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The bariatric patient: basic aspects preparation for surgical treatment of obesity and conducting after it.

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Introduction. Over the past years and decades, in the world in general and particularly in Russia, bariatric surgery is becoming more widespread for the treatment of severe forms of obesity. There is an increase in the number of operations performed along with the effectiveness and minimising risks of the operations held due to the improvement of surgical techniques. In this lecture, there are clearly stated indications and contraindications for the surgical treatment of obesity. Here are presented various types of bariatric surgeries and their pathophysiological mechanisms which affect on body weight, carbohydrate and lipid metabolism. There is also presented their effectiveness in comorbid obesity pathology, primarily among patients with type 2 diabetes. Here was held an analysis of possible negative effects after surgical treatment for obesity, including secondary hyperparathyroidism, post-bariatric hypoglycemia, etc., as well as predictors of postoperative prognosis in relation on metabolic control among patients with obesity and type 2 diabetes.

Keywords: obesity, type 2 diabetes mellitus, bariatric surgery

Methods. Bariatric surgeries (from the Greek baros – heavy, weighty, heavy) are surgical interventions that are performed on the organs of the gastrointestinal tract (GIT) in order to reduce BW.

The effectiveness of conservative treatment of obesity, especially in the long term, leaves much to be desired: most patients return to their initial body weight - BM (after its reduction) within 5 years, with high degrees of obesity the effectiveness of conservative therapy does not exceed 5-10% [1]. One of the main reasons for this is the failure of patients to comply with the necessary recommendations on lifestyle and physical activity and the unwillingness to change the stereotypes of eating behavior that have been developing for years and decades. To increase the effectiveness of obesity treatment, especially morbid or complicated by concomitant pathology, surgical methods come to the rescue.

The goals of surgical treatment of obesity are:

• reduction of BW;
• impact on the course of diseases developing
as BW increases (type 2 diabetes mellitus Diabetes 2, arterial hypertension, sleep apnea syndrome, etc.);
• improvement of the quality of life of patients with obesity.

The key to the effectiveness and safety of surgical treatment of obesity is a thorough preoperative selection of candidates for bariatric surgery by a multidisciplinary team of specialists, including an endocrinologist, bariatric surgeon, therapist, cardiologist, psychiatrist and others, in strict accordance with the accepted indications and contraindications, as well as performing operations in high-quality centers – COE (Centers of Excellence). The main characteristics of such centers are [2]:

• availability of trained and qualified medical personnel, necessary equipment and consumables for working with bariatric patients;
• comprehensive preoperative, perioperative and postoperative medical care for patients;
• readiness of all clinical services to provide emergency care in case of perioperative complications;
• performance by bariatric surgeons of at least 125 bariatric surgeries during their career and continuation of at least 50 surgeries per year (including repeat surgeries);
• maintaining a patient registry with lifelong follow-up of at least 75% of patients after surgery;
• multidisciplinary approach as an integral part of treatment.

When selecting candidates for surgery, it is necessary to be guided by the generally accepted criteria of the International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO) [3], the European interdisciplinary guidelines for metabolic and bariatric surgery [4], and the Russian clinical guidelines for the treatment of obesity in adults [5, 6]. Indications for surgical methods of treating obesity. Bariatric surgeries can be performed when previously conducted conservative therapy for obesity is ineffective in patients aged 18 to 65 years:

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• morbid obesity (BWI index - BWI≥40 kg/m^2);
• obesity with BWI≥35 kg/m^2 in combination with severe concomitant diseases that are poorly controlled by lifestyle changes and pharmacotherapy;
• not only the current but also the previous maximum BWI can be taken into account, while a decrease in BWI before bariatric surgery with a corresponding decrease in BWI below 35–40 kg/m^2 is not a contraindication for surgery and should be considered as a recommended stage of preoperative preparation in order to reduce perioperative risk;
• repeated gaining of BWI after its decrease against the background of conservative therapy (even if the BWI has not reached 35–40 kg/m2). It is worth noting that
IFSO allows bariatric surgeries to be performed on patients with a BWI over 30 kg/m^2 in the presence of medical and socio-psychological indications for a decrease in BWI [3–6].

Contraindications to bariatric surgery:
• alcohol, drug or any other addiction;
• mental illness;
• exacerbation of gastric ulcer or duodenal ulcer;
• pregnancy;
• current oncological diseases;
• irreversible changes in vital organs (chronic heart failure III-IV functional classes, liver or kidney failure);
• misunderstanding of the risks associated with bariatric surgeries;
• insufficient compliance for strict adherence to the postoperative monitoring schedule [3-6].

