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COMPARATIVE EVALUATION OF DIFFERENT TYPES OF BARIATRIC SURGERY

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Abstract

Introduction. The use of bariatric surgery as a treatment for obesity has increased dramatically over the past few years. Because the results in obese patients with type 2 diabetes were so impressive, the International Diabetes Federation recommended considering bariatric surgery as an acceptable treatment option in patients with a BMI of 30-35 kg / m^2 when diabetes cannot be adequately controlled with traditional therapies.

The aim of the study is to compare the results of bariatric surgery in patients with metabolic syndrome according to the dynamics of body mass index and major orexigenic and anorexigenic hormones.

Material and Methods. The results of surgical treatment of 19 patients with morbid obesity (5 men and 14 women) aged 44 ± 3.26 years with a body mass index >40 kg / m^2 were evaluated. The control group consisted of 12 patients with normal body mass index and no manifestations of metabolic syndrome.

Results. Our study also demonstrated the positive effect of LGAE on hormonal parameters with a decrease in ghrelin and leptin. This helped reduce BMI by 10.12% after 6 months. At the same time there is an increase in adiponectin and resistin.

Conclusions. LGAE in patients with ghrelin-associated obesity is possible as an alternative intervention, given its good tolerability. Or, as the first preparatory stage of comprehensive surgical treatment in obese patients who are not good candidates for standard bariatric surgery.

Keywords: Ghrelin; Leptin; Adiponectin; Resistin; Left gastric artery embolization

Introduction. According to data from the NCD Risk Factor Collaboration, in 2016 almost 2 billion adults (39% of the world's adult population) were overweight (determined by body mass index (BMI) ≥25 kg / m2), 671 million (12% of the world's adult population) of whom were obese (BMI ≥30 kg / m2) is three times higher than the prevalence of obesity since 1975. By 2050, more than 462 million new cases of cardiovascular disease and 212 million new cases of diabetes will occur due to overweight and obesity [7].

Any treatment for obesity is associated with a certain degree of risk, which aims to balance the potential risks and benefits of treatment for a particular clinical case. Obesity is no different from other diseases; the most aggressive and high-risk treatments are reserved for patients with the highest medical risk due to their overweight [1].

The use of bariatric surgery as a treatment for obesity has increased dramatically over the past few years. Because the results in obese patients with type 2 diabetes were so impressive, the International Diabetes Federation recommended considering bariatric surgery as an acceptable treatment option in patients with a BMI of 30-35 kg / m2 when diabetes cannot be adequately controlled with traditional therapies [5].

The aim of the study is to compare the results of bariatric surgery in patients with metabolic syndrome according to the dynamics of body mass index and major orexigenic and anorexigenic hormones.

Material and Methods

The results of surgical treatment of 19 patients with morbid obesity (5 men and 14 women) aged 44 ± 3.26 years with a body mass index >40 kg / m^2 were evaluated. The control group consisted of 12 patients with normal body mass index and no manifestations of metabolic syndrome.

According to the type of surgery, patients were divided into three groups: laparoscopic sleeve gastrectomy (LSG) (n = 10), laparoscopic Roux-en-Y gastric bypass (RYGB) (n = 7), left gastric artery embolization (LGAE) (n = 5). Informed consent was obtained for the proposed examination and treatment in all patients. Clinical examination included (gender,

age, height, body weight, waist-to-hip ratio (a value greater than 1 corresponded to the abdominal type of obesity.)). Twelve hours before the biochemical blood test, patients were restricted in their diet.

To measure the level of leptin, total ghrelin, resistin, adiponectin in serum, 10 ml of blood was collected in vacuum tubes. After 30 minutes of exposure at 22° C, blood samples were centrifuged at 1670 g for 10 minutes. Serum samples were stored in a freezer at -20° C.

