



Effect of bariatric surgery on night eating syndrome: A retrospective study

Bariatrik cerrahinin gece yeme sendromu üzerine etkisi: Retrospektif bir çalışma

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Abstract

Aim: Prevalence of night eating syndrome (NES) is higher in obese people. The effect of bariatric surgery on preoperative and postoperative eating disorders of obese patients remains controversial. This study aims to determine the preoperative and postoperative NES in patients who underwent bariatric surgery and the impact of surgery on this syndrome.

Methods: The study was conducted on 29 patients who applied for bariatric surgery at a university hospital to treat morbid obesity. The questionnaire used as a data collection tool included the participants' sociodemographic characteristics, anthropometric measurements, and the Night Eating Questionnaire (NEQ) elements. Groups with and without improvement in NES status with bariatric surgery were formed, and the groups were compared according to the other parameters. The relationship between night eating disorder, demographic characteristics, and anthropometric measurements were also evaluated.

Results: Bariatric surgery was promising in the entire group, the mean preoperative body mass index in the entire group was 42.9 ± 5.56 kg/m², and the mean postoperative 1st-year body mass index was 28.5 ± 5.98 kg/m². When NEQ was evaluated, it was seen that 27.6% of the patients had NES before the surgery and 10.3% after the surgery. It was found that only smoking had a negative effect on the improvement in NES ($p=0.045$), while other parameters did not have significant effects ($p>0.05$).

Conclusions: It has been observed that bariatric surgery positively affects NES. Although smoking negatively affects the improvement in NES, studies with larger samples are needed to evaluate these and other parameters more effectively.

Keywords: Bariatric surgery, obesity, night eating syndrome.

Öz

Amaç: Obez kişilerde gece yeme sendromu (GYS) prevalansı daha yüksek oranda görülmektedir. Obez hastaların ameliyat öncesi ve sonrası yeme bozuklukları üzerine bariatrik cerrahinin etkisi tartışmalıdır. Bu çalışmanın amacı, obezite cerrahisi geçiren hastalarda ameliyat öncesi ve sonrası GYS görülme oranının ve ameliyatın bu sendroma etkisini belirlemektir.

Yöntemler: Çalışma bir üniversite hastanesine morbid obezite cerrahi tedavisi için başvuran 29 hasta üzerinde yapıldı. Veri toplama aracı olarak kullanılan ankette, katılımcıların sosyodemografik özellikleri, antropometrik ölçümleri ve Gece Yeme Anketi (GYA) unsurlarına yer verilmiştir. Bariatrik cerrahi ile gece yeme sendromu durumunda düzelme olan ve olmayan gruplar oluşturuldu ve gruplar diğer parametrelere göre karşılaştırıldı. Ayrıca gece yeme bozukluğu ile demografik özellikler ve antropometrik ölçümler arasındaki ilişkinin değerlendirildi.

Bulgular: Demografik veriler incelendiğinde bariatrik cerrahinin yeterli kilo kaybını sağladığı görüldü. Preoperatif ortalama vücut kitle indeksi $42,9 \pm 5,56$ kg/m² ve 1 yıl sonra ortalama vücut kitle indeksi $28,5 \pm 5,98$ kg/m² olarak saptandı. GYA'yi değerlendirildiğinde hastaların %27,6'sının ameliyat öncesi, %10,3'ünün ameliyat sonrası GYS yaşadığı görüldü. Sadece sigara içmenin GYS'deki iyileşme üzerinde olumsuz bir etkisi olduğu ($p=0,045$), diğer parametrelerin ise anlamlı bir etkisi olmadığı ($p>0,05$) bulundu.

Sonuç: Bariatrik cerrahinin GYS üzerine olumlu etkileri olduğu gözlemlenmiştir. Sigara içmek GYS'deki iyileşmeyi olumsuz etkilese de, bu ve diğer parametrelerin daha etkin değerlendirilmesi için daha büyük örneklemli çalışmalara ihtiyaç vardır.

Anahtar Kelimeler: Bariatrik cerrahi, obezite, gece yeme sendromu.

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Introduction

The World Health Organization (WHO) reports that obesity will be the most significant health problem of the 21st century. The prevalence of obesity is increasing in adults, children, and adolescents in our country. While many genetic, physiological, behavioral, sociocultural, and environmental physio-pathological factors lead to the development of obesity; also cultural, behavioral, and environmental factors (energy-intensive diet, large portions, physical inactivity, sedentary lifestyle) eating disorders accelerate the development of obesity [1].

