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Effect of COVID-19 Pandemic in Patients with Bariatric Surgery

Bariyatrik Cerrahi Hastalarına COVID-19 Pandemisinin Etkisi

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Abstract

Objective: Bariatric surgery is one of the most effective treatments for morbid obesity. Postoperatively, patients should be followed up regularly. The objective of the study was to examine the effect of the COVID-19 pandemic in patients who have undergone bariatric surgery because of morbid obesity. **Material and Methods:** For the telephone survey, 157 patients aged 18–65 years who had bariatric surgery due to morbid obesity from 2015–2019 were contacted. The impact of the COVID-19 pandemic on weight gain in patients who underwent obesity surgery and the severity of the patients who had COVID-19 were investigated. The patients were evaluated nine months after the COVID-19 pandemic started. **Results:** During the pandemic, weight gain was recorded in 94 patients (59.9%). Eating behavior was enhanced in 80 (51%) patients in total, from which 69 (73.4%) patients were in the weight gain group ($p<0.001$). COVID-19 was found in 21 (13.3%) patients; no intensive care was needed, and no mortality due to COVID-19 occurred. **Conclusions:** It was observed that patients who had bariatric surgery during the pandemic changed their diet and eating patterns, mostly resulting in weight gain. The follow-up of operated patients due to morbid obesity should not be interrupted during a pandemic like COVID-19.

Keywords: COVID-19; bariatric surgery; pandemic

Özet

Amaç: Bariatrik cerrahi, morbid obezite tedavisinde en etkili yöntemlerden biridir. Ameliyat olan hastalar postoperatif dönemde düzenli olarak takip edilmelidir. Bu çalışmada, morbid obezite nedeniyle bariatrik cerrahi uygulanan hastalarda COVID-19 pandemisinin etkisinin incelenmesi amaçlanmıştır. **Gereç ve Yöntemler:** 2015-2019 yılları arasında morbid obezite nedeniyle obezite cerrahisi geçiren 18-65 yaş arası 157 hastaya telefon anketi için kişisel telefonları aranarak ulaşılmıştır. Hastalar aranarak obezite cerrahisi geçiren hastalarda COVID-19 pandemisinin kilo alımına etkisi ve COVID-19 geçiren kişilerde hastalığın şiddeti araştırılmıştır. Hastalar, COVID-19 Pandemisi başladıktan 9 ay sonra değerlendirilmiştir. **Bulgular:** Pandemi döneminde 94 hastada (%59.9) kilo artışı tespit edilmiştir Tüm hastaların 80'inde (%51), kilo alan hastaların ise 69'unda (%73.4) yeme davranışında artış saptanmıştır ($p<0.001$). COVID-19 21 (%13.3) hastada saptanmıştır. Bu hastaların hiçbirinde yoğun bakıma ihtiyaç duyulmamış ve vefat eden hasta olmamıştır. **Sonuç:** Pandemi döneminde obezite cerrahisi geçiren hastaların diyet ve beslenme alışkanlıklarında değişiklik olduğu ve buna bağlı olarak çoğunda kilo artışı meydana geldiği gözlenmiştir. COVID-19 gibi pandemi süreçlerinde morbid obezite nedeniyle ameliyat edilen hastaların takibine ara verilmemelidir.

Anahtar kelimeler: COVID-19; obezite cerrahisi; pandemi

Introduction

The definition of obesity is when a body mass index (BMI) of greater than 30 is caused by excess calories consumed or an energy intake exceeding energy expenditure (1). In the 21st century, obesity has become the most prevalent disease (2). According to the World Health Organization (WHO), about 650 million people are obese (BMI >30 kg/m^2), and 1.9 billion people are overweight (BMI >,27 kg/m^2) worldwide (2,3).

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A diversified strategy is needed to treat obesity, a serious public health issue, effectively. A lack of physical exercise and calorie-dense eating habits contribute to excessive weight gain.

Obesity can be avoided or treated by several therapy procedures, including diet, exercise, and medicinal treatment. Nevertheless, there has been a tendency for the lost weight to regain, and thus bariatric surgeries have been used since the mid-twentieth century. Treatments, including restrictive, absorption disrupting, and combination procedures, are used (4). In the treatment of obesity-related chronic diseases, bariatric surgery is among the most effective methods (5,6). However, it may result in malnutrition due to surgical complications and malabsorption (7).

