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Research Article

Comparison of Weight and Body Composition Change in Person Using and Non-Using Protein Powder in The First 6 Months Period After Barrier Surgery

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Abstract

SObjective of Study: This study aims the comparison of weight and body composition changes in people who use and do not use protein in the first six months period after the bariatric surgery.

Material and Method: This study was carried out on 144 patients who underwent bariatric surgery at a private foundation university between 10.01.2012 and 21.10.2014 and were followed up before and after the operation. The patients were separated into two groups those who use protein dust and who do not. The member quantity of two group are equal and 72. Tanita Body Composition Analyzer TBF-300 were used to analyze the patients' body.

Facts: The ages of the patients ranged from 18 to 68 years with an average of 37.87 ± 11.41 years, 63.3% using protein dust, and 36.7% not using protein dust although recommended.

As a result of the study, the differences between the fat percentage ratios of the cases in both groups were statistically significant at postoperative 6th month controls (p <0.05). When the weight ratios of the cases were examined, no statistically significant difference was found between the two groups. When the muscle ratios of both groups are evaluated; The difference between the body muscle ratios of the post op 1st month controls was statistically significant (p <0,05) and the difference between the body muscle ratios of the two groups at the post op 6th month controls was statistically highly significant (P <0, 01).

Results: As a result, it has been observed that the body fat percentage decreases more than the body fat percentage according to the second group, which does not receive protein powder supplementation, in group 1 cases, which regularly take protein powder supplementation, and that body fat weight is less well preserved.

***Keywords:** Bariatric Surgery, Body Composition, Obesity, Protein Supplement, Sleeve Gastrectomy*

Introductıon

Obesity are often described as abnormal or excessive fat accumulation that can be detrimental to health. The prevalence of overweight and obesity is increasing independently of the economic situation in many countries. There are 1.9 billion overweight adults in the world; of which approximately 600 million are obese [1]. According to the World Health Organization (WHO) reports, obesity affects 1.1 billion adults worldwide with a clinical ≥ 30 kg \ m² body mass index (BMI). It can cause many health problems such as hypertension, stroke and ischemic bone disease. Studies have shown that survival from vascular complications of individuals with a BMI of 40 to 45 kg / m² is reduced by 8 to 10 years, compared with individuals with a normal BMI [2].

Obesity is an independent risk factor for all-cause mortality, mostly due to cardiovascular disease, in the general population. According to the World Health Organization, the prevalence of obesity has increased over 100% globally since 1980, and the number of obese individuals in 2014 is estimated at 600 million. Therefore, obesity is becoming a global public health problem [3].

One of the main causes of obesity in adults is overweight in childhood. Over weighted children grow up and become over weighted adults. The treatment of pediatric obesity is based on the balance of the calories taken and the calories consumed. Lifestyle changes, family intervention and support increase the success rate. In this treatment, 3 basic elements; better eating habits, more physical activity and sedantering away from life. The frustrating result of all of this is encouraging individuals to resort to bariatric procedures. The rapid increase in the prevalence of morbid obesity in the obese population and the risk of mortality have led to an increase in annual bariatric surgical procedures [4].

Finding and increasing the variety of surgical procedures aimed at treating obesity is a source of hope for many individuals struggling with weight loss. In many cases these procedures offer life-changing solutions [5].

Treatment Methods of Obesity

Medical Nutrition Therapy

The main purpose of diet planning is to provide adequate and balanced nutrition according to the age, sex, physical activity level, physiological condition and nutrition habits of the individual [6].

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Exercise Therapy

Exercise has an important role in the treatment of obesity and plays a major role as a complement to dietary therapy. Exercise also increases lean body mass and helps maintain long-term weight loss [7].

Medication

Several drugs have been used in the treatment of obesity to reduce the level of fasting. Commonly used drugs are amphetamines and their derivatives that directly affect the starvation centers in the brain. Another group of drugs works by changing the lipid absorption in the intestines [8].

Surgery

Bariatric surgery has evolved when patients who undergo partial gastrectomy for peptic ulcer disease lose weight or find it difficult to gain weight. Considering this concept, early interventions in weight loss surgery include jejunoileal and jejunocolic bypass procedur [9].

