drainage tube was removed on the first postoperative day. On the third

postoperative day, gastric passage graphy was performed by giving the patients a radiopaque substance. The abdominal drainage tube was removed on the third postoperative day as long as there were no complications. Patients without complaints were discharged on the morning of the fifth postoperative day with recommendation of outpatient control.

Statistical Analysis

Statistical analysis was performed with SPSS 15.0 (Statistical Package for Social Sciences; SPSS Inc, Chicago, IL, USA) for Windows and Microsoft Office Excel 2010 version for evaluating the data. In comparison of the data Mann Whitney U and Wilcoxon tests were used. For descriptive analysis of the data, numerical variables and minimum maximum values were expressed as means $\pm$ standard deviation (SD) and for categorical variables number and percentage rates were used. Values of $p < 0.05$ were considered as statistically significant.

Results

We studied a population of 55 patients all underwent LSG as a bariatric surgery, 37 females (67.2%) and 18 males (32.8%). Age had a normal distribution, mean age was 37.2 ± 8.6 years and range between 18 and 70 years with 29 (52.7%) younger than 40 years and 26 (47.3%) age ≥ 40 years. The average age of the groups was 29.9 ± 4.63 (21-39) and 45.3 ± 7.02 (40-69), respectively.

In patients < 40 years, we found mean body weight as 141.10 ± 23.01 kg (105.00-198.00) and mean preoperative BMI as 49.3 ± 4.8 kg/m² (40.3-63.0). Patients ≥ 40 years showed mean body weight as 137.04 ± 16.72 kg (108-178) and mean preoperative BMI as 49.73 ± 5.38 kg/m² (41.0-67.1).

Preoperative blood glucose levels were similar in both groups 132.8 ± 27.6 mg/dL and 135.4 ± 29.7 mg/dL, respectively.

Postoperative first year mean body weight of groups were 87.03 ± 20.72 kg (38-132) and 99.85 ± 16.13 kg (67-131), and the mean BMI of groups were 30.05 ± 5.78 kg/m² (15.22-40.65) and 36.15 ± 5.52 kg/m² (26.50-49.31), respectively. Blood glucose levels decreased to 102.3 ± 23.7 mg/dL and 104.1 ± 24.5 mg/dL, respectively at the postoperative 12th month. Weight loss at postoperative first year was 54.07 ± 7.70 kg (44-

67) and 37.19 ± 8.49 kg (22-63), respectively. Percentage loss in BMI was $19.29 \pm 3.14\%$ (12.71-26.78) and $13.58 \pm 2.96\%$ (7.30-17.93), respectively. And mean % EBMIL at postoperative first year was $82.95 \pm 21.88\%$ (58.24-157.53) and $56.75 \pm 15.90\%$ (31.20-92.27%), respectively. Relation between groups according to age below and above 40 years and % EBMIL was shown in Figure 1.

According to clinical characteristics, there was no significant difference among groups in presence of gender, but statistically significance on preoperative and postoperative first year mean weight lost, BMI, percentage of % BMIL and % EBMIL (Table I).

There were no previous operations in the history of all patients except for cholecystectomy in one patient in group 1, umbilical hernia in one patient, appendectomy in one patient and abdominal hysterectomy in one patient in group 2. No complications developed intra-operatively. Patients were followed-up on for postoperative complications according to bleeding, anastomosis leakage, and re-operation.

In post-operative follow-ups, gastric leakage was detected from the stapler line in 2 patients of one at each group. The patients at both groups, leakage was detected by radiographic evaluation performed on the third postoperative day. They were treated by placing additional abdominal drainage tubes and were checked for the presence of loculated fluid or abscess. Total parenteral nutrition was given. After 43 days in patient of first group and 20 days in patient of the second group, no drainage was detected, and the patients were

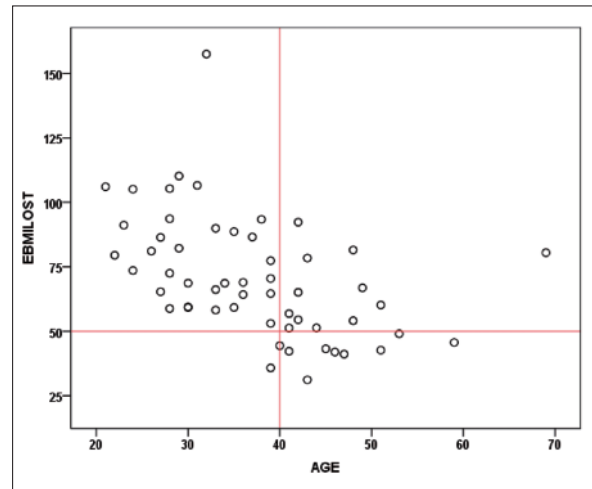


Figure 1. Relation between age (40 years) and % EBMIL (50%).

discharged uneventfully. None of the patients were operated again and there wasn't any other complications were observed.