On December 31, 2019, COVID-19 was first reported to the WHO in Wuhan City, Hubei Province of China and later designated as COVID-19 on February 11, 2020 (8,9). Obese people have been forced to stay at home due to epidemic-related social isolation standards. Like everyone else, obese people who have undergone bariatric surgery have experienced stress and uncertainty due to this circumstance. Our study investigated the weight changes in bariatric surgery patients, whether they followed their dietitian, their diets, their exercise status, and health status during COVID-19. Furthermore, Moreover, the incidence and severity of the COVID-19 disease among patients who underwent bariatric surgery were also studied.

Material and Methods

Study Population

The current research was approved by the Ethics Committee of the Health Sciences University Keçiören Training and Research Hospital with approval number 2012-KAEK-15/2188 dated 11.11.2020 and was conducted in accordance with the Helsinki Declaration Principles. The approval of the Ministry of Health of the Republic of Turkey was obtained for the study. (Form Name: Abdulkadir Ünsal-2020-10-07T20_36_40). The General Surgery Clinic conducted a cross-sectional survey of bariatric surgery patients aged between 18 and 65 from 2015 to 2019. Verbal consent was obtained from the patients before the survey was conducted. Every patient underwent a sleeve gastrectomy. We included patients who regularly attended routine health checks before COVID-19 in the study, which started about nine months after the first COVID-19 case was detected (December 1, 2019).

Following approval from the local ethical committee, the study was conducted via telemedicine interview and questionnaire. The interviews lasting 15-20 mins were performed through a variety of communication means (phone call, Zoom, Skype, WhatsApp, and video chats) under the constraints of COVID-19. The patients were given detailed information about the study by preparing a questionnaire with 27 open-ended and multiple-choice questions. In this study, patients who underwent bariatric surgery between the specified years were included, and patients who could not be contacted through telemedicine and refused to participate were excluded. Patients' questions were answered following the questionnaire, information about the outpatient clinic appointments and follow-up during the pandemic process was provided, and examination appointments were given to the patients who wanted.

A number of demographic parameters, educational levels, concomitant diseases, and weight-BMI were recorded both before and after the pandemic. The patients' BMI was calculated using weight/height^2 (kg/m^2). During the pandemic, they were questioned about their work status, eating habits, outpatient follow-ups, food, and sports. During this process, it was also noted whether they had COVID-19, what are the symptoms of it, and whether they received therapy. We aimed to assess the concerns of such patients and to shed light on their lives during the pandemic by inspecting whether the patients who underwent bariatric surgery gained weight during the COVID-19, how they dealt with this process, and how severely the patients who had COVID-19 experienced pandemic.

Statistical Analysis

Statistical analysis was done using the SPSS package program for Windows 22 (Chicago, IL, USA). The distribution of variables was investigated by the Kolmogorov-Smirnov test. For continuous variables, descriptive statistics were presented as mean±standard deviation or median, and for categorical

variables, the number of cases and percentage, were shown. The significance of the difference between the groups in terms of means was studied with Student's t-test and the significance of the difference in terms of median values with the Mann Whitney U test. Categorical variables were calculated with Pearson's Chi-Square test. P<0.05 was considered to be statistically significant.

Results

Working Group

In our clinic, there are total of 657 patients who had bariatric surgery. However, only the willing patients whose data for approximately four years could be reached were included in the study. This study excluded 500 bariatric surgery patients whose data could not be accessed, who refused to participate in the survey, who refused to provide verbal consent, and who could not be reached through communication. Therefore, 157 patients aged between 18 and 65 who underwent bariatric surgery for morbid obesity from 2015 to 2019 were included in the study. 128 (81.5%) patients were female, and 29 (19.5%) were male. The mean age of the whole group was 40.26±10.5. There were 69.4% of the patients living in provincial centers and 30.6% in small settlements (district, town, and village). Out of all, 55 (35%) patients were active smokers.

Table 1 shows the average height, weight, and BMI values of the patients before the operation before the pandemic began and at the ninth month following the pandemic. On average, pre-operative BMI was 47.7±6.2 kg/m^2, pre-pandemic BMI was 29.53±5.4 kg/m^2, and current BMI was 30.12±5.5 kg/m^2. Based on the information provided by the patients through telephone, 84 patients had comorbid disorders after surgery. The most common comorbidities (1.3%) were hypertension (26.8%), diabetes mellitus (22.9%), goiter (17.2%), asthma (8.9%), obstructive sleep apnea syndrome (5.7%), coronary artery disease (5%), and hyperlipidemia (5.2%).

Evaluating the Pandemic Process

The study period is covered from the date of the start of the pandemic (December 1, 2019) to the date of the study (9 months). Weight gain was noted in 94 (59.9%) patients. The weight gain ranged from 0 to 5 kg in 51 (54.8%), 5 to 10 kg in 31 (33.3%), and 10 to 20 kg in 11 (11.8%) patients. Overall, 38 patients (24.2%) had no change in weight from pre-pandemic to post-pandemic, while 25 patients (15.9%) experienced a loss of weight from 0-5 kg.