Indications of Bariatric Surgery

Successful weight loss is aimed at the basic principle of bariatric surgeon. Surgical treatment criteria were established in 1991 by the Consulate panel of the National Institutes of Health. The specific queriori for bariatric surgery accepted by the National Institutes of Health is stated to be applicable to patients with BMI Kg / m^2> 40 and patients with BMI, Kg / m^2 35-40 but comorbidity. Indications for bariatric / metabolic surgery are developing rapidly, taking into account the severity of obesity as well as the presence or absence of comorbid conditions according to the BMI.

Comorbid conditions are expected to improve or remission in the event of effective and permanent weight loss. Comorbid conditions associated with obesity; Type 2 diabetes, dyslipidemia, lung diseases, cardiovascular system diseases, cancer, infertility [10]. A multidisciplinary team, including medical doctors, dietitians, psychologists experienced in this field, and a surgeon experienced with bariatric procedures are very important for optimal outcome. It is recommended that follow-up be done to support the necessary changes in long-term behavior in order to optimize the results. The target weight loss after surgery is almost reached in the first 1-2 years. Significant improvement in the medical complications of obesity can occur in all patients with a successful weight loss. For these reasons, bariatric surgery has become an important tool in the treatment of medically complicated obesity [11].

The successful treatment of obesity highly depends on motivation of patients. However, surgery should have to be taken into consideration after patients have accepted the weight problem and have proved themselves able to comply with the weight loss program.

Finally, because treatment of obesity requires lifelong adjustment to lifestyle changes in the form of increased physical activity and reduced calorie intake, true patient motivation is needed for sustained positive outcomes. A weight loss of only 5 to 20 kg may be associated with a reduction in systemic blood pressure and plasma lipid concentrations and better control of diabetes. Due to the long-term benefits of this surgery for clinically severe obese patients, bariatric surgery is more frequently performed than 10 years ago [12].

There is evidence that myocardial infarction, stroke, cardiovascular events, and mortality are reduced by about half compared to non-surgical controls such as diet therapy and medical treatment during the 2-15-year follow-up period [13]. Pulmonary emboli (30-40%), cardiac events (25%) and anastomotic leaks follow bariatric operations [14]. Dumping syndrome, wound infections, strictures and stomal ulcerations are the most common complications [15].

Material and Method

This study consisted of patients who had undergone sleeve gastrectomy at a foundation university between 10.01.2012 and 21.10.2014 and who continued to follow nutrition before and after surgery. Among these dates, 144 persons were included in the study because the others of 453 operated persons did not continue to follow the nutrition. While 72 patients reported using protein supplement, 72 patients reported that they did not use protein supplement on their own initiative despite their recommendation, although it is indicated that protein powder consumption was particularly recommended during the first postoperative month. The records are noted in this way by the responsible dietitian. Body weight and height were measured as lightweight clothes and shoes. Tanita Body Composition Analyzer (model TBF-300; Tanita Corp., Tokyo, Japan) was used to measure the body mass of the participants with a sensitivity of 0.1 kilograms (kg). Participants' height were transformed in meters (m) after measuring in 0.1 centimeters (cm). BMI was calculated using the following formula: BMI = body weight (kg) / [height (m)] 2. Tanita Body Composition Analyzer (model TBF-300; Tanita Corp., Tokyo, Japan) was used to determine the body fat percentage and amount of participants.

The accuracy of the Tanita TBF-300 is considered to be high to measure the body fat amount [16]. The purpose of this study was to evaluate the effect of sleeve gastrectomy surgery between 10.01.2012 and 21.10.2014 and the comparison of weight, fat ratio and muscle mass change during the first 6 months of patients who use and not use protein supplements.

In addition to the complementary statistical methods (mean, standard deviation, ratio), one-way Anova test was used in the two-group comparison of the parameters that showed normal distribution and the Tukey HDS test was used in determining the group causing the difference. For subsequent measurements of the parameters, Variance Analysis in repeated measures and paired sample t test in binary comparisons were used. Significance was assessed at $p <0.01$ and $p <0.05$ levels.