The necessary treatment for obesity is lifestyle change and diet. However, pharmacotherapy or bariatric surgery is applied in patients who cannot achieve targeted weight loss. Bariatric surgery is currently the only treatment offering high and long-term weight loss [1, 2]. Significant improvement is observed with bariatric surgery in diseases such as obesity-related type 2 diabetes, hypertension, dyslipidemia, obstructive sleep apnea, renal dysfunction, and depression [3]. A multidisciplinary team for appropriate patient selection, adequate preoperative (pre-op) evaluation, and appropriate postoperative (post-op) follow-up are vital for reaching success in bariatric surgery [1]. Before and after bariatric surgery, eating behavior plays a crucial role in postoperative outcomes [4, 5]. Eating disorders and problematic eating behavior, which are more common in bariatric surgery patients compared to the non-obese population, may have adverse effects on post-op bariatric surgery outcomes [6].

Eating disorders start with insufficient or excessive food intake and cause permanent changes in eating attitudes and behavior [7]. The most frequent eating disorders among the patients who are candidates for bariatric surgery can be listed as; binge eating disorder, night eating syndrome, emotional eating, and frequent snacking or grazing during the day. Moreover, although it has not yet been included in the DSM-5 (Diagnostic and Statistical Manual of Mental Disorders-5), food addiction also appears in studies carried out [6, 8, 9]. The literature indicates that binge eating disorder is observed in 4-45%, grazing in 20-60%, night eating syndrome in 42%, emotional eating in 38-59%, and food addiction in 36.8% of bariatric surgery candidates [8, 10, 11]. The performance of a psychological evaluation before the bariatric surgery for the patients and providing post-op support through psychological follow-up for the patients with a diagnosed eating disorder are among the factors that will lead the patient to success after the surgery [6, 12].

Night Eating Syndrome (NES) was first described by Stunkard in 1955 as a disorder in treatment-resistant obesity patients characterized by morning anorexia, evening hyperphagia, and insomnia [13]. NES is described as the presence of morning anorexia, excessive evening eating due to omitting breakfast or eating sparingly in breakfast, at least having 25% of total daily energy after the evening meal, and the occurrence of this case at least two times per week. It has been included in DSM-5 as other eating disorders and has been reported to be associated with conscious episodes of an evening or nighttime hyperphagia and emotional stress [10, 14]. In night eating syndrome, the patient is fully aware of what is eaten when he or she wakes up at night and eats. In contrast, an entirely different illness in sleep eating disorder, the individuals wake up at night and eat. However, they are not aware of this situation and have no memory of the next day. While the prevalence of night-eating syndrome in the general population varies between 1.1% and 1.5%, this prevalence is reported as 6-16% in obese individuals. Postoperative studies

indicate that 6-8% of patients experience night-eating syndrome after surgery [15, 16].

This study aims to show the rate of NES before and after bariatric surgery and how bariatric surgery affects this disorder in short-term follow-up. Also, demographic parameters and daily habits of the patients (alcohol consumption, smoking) were questioned, and any relationship regarding NES development was noted.

Material and methods

Study

This study was conducted per the principles of the Declaration of Helsinki, 2008, with patients who applied for bariatric surgery and underwent subsequent surgery at a University Hospital in Istanbul. The local ethical committee approved the study (21.05.2020/05-218614). The study was conducted by obtaining informed consent voluntarily from patients between December 2019 and May 2021. As the study's criteria, interviews were conducted with 42 patients aged 18-65 years and with no hearing impairment. The study was completed with 29 participants and was included in the statistical analysis. Patients who could not comply with one-year follow-up protocol and patients who had revisional surgery due to weight regain and complications were excluded from the study.

Variables

As a data collection tool, the sociodemographic characteristics (age, gender, educational status, marital status), anthropometric measurements (height, weight, BMI), and finally, the Night Eating Questionnaire (NEQ) of the participants were used. The Night Eating Questionnaire was first developed by Allison et al. [17] in 2008 to evaluate the scanning and symptom severity. Turkish validity and reliability study was conducted by Atasoy et al. [18] in 2014. The Cronbach's alpha coefficient was found to be 0.69. NEQ is currently the most widely used criterion. The current version is in a 5-point Likert type and consists of 14 items, with a cut-off score of 25 [17, 18].

The patients were divided into two groups according to the effects of bariatric surgery on NES. Those with NES scores >25 in the preoperative period, but <25 in the postoperative 1st year and <25 in both periods, were included in Group 1 (improvement in NES), and those with >25 scores in the postoperative 1st year were included in Group 2 (no improvement in NES). Groups were compared according to sociodemographic characteristics and anthropometric measurements. Correlation analysis was then performed to examine the factors affecting improvement in NES.