During the pandemic, only nine patients (5.7%) were provided with dietitian support. According to the survey, only five patients (3.2%) followed a diet, 50 patients (31.8%) did light exercise, and ten patients (6.4%) followed both diet and exercise. About 62 patients from the "weight gain group" and 30 patients from the "Not weight gain group" did not exercise or follow a diet. An increase in eating behavior (including grazing, increased snacking, and increased number of meals per day) was observed in 51% of patients, out of which 69 patients (73.4%) were from the "weight gain group" (p<0.001). Due to the pandemic, 90.4% of patients did not come to their routine postoperative follow-up. This occurred because they were not able to make an appointment (45.1%) or afraid of getting COVID-19 (43.7%).

During the pandemic, 50.3% of patients went outside for mandatory causes (market, health, fueling, etc.), 38.2% for work, 6.4% for walking and exercise, 1.9% for visiting close relatives and friends, and 3.2% did not go outside at all.

COVID-19 Status

Based on the results of PCR (Polymerase Chain Reaction) tests, 13.3% (21/157) of patients were infected with COVID-19, out of which 16 (76.2%) were women. Although 31 patients had contacted with COVID-19 infected individuals, of whom 21 were infected, and ten were not infected. The symptoms examined in these patients were fever (n:20), weakness (n:19), headaches (n:12), coughs (n:11), respiratory distress (n:6), no taste or smell (n:11), and gastrointestinal problem (n:2).

Out of these 21 COVID-19 positive patients, 18 were treated at home, and three were hospitalized.

No patients required intensive care or died. In the group with COVID-19, the mean pre-pandemic BMI was 31.3 ±4.6 kg/m^2, and the mean BMI of the group that did not have COVID-19 was 29.26±5.47 kg/m^2. The difference in mean BMI between the two groups was statistically significant (p:

Table 1. Descriptive analysis report.

	Whole group n=157	Not weight gaining group n=63	Weight gain group n=94	p value
Age (y)**	40.26 (10.5)	40.2 (9.7)	40.3 (11.08)	0.926
Sex (female), n (%)	128 (81.5)	52 (82.5)	76 (80.9)	0.789
Education (%)				0.535
Uneducated	4 (2.5)	2 (3.2)	2 (2.1)	
Primary school	48 (30.6)	19 (30.2)	29 (30.9)	
Middle school	17 (10.8)	10 (15.9)	7 (7.4)	
High school	51 (32.5)	19 (30.2)	32 (34)	
University	37 (23.6)	13 (20.6)	24 (25.5)	
Smoking, n (%)	55 (35)	21 (33.3)	34 (36.2)	0.715
Region, n (%)				0.588
Province	109 (69.4)	43 (68.3)	66 (70.2)	
District	45 (28.7)	18 (28.6)	27 (28.7)	
Town	1 (0.6)	1 (1.6)	0	
Village	2 (1.3)	1 (1.6)	1 (1.1)	
Height (cm)**	165.3 (9.05)	165.9 (8.56)	164.85 (9.38)	0.357
Preoperative				
Weight (kg)**	130.57 (18.28)	130 (15.9)	131.01 (19.77)	0.869
Body mass index (kg/m²)**	47.7 (6.19)	47.3 (6.72)	48.02 (5.83)	0.244
Before COVID-19 pandemic				
Weight (kg)**	80.74 (15.3)	83.34 (16.2)	79 (14.5)	0.171
Body mass index (kg/m²)**	29.53 (5.4)	30.3 (5.9)	29 (5)	0.178
COVID-19 pandemic				
Weight (kg)**	82.3 (15.14)	78.63 (14.16)	84.8 (15.35)	0.005*
Body mass index (kg/m²)**	30.12 (5.49)	28.62 (5.55)	31.13 (5.23)	<0.001*
COVID-19 patients, n (%)	21 (13.4)	9 (14.3)	12 (12.8)	0.784
COVID-19 treatment place, n (%)				0.719
Home	18 (85.7)	8 (88.9)	10 (83.3)	
Hospital	3 (14.3)	1 (11.1)	2 (16.7)	
Dietitian support, n (%)	9 (5.7)	4 (6.3)	5 (5.3)	0.786
Diet, sports in pandemic, n (%)				0.068
Diet	5 (3.2)	2 (3.2)	3 (3.2)	
Sports	50 (31.8)	24 (38.1)	26 (27.7)	
Diet vs. sports	10 (6.4)	7 (11.1)	3 (3.2)	
Non	92 (58.6)	30 (47.6)	62 (66)	
Eating behavior during the pandemic period, n (%)				
No change	67 (42.7)	43 (68.3)	24 (25.5)	<0.001*
Decreased	10 (6.4)	9 (14.3)	1 (1.1)	<0.001*
Increased	80 (51)	11 (17.5)	69 (73.4)	<0.001*
Working status, n (%)				0.181
Not working	93 (59.2)	34 (54)	59 (62.8)	
Flexible employees	33 (21)	12 (19)	21 (22.3)	
Regular working	31 (19.7)	17 (27)	14 (14.9)	
Concomitant diseases, n (%)	84 (53.8)	34 (54.8)	50 (53.2)	0.840
Hypertension	42 (26.8)	17 (27)	25 (26.6)	0.957
Diabetes mellitus	36 (22.9)	13 (20.6)	23 (24.5)	0.575
Goiter	27 (17.2)	12 (19)	15 (16)	0.615
Obstructive sleep apnea	9 (5.7)	4 (6.3)	5 (5.3)	0.786
Hyperlipidemia	2 (1.3)	1 (1.6)	1 (1.1)	0.774
Asthma	14 (8.9)	5 (7.9)	9 (9.6)	0.724
Coronary artery disease	8 (5.1)	3 (4.8)	5 (5.3)	0.876