Determination of hormones was performed using Leptin ELISA (LDN Labor Diagnostika Nord GmbH & Co.KG, Germany), Resistin Human ELISA Kit (Thermo Fisher Scientific, USA), Human Ghrelin ELISA Kit (Thermo Fisher Scientific, USA), Human Adiponectin ELISA Kit (Thermo Fisher Scientific), USA) on the Multiskan FC analyzer (Skanlt Software version 4.1 for Microplate Readers RE, ver. 4.1.0.43), wavelength 620 nm.

Bariatric embolization of gastric arteries. The intervention was performed through transfemoral access using a 5 F guide catheter. This was followed by digital subtraction celiac imaging. A microcatheter was conducted into the target artery, and selective embolization of the left gastric artery was performed with a high-flow microcatheter. Embolization of one or more arteries was performed using 300-500-mm spherical emboli (Embosphere (Merit Medical), until the onset of angiographic symptoms of "stasis". A perfusion survey was performed to confirm the effectiveness of embolization. After the intervention, patients were prescribed a proton pump inhibitor within 6 weeks after the intervention.

Laparoscopic sleeve gastrectomy. Under the carboxyperitoneum (15-17 mm Hg), the esophagocardial junction was crossed, the left leg of the diaphragm was isolated, and the bottom of the stomach was partially mobilized. After identification of the pylorus, 6-8 cm and up the great curvature of the stomach to the left leg of the diaphragm crossed short vessels and mobilized the stomach. A gastric tube (32-34 Fr) was inserted into the stomach and a tubular stomach up to 120-150 ml (Endo GIA 45 and 60 mm long, 4.8 mm brackets) was gradually formed. An intussusception serous muscle suture was then applied from the cardiac to the antrum of the stomach.

Laparoscopic Roux-en-Y gastric bypass. Under the carboxyperitoneum (15-17 mm Hg), a gastric sac (Endo GIA 60 mm long, 4.8 mm brackets) was created. The Roux-en-Y loop was formed from the small intestine approximately 30 cm from the Treitz ligament. After the formation of the entero-enteroanastomosis and the Roux-en-Y loop (Endo GIA II length 60 mm, brackets 3.5 mm), a retrogastric-retrocollic tunnel for the Ru loop was created. The window in the mesentery of the colon was formed directly in front and on the side of the

Treitz ligament. The gastrojejunostomy was then performed using a circular end-to-end circular anastomosis method. Peritonitis was performed with an intermittent suture.

Statistical processing of the obtained research data was processed using the software Excel ("Microsoft", USA) and Statistica.10.1 (Statsoft, USA) with variation analysis. Data are expressed as mean±s.d. P-value <0.05 signified statistical significance.

Research results and their discussion

It is reported that LSG helps to reduce serum ghrelin levels in 90% of cases [6], which corresponded to a progressive decrease in BMI (Fig.1).

