

XXVII.
Balkan Clinical Laboratory
Federation Meeting
BCLF 2019

XXX.
National Congress of the
Turkish Biochemical Society
TBS 2019



OCTOBER 27-31, 2019 PAPHOS ZEUGMA CONVENTION CENTRE, BELEK ANTALYA-TURKEY

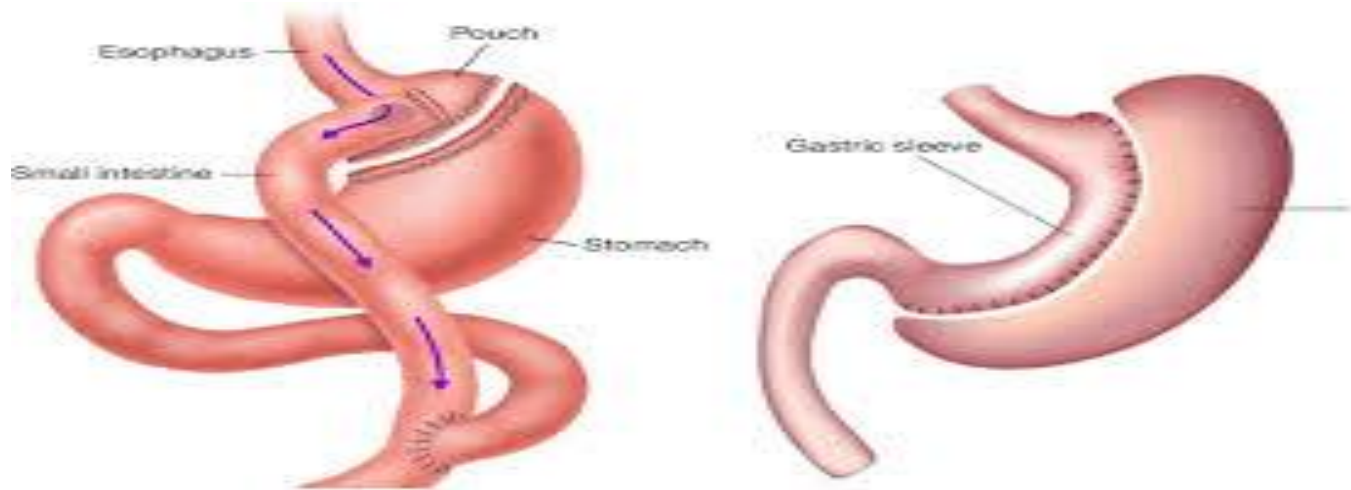
**Effect of bariatric surgery on ghrelin-
hepatosteatorrhea interaction: The Selcuk University
Faculty of Medicine example**

**Meryem Ayranci, Hakan Vatansev,
Husamettin Vatansev, Huseyin Yilmaz**

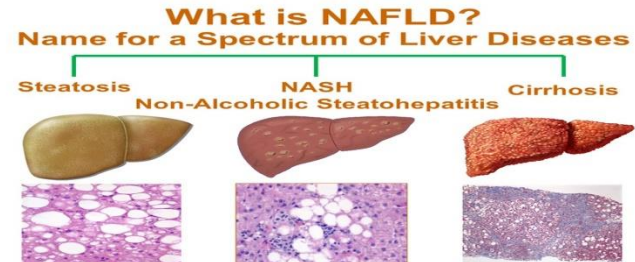
- While obesity has been described as a sign of being strong, having a good welfare level and being healthy in previous periods, it has become a disease that needs support in the treatment period. Due to its serious physiological and economic effects, it has become one of the biggest and most critical public health problems of the 21st century.
- There are many causes of obesity. Some of those; genetically defined syndromes and hypothalamic damage including uncontrolled satiety and appetite mechanism disorders, hormonal disorders, neurological, physiological, socio-cultural, psychological and genetic factors.
- Obesity causes physical and psychological many complications and comorbidities in individuals.



- Today, bariatric surgery is the most effective method for the treatment of morbid obesity, leading to serious weight loss, obesity associated diseases and an increase in quality of life. A wide range of bariatric procedures are available and are the most widely used procedures worldwide; Roux-en-Y gastric bypass (RYGB), sleeve gastrectomy (SG).