Discussion

The role of preoperative age on weight loss in obese patients after bariatric surgery was not fully investigated. We observed that patients older than 40 years might have a potential of less loss in weight and BMI after LSG as bariatric surgery.

Scozzari et al⁹ and Contreras et al¹⁰ considered a range of facts possibly interfering with weight

Table I. Clinical characteristics of patients among groups.

	Group 1 (< 40 years)	Group 2 (≥ 40 years)	p
N	29	26	
Gender (F/M)	20/9	17/9	0.779
Age (average, years)	29.9 ± 4.63	45.3 ± 7.02	< 0.001
Body weight (kg)	141.10 ± 23.01	137.04 ± 16.72	0.438
Height (cm)	169.41 ± 8.12	166.31 ± 9.37	0.188
Mean BMI	49.34 ± 5.87	49.73 ± 5.38	0.859
Glucose (mg/dL)	132.8 ± 27.68	135.4 ± 29.79	0.783
Body weight (1 st yr)	7.03 ± 20.72	9.85 ± 16.13	0.034
Mean BMI (1 st yr)	30.05 ± 5.78	36.15 ± 6.64	< 0.001
Glucose (mg/dL)	102.3 ± 23.7	104.1 ± 24.5	0.805
Weight loss (1 st yr)	54.07 ± 7.70	37.19 ± 8.49	< 0.001
Loss in BMI (%)	19.29 ± 3.14	13.58 ± 2.96	< 0.001
Loss in EBMIL (%)	82.95 ± 21.88	56.75 ± 15.90	< 0.001

loss in patients of old age in the discussion of their present studies. Differences in energy requirements, physiopathological and behavioral hypothesis, social and psychological condition, an impaired metabolic capacity and a lower lipolytic activity, all can be associated with weight loss after bariatric surgery. Younger patients might lose great weight due to their high metabolic activity compared to senior patients.

A recent systematic review study conducted with the aim of identifying preoperative predictors of weight loss following bariatric surgery has been published¹¹; interestingly, patients' age was not included among the significant preoperative factors. Different physiopathological and behavioral hypothesis may explain the relationship between age and weight loss after bariatric surgery. Obesity is a heritable chronic disease and genes controlling BMI are both affecting energy intake and energy expenditure¹². Energy requirements normally decrease with age¹³. It has been reported that, in normal body weight subjects, aging is associated with a lower lipolytic capacity¹⁴, in particular after sympathetic stimulation¹⁵, and this may explain the increased adipose tissue deposition of older subjects. In a study significant reduce was seen on serum glucose levels with three months of caloric restriction and moderate physical exercise¹⁶. In our study we also found a significant decrease on glucose levels of both groups one year after surgery.

A study conducted on 50 obese patients who underwent RYGBP showed significantly greater weight loss of patients younger than 35 years with reduced energy intake¹⁷. From the age 40 years old, total energy expenditure begins to decline¹⁸, and this age related decrease seems to be mainly due to a reduction on physical activity¹⁹. In patients older than 55 years, sedentary lifestyle may be one reason for lesser weight loss²⁰⁻²². With an active physical lifestyle young patients have more active life²³. Obesity is not only a medical but is also a social disease because of this situation patient psychological and social aspects associated with age may account for postoperative weight loss and maintenance²⁴. It has been reported that, with respect to attractiveness, younger obese people are denigrated to a greater degree than older obese subjects²⁴; as a result, older individuals may be less inclined to maintain lower weights.

Scozzari et al⁹ found that operative age was a statistically significant modifier of the BMI trend

over time. Conteras et al¹⁰ suggest that patients younger than 45 years lose greater amount of excess BMI than older patients after bariatric surgery and this tendency might be useful as a preoperative weight loss predictor in bariatric patients. Their studies showed us that age negatively associates with success in weight loss. Results obtained in 163 obese patients²⁵ were similar with the results of patients younger than 50 years old⁹ achieved a greater weight loss after 12 months of follow up. Like these present studies we also found that patients younger than 40 years lose a significant weight loss after LSG as a bariatric surgery.

In a study Ortega et al²⁶ showed that younger individuals with lower BMI but higher WC, and lower HbA1c and TG, had higher EWL and a higher rate of successful (EWL $\geq$ 60%) weight loss. Limitations of our study is the absence of comparison between two groups prior and at 1 year after surgery according to like these comorbidities and other possible many factors that have an impact on weight loss after surgery and how they can correlate with age.

Conclusions

We suggest that age might be a predictive factor of weight loss and before this bariatric surgery, patients over forty years old should be informed about that they will have a lower weight lost than younger patients in order to avoid their big disappointment after surgery. We need further prospective studies with longer follow up period and large number of patients to determine age as a major factor for weight loss in patients undergoing LSG for bariatric surgery.

Conflict of Interest

The Authors declare that there are no conflicts of interest.

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