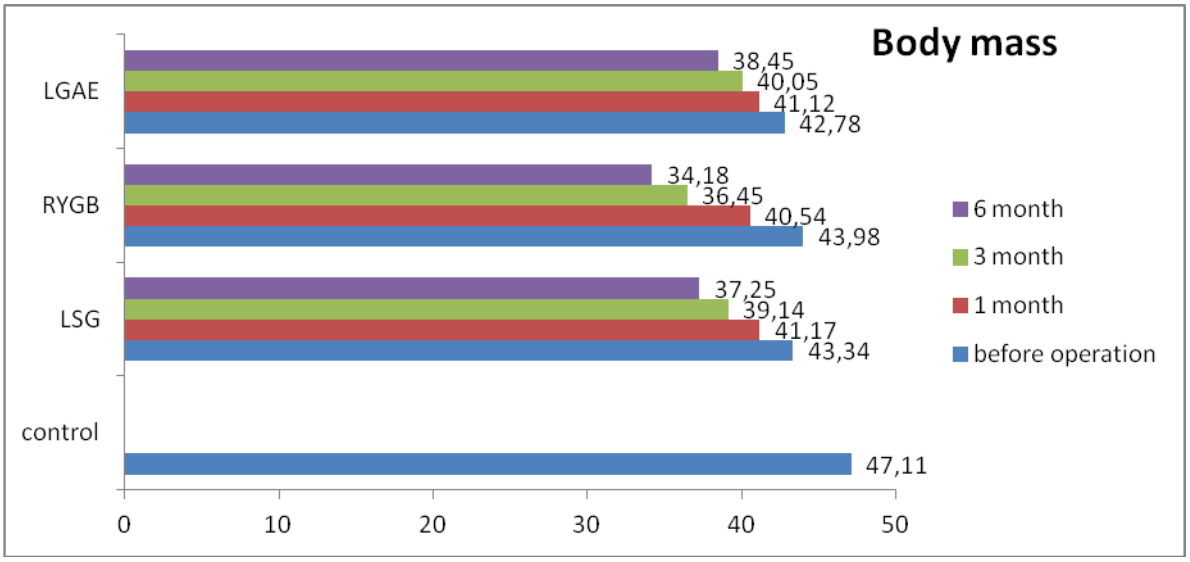

Figure 1. Dynamics of body mass index after different types of bariatric surgery

In our study, we also noted a significant reduction in serum ghrelin levels after LSG (up to 40% 6 months after surgery) (Fig.2). There was also a decrease in leptin concentration and an increase in resistin and adiponectin.

RYGB induces sustained weight and fat loss along with increased adiponectin levels and decreased leptin levels. On the other hand, ghrelin levels have been found to fall temporarily after RYGB. This confirms the results of studies indicating that this type of operation inhibits the production of ghrelin [4], due to impaired secretory capacity of the stomach [9]. There is evidence that dynamic adaptation of the gastrointestinal tract may lead to a gradual partial normalization of ghrelin secretion after RYGB [8]. Ghrelin may play a role in weight loss after RYGB in the short term (up to 3 months). But in the long run (after about 3-6 months) there is a stabilization of its level without a significant reduction. At the same time, patients' weight continued to decrease, suggesting that ghrelin may not be

involved in weight loss after RYGB. On the other hand, the concentrations of adiponectin and resistin increased and negatively correlated with BMI, the amount of fat in the body (Fig. 4, 5).