- The incidence of non-alcoholic fatty liver disease (NAFLD) has increased in morbidly obese patients and is considered to be the most common liver disease today.
- NAFLD represents a complex spectrum of disease and is generally classified as non-alcoholic fatty liver (simple steatosis) and NASH. Simple steatosis is characterized by the presence of steatosis without significant signs of inflammation or fibrosis; In NASH, steatosis is associated with hepatic inflammation that is histologically indistinguishable from alcoholic steatohepatitis and is usually accompanied by progressive fibrosis.
- Bariatric surgery is thought to improve some factors that significantly contribute to the pathogenesis of non-alcoholic fatty liver.



- Ghrelin is an important hormone synthesized mainly from cells in the fundus part of the stomach, which has a regulatory role in growth hormone secretion and energy homeostasis. It has been reported that ghrelin has short and long term effects on eating behavior and body weight regulation by central effect.
- It is seen that ghrelin, an anabolic hormone, decreases in obese individuals compared to controls with normal body weight, and the decreases in ghrelin levels associated with obesity are reversible with the weight loss achieved after calorie restriction. In addition, various plasma ghrelin levels have been encountered in weight loss achieved by bariatric surgery, depending on the procedure and study performed.



Material-Methods

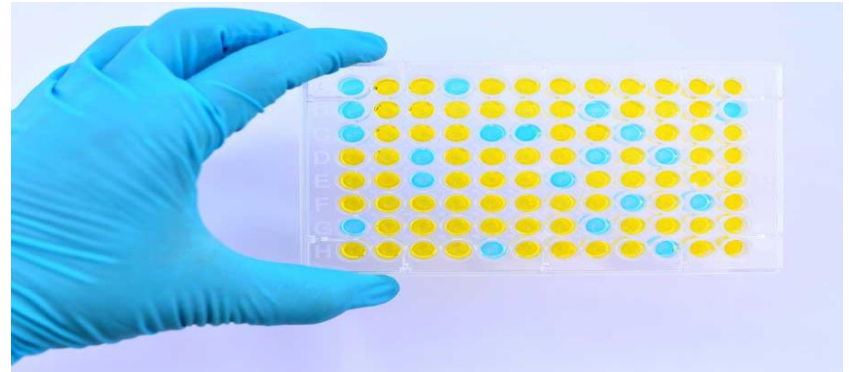
- A total of 41 patients who were admitted to the Selcuk University Faculty of Medicine Clinic of General Surgery were included in the study. At the end of the study, only 23 of these patients (4 men, 19 women) were able to come to all controls and complete the study. The mean age was 36.5 ± 12.3 years for men and 44.7 ± 12.8 years for women. LSG was applied to 16 patients and LRYGB was applied to 7 patients.
- People who will undergo bariatric surgery; Medical treatment methods, diet, exercise and lifestyle changes were determined according to IFSO criteria. Accordingly, patients with BMI of $40 \text{ kg} / \text{m}^2$ or more or BMI of $35\text{-}40 \text{ kg} / \text{m}^2$ with comorbidities (T2DM, hypertension, etc.) accompanying bariatric surgery were included.

Material-Methods

- Steatosis grading by abdominal ultrasonography was performed in 4 stages by a radiologist before and after 1, 3 and 6 months postoperatively.
- **Normal-Grade 0: It is considered normal.**
- **Weak-Grade 1: There is a slight diffuse increase in liver echogenicity, diaphragm and intrahepatic vessel contours.**
- **Intermediate-Grade 2: There is a moderately diffuse increase in liver echogenicity, diaphragm and slight deterioration of intrahepatic vascular images.**
- **Heavy-Grade 3: There is a significant increase in echogenicity. The intrahepatic vessel structure and diaphragm contours are unclear or invisible.**

Material-Methods

- Blood samples were collected from the participants before and after the operation at the 1st, 3rd and 6th months. All blood samples were taken following morning fasting. Ghrelin levels were determined by elisa method



Results

- At the end of the 6th month, the mean body weight decreased from 131.30 ± 18.65 kg to 99.34 ± 17.01 kg. The BMI decreased from 49.27 ± 7.46 kg / m² to 37.37 ± 7.15 kg / m². Body weight and BMI values were significantly decreased in all postoperative controls ($p < 0.05$). (**Table 1**)

Table 1. Change of patients body weight and BMI over time.

