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CHOICE OF SURGICAL TACTICS IN METABOLIC SYNDROME

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Abstract: Over the past few years, the problem of obesity with metabolic disorders leading to atherosclerosis and its severe complications and high mortality has become global. Particularly dangerous is the metabolic syndrome (MS), which belongs to this group and is characterized by a combination of obesity, arterial hypertension, dyslipidemia, tissue insulin resistance, hyperinsulinemia, impaired glucose tolerance or type 2 diabetes mellitus (T2DM) [1]. All these components of MS in themselves lead to severe complications associated with loss of ability to work and the need for expensive treatment, which in 20% of cases is ineffective [4, 5]

Key words: metabolic syndrome, surgery, operation

Introduction. Metabolic syndrome (MS) is a set of risk factors such as abdominal obesity, hypertension, dyslipidemia (elevated cholesterol and triglyceride levels), and insulin resistance or type 2 diabetes. Surgical tactics for metabolic syndrome should be based on the treatment of associated diseases and reducing risks for the patient. Surgery may be recommended in the following cases:

1. Bariatric surgery: One of the main areas of surgical tactics is bariatric surgery, especially for obesity of I and II degrees, when other treatment methods (diet, physical activity) do not give a sustainable result. Bariatric surgery helps not only in weight loss, but can also improve metabolic parameters (lower blood pressure, glucose and cholesterol levels), which helps improve the patient's condition.

2. Hypertension management: In some cases of severe hypertension that does not respond to conservative treatment, surgery such as sympathectomy may be considered, although this is very rare.

3. Vascular surgery: If a patient with metabolic syndrome develops atherosclerotic changes in the vascular system, interventions aimed at restoring vascular patency, such as angioplasty or coronary artery bypass grafting, may be indicated.

4. Diabetes surgery: If type 2 diabetes develops and is not controlled with medication, surgeries aimed at improving glycemic control, such as gastric resection (e.g., bariatric surgery) or even pancreas transplantation, may be indicated.

Often, loss of working capacity is caused by inefficiency, which occurs in complicated forms of MS, when there is one of the following components of MS: morbid obesity, "malignant"

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hypertension, familial hypercholesterolemia, persistent insulin resistance and poorly corrected hyperglycemia in diabetes mellitus [3]. To influence a single complex of endocrine-metabolic disorders, it is necessary to disrupt this close relationship of the components of MS, acting on the "weak" link [7]. This is obesity, the experience of treating which surgically we have had since 1976. Currently, there are about 40 methods of surgical treatment of obesity. These are gastro-restrictive and malabsorptive operations [6]. Considering the world and our many years of experience, it should be noted that all these methods contribute to weight loss, but not all of them have a positive effect on the components of MS in the long term. At the same time, none of the applied methods is free from certain complications, which are far from indifferent in obesity and MS. The operation in patients with MS should meet the following requirements: 1) significantly and stably reduce body weight, thereby eliminating insulin resistance and hyperglycemia, normalizing impaired lipid metabolism; 2) ensure the exclusion of part of the small intestine from the passage of food due to the bypass component; 3) have an acceptable complication rate in comparison with conservative treatment; 4) be technically simple to perform to reduce the time the patient with obesity is under anesthesia; 5) be reversible in case of complications and undesirable consequences; 6) the costs of treatment should be less than with conservative treatment. As world experience shows, the preferred types of operations should be considered bypass operations, in particular: gastric bypass (GB) and biliopancreatic diversion (BPSh), when the malabsorptive component is preserved [11, 13]. At the same time, the above criteria are met by the jejuno-ileo-bypass surgery (EISS) using the Payne-DeWind technique, which most surgeons have abandoned due to a significant number of severe remote metabolic complications depending on the short functioning intestine and bypass enteritis developing due to reflux of intestinal contents into the bypassed part of the small intestine [9, 10, 14]. Considering the simplicity of performing EISS and the long-term effect, Professor Sedletsky Yu.I. modified this intervention to reduce the number of remote complications, which was achieved [8]. At present, in MS, we give preference to gastro- and biliopancreatic bypasses, but as a reserve we use EISS in our modification for the following indications: 1) in superobese patients; 2) as the next stage of combined bariatric operations; 3) for those cases when there are difficulties in performing BPSh and GS.

Material and methods. From 2015 to 2023, 120 patients underwent modified jejunoileal bypass. Of these, there were 35 men and 85 women with an average age of 27.2 years (from 18 to 63 years). The average body weight (BW) of the operated patients was 148.9 kg (from 93 to 230 kg) with an average height of 165.9 cm. The average initial body mass index (BMI) was 54.1 (from 30.1 to 85.2) kg/m2. 55.6% of patients were classified as superobese (BMI> 50 kg/m2). The excess BW averaged 85 kg (initial BW - ideal BW). All patients were diagnosed with metabolic syndrome. The diagnosis of "metabolic syndrome" was established based on the criteria established in 2015 by the International Diabetes Federation. The most common components in addition to abdominal obesity (80 people) were: arterial hypertension - 96, hyperlipidemia and dyslipoproteinemia - 82, diabetes mellitus or impaired glucose tolerance - 65. Sixteen patients had peripheral obesity, the diagnosis of metabolic syndrome in them was established based on the combination of arterial hypertension, dyslipidemia and impaired glucose tolerance. Previous attempts to reduce MT and treat metabolic syndrome with conservative methods were ineffective. The modification of the EIS consisted of transection of the jejunum at a distance of 35–40 cm from the Treitz ligament and anastomosis at a distance of 15–20 cm from the ileocecal angle of its proximal section with the ileum according to the “end-to-side” type. The anastomosis was

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applied with the formation of a “spur” and a valve between the functioning section of the jejunum and the bypassed section of the ileum to prevent bypass enteritis [8]. Remote results were monitored for up to 8 years. The response rate over the 8-year observation period was within 38.8% of the initial value. In the comparative analysis, we used nonparametric statistical methods, in particular, the Friedman and Kendall criteria, the Gaussian distribution, standard mean values, and the interquartile range.