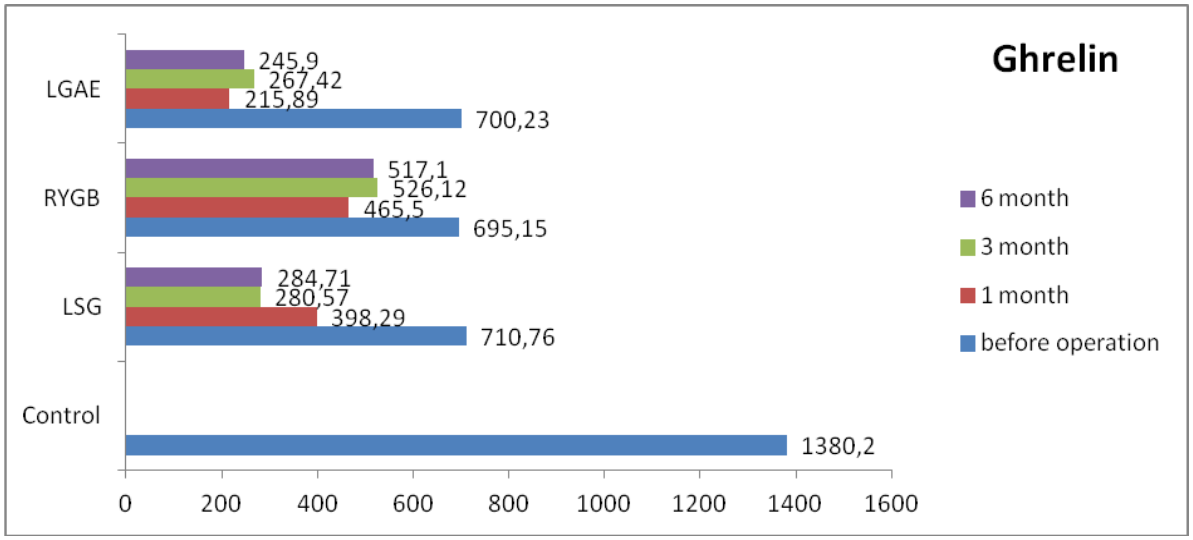

Figure 2. Dynamics of serum ghrelin after different types of bariatric surgery

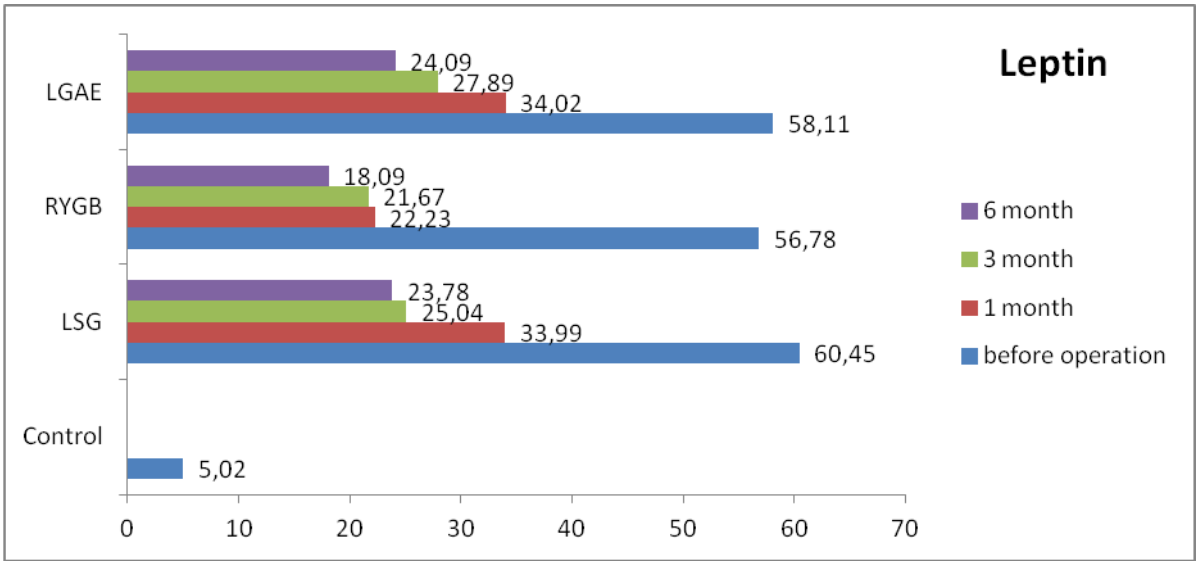

Figure 3. Dynamics of serum leptin after different types of bariatric surgery

The stomach plays a neurohumoral role in the regulation of hunger with ghrelin: this is the rationale for embolization of the gastric floor. In 2007, the first results of LGA catheter embolization to reduce systemic plasma ghrelin levels [2] due to mucosal ischemia due to "disabled" blood flow appeared. Other researchers [3] show a reduction in ghrelin levels of 40.83%, 31.94% and 24.82% at 3, 6 and 9 months after LGAE, respectively.