To ensure the effectiveness and safety of bariatric surgeries, it is necessary to adhere to the following strategies [4–6]:
• careful preoperative selection of candidates by a multidisciplinary team of specialists (including an endocrinologist, bariatric surgeon, therapist, cardiologist, psychiatrist, etc.) in strict accordance with the accepted indications and contraindications;
• performing surgeries in the COE;
• lifelong monitoring of operated patients: in accordance with the European COE program, at least 75% of patients should be followed up for at least 5 years;
• timing of follow-up examinations: at least once every 3 months during the 1st year after surgery, at least once every 6 months during the 2nd year after surgery, then annually;
• regular monitoring of clinical and biochemical parameters in order to exclude deficiencies of micro- and macronutrients.

Basic strategies for lifestyle changes after bariatric surgery

Dietary recommendations include [10–12] a gradual change in the consistency and structure of food over 1–2 months:
• from small portions of clear liquids in the first 24–48 hours after surgery, gradually increasing the volume to ≥8 cups per day (up to 2 L), to liquid products 3–7 days after surgery (milk, soy drinks, and plain yogurt), with a transition 1–2 weeks after surgery to purees (from more homogeneous to less homogeneous), with the addition of soft foods (meatballs, scrambled or boiled eggs, cooked vegetables, peeled fruits) to the diet 2 weeks after surgery, solid foods (legumes, fresh vegetables, fresh fruits, and bread) after 1 month, and consumption after 2 months after surgery balanced solid food;
• 4-6 meals during the day, chewing food well and stopping when you feel full;
• reducing the intake of high-calorie foods and drinks (e.g. smoothies, ice cream, milkshakes, carbonated drinks, juices, chocolate, cream cakes, cookies) and limiting added sugar to avoid dumping syndrome;
• separating liquid intake from solid foods, avoiding drinking drinks 15 minutes before or within 30 minutes after meals.

Gradual expansion of physical activity:

Patients should be advised to engage in moderate aerobic physical activity, including a minimum of 150 min per week with a goal of 300 min per week, plus strength training 2–3 times per week [13, 14]. This will help prevent the development of sarcopenia at the stage of significant BW loss, preserve bone mass, and increase the metabolic rate. It is necessary to remember about adequate hydration during physical exercise [15].

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Smoking cessation is necessary at least 6 weeks before and after bariatric surgery, given the increased risk of poor wound healing, anastomotic ulcers [13, 16]. It is recommended to avoid or reduce the amount of alcohol consumed after bariatric surgery due to accelerated absorption of alcohol, higher maximum concentration, longer time required for elimination and increased risk of development of alcoholism. Excessive alcohol consumption may affect BW loss as a result of increased calorie intake and cause, for example, vitamin deficiencies, especially of group B [17, 18].

According to the literature, there is a slightly increased risk of suicide among patients who have undergone bariatric surgery [19, 20]: 30% of the total number of suicides occur within the first 2 years and almost 70% within 3 years after surgery. In addition, approximately 10% of candidates for bariatric surgery reported that they had attempted suicide throughout their lives [21]. The reasons for this are inflated and unfulfilled expectations from bariatric surgery, lack of proper weight loss or its relapse, as well as aesthetic dissatisfaction with their figure. These data confirm the need for the mandatory presence of a psychiatrist/psychologist in a multidisciplinary team of specialists making a joint decision on the absence of contraindications to surgical treatment of obesity.

Planning pregnancy after bariatric interventions is advisable at the stage of BM stabilization, i.e. not earlier than 12–18 months after surgery [15, 22], provided that possible metabolic disorders (mineral metabolism, iron metabolism, protein deficiency, etc.) are compensated for [23]. In this case, an individual plan for laboratory monitoring and drug support during pregnancy should be developed jointly by an obstetrician-gynecologist, endocrinologist, nutritionist, therapist, and bariatric surgeon, taking into account the type of bariatric surgery performed, the severity of malabsorption, concomitant pathology, and individual risks [24]. Monitoring frequency – every trimester: monitoring of MT gain, exclusion of possible micro- and macronutrient deficiencies [13].

Since deficiency of iron, vitamins A, K, B12 and folic acid is associated with both maternal complications and fetal developmental disorders [22], correction of expected nutrient deficiencies is of crucial importance in the period before conception [13]. Pregnancy after bariatric surgery should be considered a high-risk pregnancy [22], including due to the associated risk of premature birth and complications associated with gastrointestinal surgery, such as intestinal obstruction, gastric ulcer, etc. An important aspect of pregnancy management after surgical treatment of obesity is the recommendation to screen for gestational diabetes not with the usual oral glucose tolerance test, but with capillary glucose monitoring to avoid the development of dumping syndrome and hypoglycemia [25, 26].