Results and discussion. The effect on obesity was monitored based on the change in BMI. The results of determining the BMI index and body weight loss after the EIS operation indicate that during the observation periods of 5-6 and 9-10 years, an increase in the BMI index is observed compared to the data 1-4 years after the operation, reaching a value of 40 kg/m2 or more. In parallel with the change in BMI, an increase in body weight is observed, reaching a maximum after 9-10 years due to a decrease in the body weight loss index. This is obviously associated with hypertrophy of the mucous membrane and stretching of the loops of the functioning section of the jejunum and ileum in the long-term observation periods. Assessing the dynamics of changes in the level of glucose in the blood, triglycerides (TGC) and total cholesterol, it was found that the most significant changes after the EIS operation occur in the indicator of changes in glucose in the blood. This result is associated with the incretin effect, since in the case of EIS, carbohydrates actively stimulate L-cells of the terminal ileum. Thus, after 1-4 years of observation, a sharp decrease in the glucose level is observed and its slight increase, starting from 5-6 years of observation, reaching a maximum during the observation period of 9-10 years, combined with a change in body weight (Fig. 4). The cholesterol level is significantly reduced immediately after the operation. The interquartile range value decreases symmetrically with increasing observation periods, and the densest values within 4.5 mmol/l are noted at 9-10 years of observation after the EIS operation. The triglyceride level after the EIS operation also decreases both in terms of the Gaussian density index and the median value. It is also necessary to note the significant and stable effect of EIS on systolic blood pressure (SBP) and diastolic blood pressure (DBP). When assessing the dynamics of changes in SBP and DBP, it was found that after the EIS operation, SBP stabilization and correct DBP values in relation to it are observed (Fig. 5, 6). It should be noted that such changes are observed in the remote period and indicate a stable effect of jejunoileal shunting on the regression of arterial hypertension. As our experience shows, the effect of jejunoileal shunting in MS is due to the following mechanisms. 1. A significant decrease in the absorption of the main food ingredients by the jejunum. 2. A decrease in hyperglycemia and elimination of hyperlipidemia. 3. Normalization of lipid metabolism. At the same time, positive changes in the lipid spectrum of the blood to a greater extent than the loss of body weight per se, cause a decrease in insulin resistance and the level of hyperlipidemia. Of the 120 patients who underwent jejunoise bypass, 52 (38.2%) developed complications, including 40 (29.4%) patients who required repeated surgery due to a high incidence of postoperative ventral hernias in obese patients. Postoperative ventral hernia developed in the late postoperative period in 29 patients. Hernia was repaired in combination with abdominoplasty. Small bowel integrity restoration ("switching on") was performed in 8 (5.9%) patients. Of these, 6 patients had their bowel switched on due to diarrhea and associated electrolyte disorders; 1 patient had a blind loop switched on due to intussusception of the "switched off" section of bowel, during which its distal end was anastomosed with the initial section of the jejunum; One patient with current alimentary dystrophy developed acute intestinal obstruction, which was eliminated by "switching on" the small intestine along its entire length.

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Three patients (2.2%) underwent emergency surgery due to developed intussusception. We have not observed any intussusceptions recently, since we fixed the disconnected stump to the patient's own mesentery for preventive purposes. The developed electrolyte disturbances required rehospitalization and intensive infusion correction of the developed disorders in 11 (8%) patients. We did not consider transient electrolyte disturbances observed during the first year after surgery as complications, since they were related to the predicted effect, did not affect the general well-being of patients, did not lead to a significant decrease in their quality of life, and were easily corrected. In 1 case (0.7%), "bypass enteritis" developed, anti-inflammatory and infusion therapy was performed with a good effect. In 72 patients (52.9%), seromas in the subcutaneous fat tissue developed in the early postoperative period, of which 12 (17%) patients had infected seromas. A ligature fistula developed in 7 patients (5.1%). In all these situations, no increase in the length of hospital stay was required, all necessary manipulations were performed on an outpatient basis.

Discussion of the results obtained. The EIS implies significant and stable weight loss and regression of the components of the metabolic syndrome. In this variant of the operation, it was important to minimize the number of complications specific to the EIS associated with the switched-off gut syndrome and malabsorption. The goal was achieved by lengthening the functioning segment of the ileum and adequately preventing reflux into a fairly long section of the small intestine switched off from digestion. This made it possible to get rid of the main disadvantages of traditional jejunoieileoshunting. As can be seen from the presented data, most of the postoperative complications that arose were standard surgical problems typical for patients with obesity. A small number of observed metabolic disorders allows us to recommend the modified EIS operation for safe use. The key to success and safety of surgical treatment of severe forms of metabolic syndrome is careful selection of patients and long-term observation in the postoperative period for timely correction of possible metabolic disorders. The most qualified observation can only be carried out by the surgeon who performed the operation. Although the risk of such surgical intervention is quite high, it is significantly lower than the risk of developing life-threatening complications associated with MS. Therefore, the modified EIS operation can be used to correct MS for certain indications.

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