*p<0.05 was considered significant; **Mean, SD (±); n: Number of patients.

0.044). As shown in Table 2, there was an extra disease in 52.4% of the COVID-19-positive group and 54.1% of the COVID-19-negative group, having no statistically significant difference between the two groups (p: 0.885). In the entire group, two patients with hyperlipidemia had COVID-19.

Discussion

Several studies have found obesity, as an independent risk factor in COVID-19 (10). We believe that disrupting control during a pandemic is a major contributor to weight gain. Telemedicine is essential during such a pandemic period to reach and follow up with patients.

Quarantine has become unavoidable in all countries to prevent the spread of COVID-19 (11). During quarantine, the lifestyle of people had become monotonous due to a decrease in physical activity, time away from work, and working from home. The quarantine period for COVID-19 is expected to change people's dietary and physical activity habits. In a large-scale investigation found that the bodyweight of obese patients increased during the pandemic period, showing similar results as our study (12).

In order to prevent the spread of the COVID-19 virus11, isolation strategies must be implemented (12). During the quarantine period, social distancing, travel restrictions were encouraged (10). We found that most of the patients went out only when necessary during the quarantine period, while others did not go out at all.

The physical activities of most of the patients were impacted negatively during the social isolation.

The most common reason for this negativity was a lack of motivation.

Previous studies indicated the change in dietary habits during the pandemic (13). According to another study, people felt hungrier and ate more food during the pandemic (12). In a similar way; our study indicated the increase in eating behavior in patients who had bariatric surgery during the pandemic.

Table 2. Evaluation of patients according to their status of having COVID-19.

	All, n=157	COVID-19 negative n=136	COVID-19 positive n=21	p value
Age (y)**	40.26 (10.5)	40.4 (10.5)	32.3 (10.6)	0.749
Sex (female), n (%)	128 (81.5)	112 (82.4)	16 (76.2)	0.498
Concomitant diseases, n (%)	84 (53.8)	73 (54.1)	11 (52.4)	0.885
Hypertension	42 (26.8)	37 (27.2)	5 (23.8)	0.743
Obstructive sleep apnea	36 (22.9)	31 (22.8)	5 (23.8)	0.918
Hyperlipidemia	27 (17.2)	24 (17.6)	3 (14.3)	0.704
Asthma	9 (5.7)	8 (5.9)	1 (4.8)	0.837
Coronary artery disease	2 (1.3)	0	2 (9.5)	-
Goiter	14 (8.9)	12 (8.8)	2 (9.5)	0.917
Obstructive sleep apnea	8 (5.1)	7 (5.1)	1 (4.8)	0.940
Smoking, n (%)	55 (35)	49 (36)	6 (28.6)	0.505
Height (cm)**	165.3 (9.05)	165.13 (9.1)	166.3 (8.9)	0.566
Preoperative				
Weight (kg)**	130.57 (18.28)	129.7 (18.5)	136.4 (15.84)	0.070
Body mass index (kg/m²)**	47.7 (6.19)	47.46 (6.2)	49.4 (6.3)	0.129
Before pandemic				
Weight (kg)**	80.74 (15.3)	79.84 (15.34)	86.5 (14)	**0.020***
Body mass index (kg/m²)**	29.53 (5.4)	29.26 (5.47)	31.3 (4.6)	**0.044***
During pandemic				
Weight (kg)**	82.3 (15.14)	81.5 (15.2)	87.7 (14.04)	0.061
Body mass index (kg/m²)**	30.12 (5.49)	29.9 (5.43)	31.7 (5.7)	0.199

*p<0.05 was considered significant (Bold); **Mean, SD (±); n: Number of patients.