Prevention and control of weight gain is the cornerstone of assessing the effectiveness of bariatric surgery. Weight loss after bariatric surgery is the result of lack of observation in the postoperative period (as practice and literature data show, 60% of those who gained weight were never observed in the long term by a nutritionist, endocrinologist or bariatric surgeon), non-compliance with the diet and insufficient physical activity, eating disorders or surgical reasons [27]. It is estimated that up to 50% of patients after bariatric therapy restore about 5% of BW 2 years after surgery [2].

Evaluation of the effectiveness of bariatric surgeries.

The International Diabetes Federation (IDF) proposed achieving the following goals [28]:

• BW loss of more than 15% of the initial;
• achieving a glycated hemoglobin level (HbA1c) ≤ 6%;
• absence of hypoglycemia;
• reduction in the dose or number of taken hypoglycemic drugs;
• achieving total cholesterol <4 mmol / l, low-density lipoprotein cholesterol <2 mmol / l, triglycerides <2.2 mmol / l;
• maintaining blood pressure <135/85 mm Hg;
• improving the quality of life and the course of diseases associated with obesity. According to the 2014 European Multidisciplinary Guidelines for Metabolic and Bariatric Surgery, in the presence of type 2 diabetes, surgical treatment can be considered effective if [4]:
• the HbA1c level has decreased by more than 0.5% within 3 months or has reached a level of <7.0%;
• the insulin dose after surgery has decreased by 25% or more from the preoperative dose;
• the dose of oral hypoglycemic agents has decreased by 50% or more from the preoperative dose.

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Postoperative monitoring. After bariatric surgery, all patients should be monitored for life by a multidisciplinary team of specialists experienced in the treatment of obesity and the correction of the medical, psychological and psychiatric consequences of bariatric surgery. The occurrence of vitamin and mineral deficiencies is one of the most common and serious problems after bariatric surgery. Prevention, detection and treatment of these deficiencies are the cornerstone of long-term monitoring of patients after surgical treatment of obesity [25, 44]. To prevent the risk of developing metabolic disorders, especially after bypass operations, patients require particularly careful postoperative monitoring: clinical monitoring with a comprehensive clinical blood test, a biochemical blood test, including, in addition to standard indicators, lipid levels, serum iron and ferritin, calcium metabolism markers (total and corrected calcium, phosphorus, alkaline phosphatase), as well as the concentration of 25 (OH) D, parathyroid hormone. Determination of blood levels of trace elements (zinc, copper, magnesium) and vitamins (folic acid, thiamine, cyanocobalamin) is also advisable in the presence of symptoms of the corresponding deficiencies. If laboratory abnormalities are detected, as well as in the presence of a characteristic clinical picture, additional diagnostic tests should be recommended, for example:

• in case of anemia: determination of ferritin, vitamins B12, A and E, folic acid, zinc and copper;
• in case of visual impairment: determination of vitamins A, E and B1;
• in case of increased bleeding: a detailed clinical blood test, coagulogram;
• in case of neurological symptoms and complaints: determination of vitamins B1, B12, E, niacin, as well as copper levels;
• in case of development of vitamin D deficiency refractory to therapy: determination of parathyroid hormone, osteocalcin, N-telopeptide; No later than 2 years after bypass bariatric surgery, it is advisable to study the mineral density of bone tissue using X-ray densitometry [24]. Bisphosphonates can be considered in patients with osteoporosis only after replenishment of calcium and vitamin D deficiency. If therapy is indicated, intravenous bisphosphonates should be used, since there are concerns about adequate oral absorption and potential ulceration of the anastomosis with orally administered bisphosphonates [13, 14].

In conclusion, we would like to once again emphasize the basic principles of preparation for surgical treatment of obesity and subsequent rehabilitation after it:

• adequate selection of candidate patients;
• multidisciplinary approach both at the stage of preparation and after bariatric surgery; • active dispensary observation and regular laboratory monitoring, allowing timely drug correction, prevent the development of various metabolic disorders;
• routine administration of preventive drug therapy in the postoperative period.

Implementation of these principles in this cohort of patients determines the success of bariatric treatment and is a priority task.

Conflict of interests. The authors declare no conflict of interest.

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