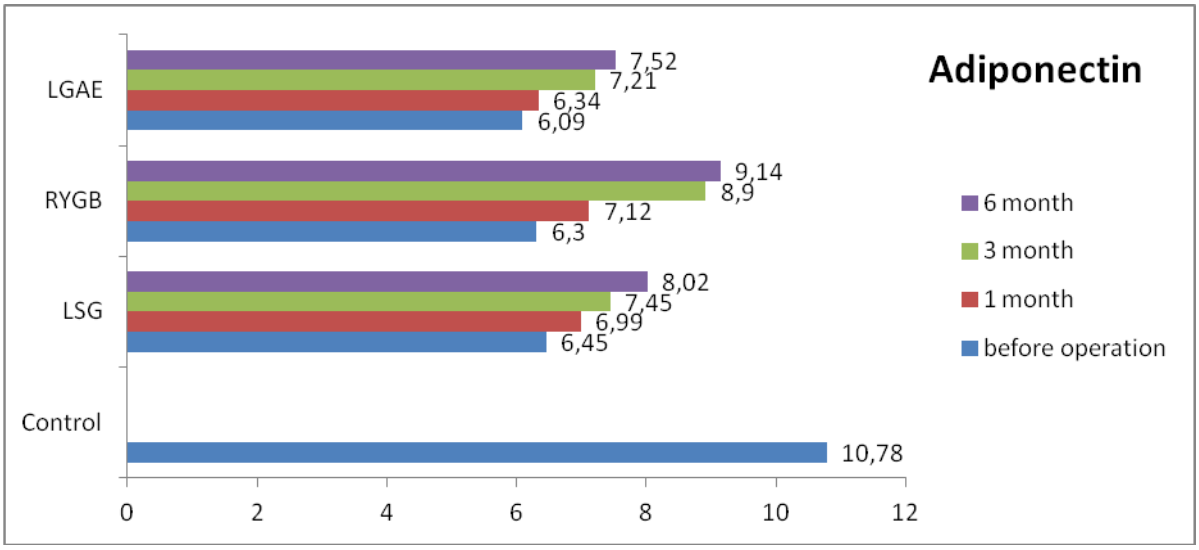

Figure 4. Dynamics of serum adiponectin after different types of bariatric surgery

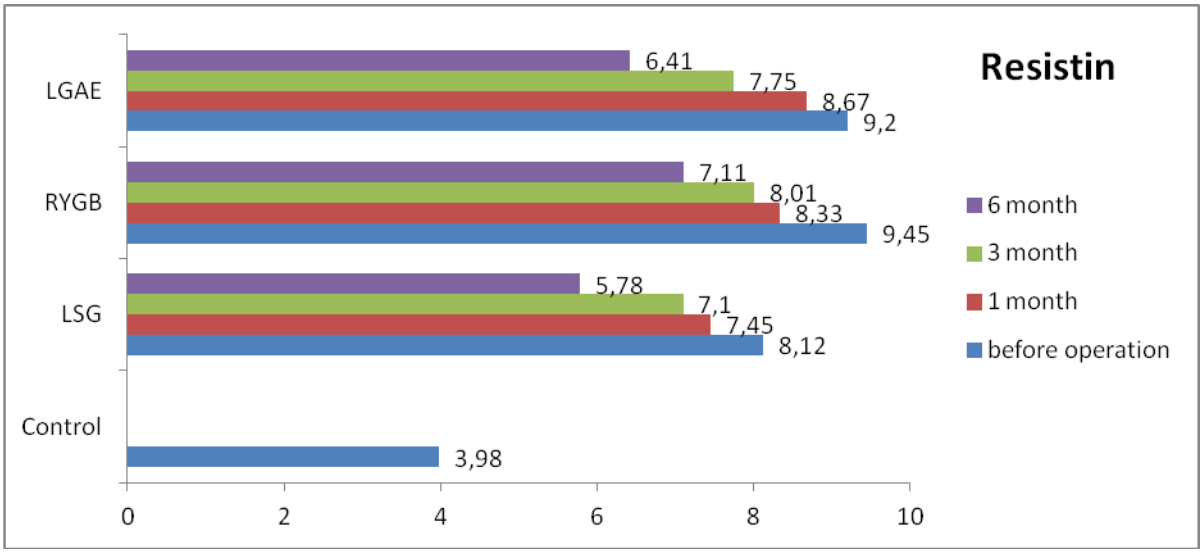

Figure 5. Dynamics of serum resistin after different types of bariatric surgery

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