It was anticipated that the American College of Sports Medicine's standard of 150 min of moderate-intensity or 75 min of high-intensity activity per week would be difficult to meet in the pandemic (13). A fall in physical activity from 10,000 to 1,500 steps per day, even over a short period of two weeks, is reported to result in insulin sensitivity decreasing, lipid metabolism being impaired, visceral fat accumulation increasing, and cardiovascular health decreasing (14). Our study determined that the majority of the participants were inactive in terms of physical activity during the pandemic and quarantine. It is believed that governments and health professionals do not give enough attention to the public by informing them about the importance of regular physical activity during isolation (10).

It has been observed that individuals with coronary artery disease, diabetes mellitus, hypertension, obesity, and the elderly are at higher risk of developing COVID-19 disease (15). Our study found no difference inCOVID-19 infection between those who had an additional disease and those who did not. This may be the fact that the working conditions of those with additional diseases in our country may be improved during the pandemic. It may also be possible as people are properly following the isolation in the pandemic. Researchers have noted that chronic diseases that pose a risk for COVID-19 are related to the ACE1 (Angiotensin-converting enzyme 1) system, which causes oxidative, inflammatory, and fibrotic tissue damage (16). ACE1 system has been found to be effective in overweight people who eat excessively and in physically inactive individuals (17). The effects of COVID-19 on obese patients are not yet evident during the pandemic. It has been reported that in the case of H1N1 influenza, the prognosis of obese patients is not good (18). Based on this, obese patients were considered as a risk group, as in H1N1 influenza infection, with the occurrence of COVID-19 complications (19-22). In 2009, obesity was recognized as an independent risk factor for influenza-related complications in the H1N1 pandemic, likewise; for COVID-1923.It has been well documented that obesity is a pro-inflammatory condition (23).

According to the data that included BMI data from China where COVID-19 started, it was stated that severe pneumonia developed in 86% of those who were overweight and 42% of those who were obese (24). In severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) pandemic, severe obesity (BMI > 40 kg/m^2), diabetes mellitus, and hypertension are also contributing factors. It has been reported to increase the risk of complications and death (25). Studies stated that obesity causes lower respiratory tract infection and severe tissue damage and is an independent risk factor for increased mortality (26). Weight loss provided by restrictive procedures that reduce calorie intake by reducing stomach volume can alleviate chronic inflammation induced by obesity and normalize inflammatory mediators in morbidly obese people. The current study showed that only 21 patients had COVID-19 disease, only three were hospitalized, and there was no need for intensive care and mortality. All patients with hyperlipidemia had COVID-19, but it was not feasible to link them due to the small number.

This study is the only research investigating the effects of COVID-19 on bariatric surgery patients in Turkey, a crossroad between east and west. The patients participating in the study have been operated in our own center, and whose earlier follow-up information was recorded. All of the patients were operated on in a particular center by a particular team. During the survey, adequate time was allocated to all patients participating in our study.

Our study has the limitation that it is a cross-sectional survey study; causal correlation could not be evaluated. The number of patients in our study was limited, and similar studies can be done with large groups in the future.

Conclusion

Therefore, it can be concluded that bariatric surgery is effective in decreasing the BMI of obese patients, decreasing inflammation, and decreasing comorbid diseases, protecting them from COVID-19 disease or its mild course. Patients in our study were obese before surgery, but since they are not in the obese category now, there was no mortality or intensive care need. According to our study, most of the bariatric surgery patients had gained weight due to changes in their diet and eating habits during the pandemic period. It is therefore es-

sential to provide routine follow-up to patients who have undergone bariatric surgery.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: Abdulkadir Ünsal; Design: Veysel Barış Turhan; Control/Supervision: Veysel Barış Turhan; Data Collection and/or Processing: Doğan Öztürk; Analysis and/or Interpretation: Doğan Öztürk; Literature Review: Veysel Barış Turhan; Writing the Article: Abdulkadir Ünsal; Critical Review: Hakan Buluş; References and Fundings: Abdulkadir Ünsal; Materials: Doğan Öztürk.

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