	Preop Mean \pm Std	Postop 1 st month Mean \pm Std	Postop 3 rd month Mean \pm Std	Postop 6 th month Mean \pm Std	<i>p</i>
Body weight (kg)	$131.30 \pm 18.65^{a,b,c}$	118.85 ± 16.96^a	109.48 ± 17.25^b	99.34 ± 17.01^c	0.0001
BMI (kg/m ²)	$49.27 \pm 7.46^{d,e,f}$	44.61 ± 7.15^d	41.13 ± 7.19^e	37.37 ± 7.15^f	0.0001

a,b,c: Preop-postop 1st, 3rd, 6th, body weight $p = 0.0001$

d,e,f: Preop-postop 1st, 3rd, 6th, BMI $p = 0.0001$

Results

- Analysis of variance of Ghrelin level over time was not statistically significant ($p = 0.384$). As a result, there was no bilateral comparison between preop period and other controls ([Table 2](#)).

Table 2. Change of ghrelin values over time

	Preop	Postop 1 st month	Postop 3 rd month	Postop 6 th month	<i>p</i>
<u>Ghrelin (ng/ml)</u>	0,73 (0,13-16,06)	0,55	0,68	1,56	0,384^a
<u>Median (min-max)</u>		(0,15-14,20)	(0,13-22,19)	(0,17-30,71)	

Results

- The relationship between hepatosteatosi and time was statistically significant ($p = 0.001$). An inverse and moderate relationship was found between hepatosteatosi and time. Accordingly, the fat in the liver compared to the preoperative period decreased in all other controls over time (**Table 3**).

Table 3. Change of the degree of hepatosteatosi in patients undergoing obesity surgery over time.

			TIME			
			Preop	Postop 1 st month	Postop 3 rd month	Postop 6 th month
HEPATOSTEATOSIS STATUS	GRADE 0	%	8.70	4.35	17.39	39.13
	GRADE 1	%	39.13	65.22	52.17	47.83
	GRADE 2	%	26.09	26.09	26.09	13.04
	GRADE 3	%	26.09	4.35	4.35	0.00

Results

- According to Spearman correlation analysis between ghrelin levels and hepatosteatosi, there was a negatively weak and significant correlation between ghrelin levels and liver fat levels in postoperative 1st and 3rd months ($r = -0.417$ $p = 0.048$, $r = -0.459$ $p = 0.028$, respectively) (Table 4).

Table 4. Spearman correlation analysis between ghrelin and hepatosteatosi status in patients with obesity surgery.

HEPATOSTEATOSIS \ GHRELIN	Preop	Postop 1 st month	Postop 3 rd month	Postop 6 th month
PREOP	$r = -0.127$ $p = 0.565$	-	-	-
Postop 1st month	-	$r = -0.417^*$ $p = 0.048$	-	-
Postop 3rd month	-	-	$r = -0.459^*$ $p = 0.028$	-
Postop 6th month	-	-	-	$r = -0.246$ $p = 0.257$

* $p < 0.05$

Conclusions

- In conclusion, obesity surgery improved some endocrine abnormalities but did not reveal a significant difference in ghrelin levels. In the presence of steatosis in the liver, significant changes occurred after obesity surgery.
- Reasons for encountering different results related to ghrelin levels; The difference in surgical techniques and methods used to measure ghrelin can be explained by different study designs and follow-up times, as well as different body weight losses.

Conclusions

- It is stated that the results of the studies evaluating ghrelin levels after bariatric procedure vary.
- It was emphasized that the reason for these variable results was related to the energy homeostasis of the patients and that the ghrelin level varies according to whether the individual is in the weight loss stage or stable stage.
- It has been reported that ghrelin levels decrease in patients who are in stable stage immediately after bariatric surgery and ghrelin levels increase in individuals who still lose weight.

Conclusions

- In the literature, there are limited number of studies evaluating ghrelin and hepatosteatosi together after obesity surgery. We think that this study will contribute to fill this gap, but there is a need for studies to follow up the patient for a longer period.