Results

This study was conducted between 10.01.2012 and 21.10.2014 and who continued to follow nutrition before and after surgery. 144 male and female patients were followed up before and after the operation. The ages of the cases ranged from 18 to 68 years with a mean of 37.87 ± 11.41 years (Table 1).

Table 1: Studies on the distribution of patients using and not using proteins.

	Min-Max	**Mean ±SD**
Age (year)	18-68	37.87±11.41
n%		
# of patients used protein (Group 1)	72	50
# of patients used protein (Group 2)	72	50
Total	144	100

As seen in Table 1, 63.3% of the cases used protein powder, while 36.7% did not use protein powder.

The mean body fat percentages in the preop period were 44.16 ± 5.60 in the first group and 46.29 ± 5.34 kg in the second group (Table 2).

There was significant difference in the body fat percentage measurements of the controls of group 1 cases ($p <0.01$). According to the bilateral comparisons made; The decrease in fat percentages at postoperative first month was not statistically significant ($p> 0.05$), whereas the decrease in fat percentage at postoperative 6th month was statistically significant ($p <0.01$).

Table 2: Analyzes of Body Fat Changes in Patients using and not using protein.

	GROUP 1 (n = 72)	GROUP 2 (n = 72)	
BODY % FAT RATIO (%)	**Mean ±SD**	**Mean ±SD**	**ᵃp**
Preop	44.16±5.60	46.29±5.34	*0.0211
1st Month Check	43.24±5.49	44.77±4.73	0.0621
6th Month Check	35.86±6.23	38.50±6.17	*0.0117
ᵇp	**0.0	**0.0	
BİLATERAL COMPARISON	ᶜp	ᶜp	
Preop * 1st Month Check	0.3195	0.0611	
Preop * 6st Month Check	**3.914e-14	**2.277e-13	

ᵃOneway Anova Test *ᶜAdjustment for multiple comparisons;Bonferroni*
*ᵇVariance Analysis in repeated measures** $p < 0.05$ **$p < 0.01$

Table 3: Analyzes of Body Weight Changes in Patients using and not using protein.

	GROUP 1 (n = 72)	GROUP 2 (n = 72)	
BODY WEIGHT RATIO (KG)	**Mean±STD**	**Mean±STD**	**ᵃp**
Preop	134.24±24.72	127.83±21.57	0.0994
1st Month Check	120.15±21.31	115.73±19.98	0.2012
6th Month Check	96.99±18.78	94.20±16.54	0.3454
ᵇp	**0.0	**0.0	
BİLATERAL COMPARISON	ᶜp	ᶜp	
Preop * 1st Month Check	**0.0003	**0.0006	
Preop * 6st Month Check	**1.2529e-18	**1.9433e-19	

ᵃOneway Anova Test *ᶜAdjustment for multiple comparisons;Bonferroni*
*ᵇVariance Analysis in repeated measures**$p < 0.05$ **$p < 0.01$

Statistically significant differences were found in body fat percentage measurements of group 2 controls compared to the preoperative period measurements (p <0.01). There was no statistically significant decrease in the percentages of fat in the first postoperative month (p> 0.05) compared to the preop body fat percentages of the cases (p> 0.05). On the other hand, the decrease in the percentage of fat in the postoperative 6th month was statistically significant (p <0.01).

The difference between the fat percentages in the preoperative period was significant (p = 0.0211, p <0.05) when we compared the first group cases called protein powder users and the second group cases called nonuse users. There was no significant difference between the body fat percenteges of two groups in the postoperative 1 month (p = 0.06; p <0.05). Significant differences were found between the two groups in the body fat percentages reevaluated at postop 6 month (p = 0.0117, p <0.05). We observed more loss of fat in group 1 cases than group 2 patients who did not use protein powder.

The pre-operative body fat percentages and post-operative body fat percentages of our cases are similar to those in Figure 1.