Statistical Analysis

The research is of a scanning model and descriptive. Data collected quantitatively were evaluated with IBM SPSS Statistics 25.0. The significant difference between variables was analyzed using the Mann-Whitney U test for non-parametric data and the Chi-square test for parametric data. Pearson's Correlation Analysis was also used to evaluate the parameters affecting the improvement in NES after bariatric surgery. A p-value less than 0.05 was regarded as statistical significance.

Results

Among the 29 patients included in the study, 24.1% (n = 7) were male, 75.9% (n = 22) were female. The mean age was 41.52±9.52 (24-62) years. In terms of education level, 65.5% (n=19) of the patients were university or high school graduates, and 34.5% (n=10) were primary or secondary school graduates. Additionally, 72.4% (n = 21) of them were married and 27.6% (n = 8) of them were single. These parametric did not show significant differences between groups (p>0.05). When smoking and alcohol use were evaluated, 37.9% of the patients smoked, and 17.2% used alcohol. It was determined that all patients in the group with no improvement in NES (group 2) were smokers, and statistical significance was observed between smoking status and groups (p=0.045) (Table 1). Furthermore, no significant difference was determined between the groups in terms of the number of daily main meals, the number of daily snacks, nutritionist support status, and psychological support status (p>0.05) (Table 1).

When the anthropometric values of the patients were examined, it was observed that the mean height was 165 ± 9.9 cm, preoperative mean weight of the patients was found 118 ± 21.4 kg, mean postoperative 1st-year weight was found 77.7 ± 16.2 kg. The mean preoperative BMI was 42.9 ± 5.56 kg/m². The mean postoperative 1st-year BMI was 28.5 ± 5.98 kg/m², and the excess BMI loss percentage (%EBMIL) was %86.89. No significant results were detected in comparing groups according to these anthropometric parameters. (p>0.05) (Table 1).

The rate of the night eating syndrome, which was 27.5% (Group 1, n = 8) before the surgery, decreased to 10.3% (Group 2, n = 3) after the surgery. Moreover, it was observed that six patients recovered after surgery, there was no change in the results of two patients, and night eating syndrome developed in one patient.

In the Pearson Correlation Analysis, which we used to examine the effects of the parameters on the improvement in NES, it was found that there was a significant negative correlation between smoking and improvement in NES and no correlation with other parameters (p=0.019) (Table 2).

Table 1. Comparison of the groups according to the sociodemographic and anthropometric parameters.

		Group 1 (n=26)	Group 2 (n=3)	p
Age (year) †		41.65±9.81	40.33±8.08	0.774
Gender ‡	Male	6 (23)	1 (33)	1.000
	Female	20 (77)	2 (67)	
Marital status ‡	Single	18 (69)	3 (100)	0.540
	Married	8 (31)	0 (0)	
Education level ‡	Primary-secondary school	10 (39)	0 (0)	0.532
	High school-university	16 (61)	3 (100)	
Smoking ‡		8 (31)	3 (100)	0.045
Alcohol ‡		5 (19)	0 (0)	1.000
Number of daily main meals ‡	<3	11 (42)	2 (67)	0.573
	≥3	15 (58)	1 (33)	
Number of daily snacks ‡	<3	14 (54)	2 (67)	1.000
	≥3	12 (46)	1 (33)	
Nutritionist support ‡		17 (65)	2 (67)	1.000
Psychological support ‡		4 (15)	0 (0)	1.000
Height (m) †		1.65±0.10	1.63±0.07	0.857
Preoperative weight (kg)		120.19±22.16	106.33±8.14	0.151
Preoperative BMI (kg/m ²)		43.52±5.72	39.79±3.92	0.283
Postoperative 1st-year weight (kg)		77.27±13.93	75.67±12.22	0.914
Postoperative 1st year BMI (kg/m ²)		28.11±4.79	28.42±5.88	1.000
Postoperative 1st-year EBMIL (%)		87.43±30.02	82.25±3.54	0.943

†: mean ± standard deviation, ‡: n (%), BMI: Body mass index, EBMIL: excess body mass index loss.

Table 2. The effects of different parameters on the improvement of NES.

	Improvement in Night eating syndrome	
	Pearson Correlation Coefficient (r)	p
Sex	0.073	0.707
Age	0.043	0.825
Marital status	0.21	0.275
Education level	0.054	0.78
Smoking status	-0.435	0.019
Alcohol use	0.155	0.422
Number of daily main meals	0.149	0.44
Number of daily snacks	0.079	0.686
Nutritionist support	-0.008	0.966
Psychological support	0.136	0.482
Height	0.069	0.723
Preoperative weight	0.2	0.299
Preoperative body mass index	0.205	0.285
Postoperative 1st-year weight	0.037	0.851
Postoperative 1st-year body mass index	-0.02	0.919

Discussion

Bariatric surgery is recognized as the most effective treatment for obesity and, in general, results in the improvement or resolution of the medical and psychosocial comorbidities associated with morbid obesity. However, studies show that bariatric surgery candidates are likely to present with eating disorders and problematic eating behavior. These problems may persist or develop after bariatric surgery, and even psychological disorders that did not exist before may also occur [19, 20]. The prevalence of eating disorders and problematic eating behavior in bariatric surgery patients suggests that this situation may significantly impact the outcomes of bariatric surgery [14].

Among the 29 patients included in the present study, 75.9% were female, 24.1% were male, and regarding their education levels, 48.3% were high school graduates, and 27.6% were primary school graduates. In research evaluating the eating disorders in individuals who underwent bariatric surgery, it was reported that the education levels of 215 patients (82% female, 18% male) were high school or lower level with a ratio of 45.2%. Therefore, the gender ratios and education levels in the two studies show similarities [21]. Other studies examining the eating disorders show parallelism with this study, and it was seen that most of the participants were women [22, 23]. Although female gender is predominant in our study and many of the studies, there has been no gender impact on NES development before or after bariatric surgery. However, a comparative larger prospective cohort is necessary to justify this fact.

The patients' marital status and daily habits can be another contributing factor for various eating disorders. In a study conducted in Spain that included 31 individuals with a history of bariatric surgery, it was concluded that 61% of the participants were married, 39% were single, 38.2% of the participants were smoking, and 40.0% were using alcohol. The results of this study on alcohol use were found to be higher than in our study, but other findings showed similarities [24]. In another study performed on college students, it was found that smoking was not a contributory factor for NES relatively shorter sleep time and poor sleep quality were found to be contributory factors for the development of NES [25]. Compared to a study examining alcohol use in bariatric surgery, the rate of alcohol use in ours seems to be higher by 10% [26]. Our study showed that smoking had a negative effect on recovery in NES after bariatric surgery and all the patients with NES in our study were smokers. Interestingly this situation contradicts some studies in the literature. Changes in appetite caused by smoking and the resulting irregular eating habits can be reported to explain this situation.

After surgery, patients are advised to consume 3-6 meals a day, watch portion control to prevent nausea and vomiting, and take snacks [27-29]. Consuming less frequent meals and low-calorie intake during the day can contribute to NES development. When the patients' number of daily meals was examined, it was determined that 55% had three main meals a day, and 44.8% had three snacks a day. In a different study in which the nutritional quality of the patients was discussed, it is seen that 70.5% had three main meals a day, and 31.8% had three snacks a day [30]. While 62% of the patients participating in this study reported that they received dietitian support, in another study, it is seen that 74% of the participants have no contact with a dietitian [31]. We believe that continued dietitian support is of most importance for the treatment of NES and other eating disorders and to prevent weight regain after bariatric surgery.

No statistically significant difference was found between the postoperative questionnaire scores of male and female patients in the current study. Nevertheless, in a study evaluating eating behavior after surgery, there was no gender difference in the

results similarly [23]. In contrast, in another study, it is reported that BMI is higher in women than in men [33].

The eating behavior of bariatric surgery candidates was examined in various studies. It was seen that between 1.9% and 41.7% of the candidates had existing NES before bariatric surgery [11]. Similarly, in another study, the prevalence of this rate varied between 8.9% and 55% [34]. These findings were in accordance with our results which show a pre-op night eating rate of 27.6%. This finding shows that careful evaluation of the patients with a dedicated dietician and psychologist is necessary before surgery.

In a study examining the effect of bariatric surgery on night eating syndrome, it is seen that the postoperative night eating questionnaire scores decreased from 14.18 ± 7.69 to 12.32 ± 7.66 and that in both studies, there was a downward trend in the postoperative night eating questionnaire scores. No statistically significant difference was found between BMI and NES in our study. The same results were also achieved by Ferreira Pinto et al.'s study [35].

The main limitation of our study was the small sample size and retrospective design. Also, comparing patients with eating disorders and NES with a control group in a longer follow-up period would lead to better and more factual findings and might clearly show the advantages of bariatric surgery in these particular groups of patients.

In conclusion, due to our findings, it was observed that there was an improvement in the incidence of night eating syndrome and questionnaire scores in patients after bariatric surgery. According to the results obtained, it is seen that evaluating the presence of eating disorders in patients undergoing bariatric surgery and raising awareness about eating disorders in patients are of importance. Moreover, smoking is an essential parameter for the improvement of NES after bariatric surgery.

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