The mean body weight in the preop period was 134.24 ± 24.72kg in the first group and 127.83 ± 21.57kg in the second group (table 3).

Statistically significant differences (p <0.01) were found in the measurements of body weight changes in first group during controls with respect to the results taken in preoperative period.

The decrease in the body weights at the postoperative 1st month and 6th month according to the preop body weights of the cases in the bilateral comparisons were found statistically highly significant (p = 0.0003, p = 1.2529e-18, p <0.01).

Statistically significant differences were found (p <0.01) in the measurements of body weight changes in group 2 controls comparing to preoperative period. The decrease in the body weights at postoperative 1st and 6th months comparing to the preoperative measurements of body weights of the patients was found statistically significant (p = 0.0006, p = 1.9433e-19, p <0.01).

When we compared the first group patients using protein powder and the second group, the difference between the body weights at preop, postop 1 month and postop 6 months was not significant.

Pre-operative and post-operative weight ratios of our cases are shown in Figure 2.

The mean body muscle weight in the preop period was 74.01 ± 15.75 Kg in the first group and 68.23 ± 14.34 Kg in the second group (Table 4).

There was significant difference (p<0.01) between body muscle weight measured in preop period and post-operational period of patients in first group. According to the comparison results, there was no statistically significant decrease in body muscle weight for first month post-operational period (p = 0.09; p <0.05). The decrease in fat percentage at the postoperative 6th month was highly statistically significant (p = 0.0015; p <0.01).

Statistically significant differences were found in the measurements of body muscle changes in second group comparisons with respect to preoperative period measurements (p <0.01). Statistical significance was found between the preop body muscle weights of the patients and the muscle weight measurements at the 1st postoperative month (p = 0.0344, p <0.05). Also, the decrease in the body muscle weights at

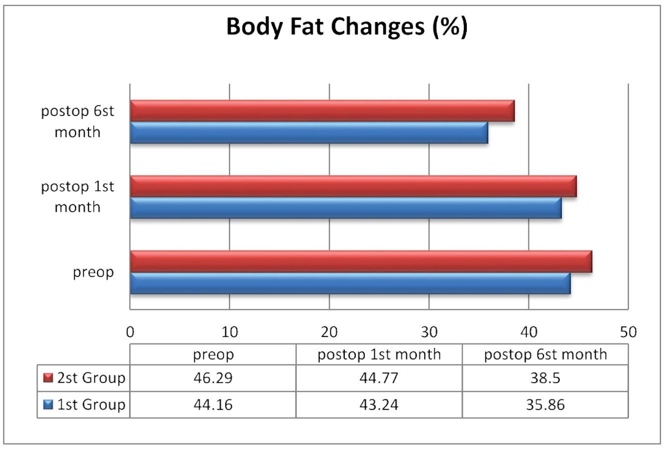

Figure 1: Change in fat percentage (%) of cases using and not using protein.

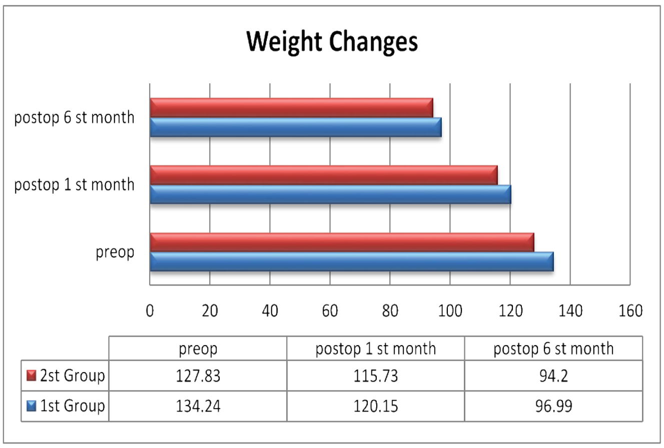

Figure 2: Weight change of patients using and not using protein.

Table 4: Examination of Body Muscle Changes in Patients Using and not Using Protein.

	GROUP 1 (n = 72)	GROUP 2 (n = 72)	
BODY WEIGHT RATIO (KG)	Mean ±SD	Mean ±SD	ᵃp
Preop	70.68±15.43	68.23±14.34	0.3252
1st Month Check	68.27±11.34	63.63±11.34	*0.0269
6th Month Check	63.86±13.57	57.04±9.05	**0.0005
ᵇp	**0.0	**0.0	
BİLATERAL COMPARISON	ᶜp	ᶜp	
Preop * 1st Month Check	0.0904	*0.0344	
Preop * 6st Month Check	**0.0015	**1.077e-7	

[a]*Oneway Anova Test* [c]*Adjustment for multiple comparisons;Bonferroni*
[b]*Variance Analysis in repeated measures** p < 0.05 **p < 0.01

the 6th month was statistically highly significant (p = 1.077 e-7; p < 0.01).

According to the comparison results of two groups, there was statistically significant differences in postoperative first month body muscle weight measurements and the muscle loss measured and calculated at postoperative sixth month is highly statistically significant.

Muscle loss in group 2 patients that do not use protein dust is greater than in group 1 patients.

The preoperative muscle rates of our cases and the muscle rates of all the post-operative follow-ups are similar to those of Figure 3.

Discussion

In this observational study on the patients receiving RYGB and SG is aimed at assessing the association between daily protein intake and lean body mass loss as a percentage of total weight loss during the 4th and 12th months following surgery. Dietary advice and daily protein intake were assessed at the 2nd, 6th weeks, 4th, 8th and 12th months before the operation. Although bariatric surgery is the most important strategy for achieving and sustaining significant weight loss in morbid obese individuals, there is concern that bariatric surgery may cause more lean body mass loss than other weight loss interventions.

Patients on a hypocaloric and protein-rich diet were classified based on the success of their two-day protein intake goal. The study showed that following RYGB and SG, more protein intake was associated with better fat-free body mass loss protection. Despite the fact that participants in the study did not achieve the amount of protein uptake today, the results support the proposed protein intake goal of at least 60 g / d or 1,1 g / kg IBW / day, which is significantly

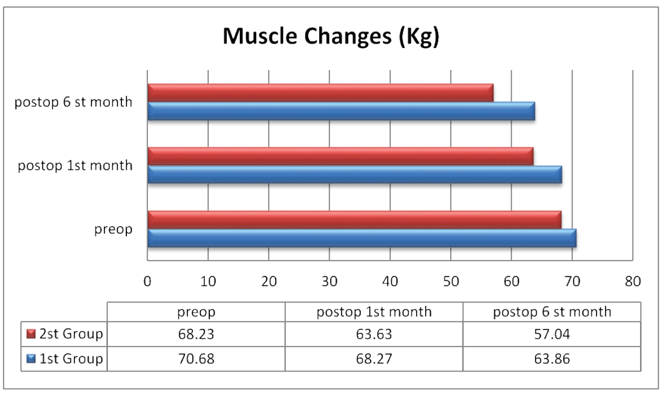

Figure 3: Muscle ratio changes of the patiens using protein supplement and not using protein supplement.

related to the better protection of lean body mass loss [17].

Findings that we have in our work also support the studies done in the literature. Comparing the two groups so called using and not using protein, the differences between body muscle loss in postoperative first month is statistically significant (p=0.026; p<0.05). In addition, the body muscle loss comparison in postoperative sixth month is highly statistically significant (p=0.0005; p<0.01). Muscle loss in group 2 patients that do not use protein dust is greater than in group 1 patients.

According to the researches; no changes in albumin or prealbumin levels were found after 6 and 12 months of bariatric surgery regardless of protein supplement or type of surgery. In most studies, protein intake was found to be less than 60 g / day. In addition, there was significant lean body mass loss after RYGB and SG. No association between protein intake and serum protein levels was found out [18].

In a study involving the bariatric surgery-exposed protein group and the control group, body weight decreased significantly in both groups, but body fat mass loss was observed higher in the protein group than in the control group. This study demonstrates that after 6 months of bariatric surgery, protein supplement improves body composition by increasing body fat mass loss and reducing lean body mass loss [19].

When we compared the first group cases that we named protein dust users with the second group cases that we named as non-users, there was no significant difference between the measured fat ratios in postoperative first month of two groups (p = 0.06, p <0.05). Significant differences were found between the two groups in the body fat percentages reevaluated at postop 6 months (p = 0.0117, p <0.05). We observed more loss of fat percentages than group 2 patients who did not use protein dust in group 1 cases.

After all bariatric procedures, lifelong vitamin and mineral supplementation is recommended. Evidence of vitamin and mineral deficiencies can take a long time, so biochemical tests will be helpful in detecting nutritional status [20]. GBP and SG have similar effects in terms of risk of micronutrient and protein failure in the first year after bariatric surgery due to energy and food restrictions [21]. Micronutrients recommended for routine post-bariatric surgery are selected according to AACE/TOS/ASMBS-2013. Mineral multivitamins Vertikalbandedgastroplasti (VBG), Roux-en-Y gastric bypass (RYGB) methods are recommended to support 1-2 tablets of prenatal minerals daily after bariatric surgery [22].

In studies comparing early endocrine and metabolic changes in obese patients in grade III, the reduction of stomach wall and volume restriction, premature satiety, prevents the release of oroxygenic hormones by bypassing the excreted stomach. The presence of undigested food in the terminal tract triggers the incretin effect. These mechanisms explain early recovery in some aspects of the metabolic syndrome independently of significant weight loss [23].

In a clinical trial with randomized 60 patients, the effects of SG and BG in first degree obese patients are compared. The patients having SG have greater weight loss in sixth and tvelveth months. In a retrospective analysis of a cohort of 71 GB of 38 GB by Bayham et al., Both groups were studied for up to 60 days postoperatively. During this period, 79 percent of patients with GB and 83 percent of patients with SG did not take medication for diabetes.

In the prospective cohort extending to postoperative 90th day, it was observed that the number of patients with the possibility of having diabetes in the GB group was higher than the SG group [24].

In the same cohort, Schauer and colleagues reported improvement in three groups of glycemic control at the end of 12 months, with an average HbA1c of 7.5 in the drug group, 6.4 in the GB group and 6.6 in the SG group. Significant differences were found in the amount of decrease in HbA1c between the two groups for 90 days in the study [25].

Random insulin increased after VSG, but random blood sugar decreased.

Lactate, NADH, NADPH, glucose and AMP / ATP ratio were found to increase after VSG, while gluconogenic enzymes and pyruvate and malate concentrations were found to decrease. Thyroid hormones, triiodothyronine and free thyroxine have decreased after VSG. In this study, VSG is proved to suppress hepatic glucose production [26].

In a study conducted by SG and RYGB to evaluate anthropometric and biochemical parameters, including changes in glucose levels, lipid profile, and liver function, no significant difference in glucose levels was observed between the two methods. The most significant differences were recorded for triglyceride levels. Triglyceride values decreased after all the cholesterol fractions after RGB, but showed an increase in the first months after SG treatment. However, because of the invasive character of RYGB, lifetime limited absorption of nutrients, SG procedure should be considered as the first option [27].

Conclusions and Recommendations

As a result of analyzes made, the differences between the fat percentage ratios of the patients in both groups were statistically significant at post op 6th month controls.

When the weight ratios of the cases were examined, no statistically significant difference was found between the two groups. When the muscle ratios of both groups are evaluated; post-op 1st month controls had statistically significant results, while post-op 6th month controls revealed highly statistically significant changes in body muscle rates of the two groups.

As a result, we observe that while body fat percentage is more decreased in group 1 patients, that regularly taking protein supplement, compared to group 2, we observed that the lean body mass is better preserved.

In this study to investigate the effect of protein supplementation on body composition in patients undergoing bariatric surgery, protein supplementation should be performed on each patient and body composition analysis should be performed with regular checks to ensure that weight loss is achieved by fat mass instead of fat-free mass. Quality proteins should be a top choice in the pattern of hypocaloric and protein rich diets. The creation of this consciousness in bariatric surgery patients will succeed us.

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