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MODERN VIEWS OF METABOLIC SURGERY IN CORRECTION OF TYPE II DIABETES MELLITUS

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Abstract: The conclusions of many pilot clinical studies have been that gastric surgery can have a significant direct impact on glucose homeostasis. Bariatric surgeries are surgical interventions performed on the organs of the digestive tract in order to reduce body weight.

Keywords: type 2 diabetes mellitus, minigastric bypass, clinical and morphological changes, body weight, obesity, metabolic surgery, bariatric surgery.

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Type 2 diabetes mellitus (DM2) is defined by WHO as a metabolic disease characterized by chronic hyperglycemia, which leads to disruption of the interaction of insulin with tissue cells. Many authors believe that, along with obesity, DM is becoming an urgent problem with a high incidence and low level of control over the disease, even with improved drug therapy. According to Hill J., about 90% of DM2 patients are overweight or obese, since DM2 is directly associated with obesity. As Ershova E.V. Recently, surgical methods have become widely used worldwide for the treatment of severe forms of obesity, and there is an obvious trend both towards an increase in the number of operations performed and towards an increase in the number of countries where bariatric surgery is becoming more widespread. Bariatric surgeries are surgical interventions performed on the organs of the digestive tract in order to reduce body weight (BW).

In 1925, O. Leyton described the "side effect" of gastric resection for peptic ulcer in the form of rapid relief of glucosuria or a symptom of diabetes. But the main breakthrough in the surgical treatment of diabetes was the introduction of bariatric surgery. The conclusions of many pilot clinical studies have been that gastric surgery can have a significant direct impact on glucose homeostasis. It should be noted that the founder of metabolic surgery is Buchwald, who in 1964, after many years of experimental research, performed the operation of partial ileo-bypass grafting (PIS) in humans.

The most important developments in the surgical correction of type 2 diabetes include the recognition of the gastrointestinal tract as the main biological target for

diabetes surgery, which is based on the results of numerous, including prospective, studies conducted in recent decades.

Clinical studies have shown that bariatric surgery is highly effective in the treatment of patients with carbohydrate metabolism disorders. The scientific work of W. Pories, carried out in the 90s, for the first time showed the possibility of a significant improvement in the course of DM2 after GS. Yashkov Yu.I. believes that when determining indications for bariatric surgery, it is necessary to carefully study and evaluate the role of factors that may predispose to T2DM decompensation in the long term, for example, the duration of the history of diabetes, the duration of insulin therapy, the role of lipid disorders, the optimal level of C-peptide, which determines the long-term prognosis and others.

A study on metabolic surgery shows that normalization of glycemia after bypass surgery occurs in the early postoperative period and is maintained in the long term with an efficiency of more than 90%.

According to the literature data, requirements for bariatric operations have been developed to ensure the safety and effectiveness of their implementation:

• careful preoperative selection of candidates by a multidisciplinary team of specialists (including endocrinologist, bariatric surgeon, therapist, cardiologist, psychiatrist, etc.) in strict accordance with accepted indications and contraindications;

• performance of operations in the centers of high quality - COE (Centers of Excellence);

• life-long follow-up of operated patients: in accordance with the European COE program - at least 75% of patients must be followed up for at least 5 years;

• terms of control examination: at least 1 time in 3 months during the 1st year after the operation, at least 1 time in 6 months during the 2nd year after surgery, then annually;

• in patients with type 2 diabetes, to minimize the risk of hypoglycemia, the use of oral hypoglycemic drugs or insulin should be corrected in the early postoperative period.

Thus, all bariatric operations, depending on their effect on the anatomy of the gastrointestinal tract, can be divided into 3 groups: restrictive, bypass (malabsorptive) and mixed. According to Ershov E.V., Troshin E.A. and other authors, the choice of surgical tactics depends on the degree of obesity, the specifics of concomitant metabolic disorders and diseases, the psychological characteristics of the patient, the type of eating behavior and the patient's readiness for treatment and lifestyle changes. Often the choice of surgical technique is determined by the personal experience of the surgeon.

Numerous scientific works devoted to metabolic surgery show that today the most commonly used operations in the world in the treatment of type 2 diabetes are:

1. Roux-en-Y gastric bypass is performed using a laparoscopic technique and is the most commonly used method of surgical treatment of obesity, as well as the method of choice for patients with obesity and type 2 diabetes. This operation is considered by many specialists as the "gold standard" of bariatric surgery.

Most scientists believe that a combined intervention aimed at mechanically changing the volume of the stomach in direct contact with food and creating a “mild malabsorption” due to the exclusion of hepato-pancreato-gastro-duodenal secretions from physiological digestion entering the system of the digestive transport conveyor to the proximal sections of the jejunum.

2. Vertical ("sleeve") resection of the stomach - the bariatric effect of this operation is due to a decrease in the volume of the stomach, the rapid onset of a feeling of fullness; the inclusion of neurohumoral mechanisms in the form of a decrease in the production of ghrelin and an acceleration of the evacuation of food from the stomach into the duodenum.

3. Laparoscopic gastric banding is one of the most frequently performed operations worldwide. It has the lowest morbidity and mortality rate (less than 0.1%).

4. Biliopancreatic shunting with duodenal exclusion is one of the most effective bariatric interventions, providing rapid weight loss over a long period of time. It is used for superobesity and is rarely performed. The bariatric effect is based on a decrease in the functional volume of the stomach and a decrease in malabsorption, which is due to the exclusion of a significant part of the small intestine.

Complications do not differ from those in other bariatric surgeries. Late metabolic complications due to malabsorption are considered to be the most important. There are several bariatric operations that have a positive effect not only on weight loss, but also on the normalization of glycemia - the so-called sleeve gastroplasty (RG), Roux-en-Y gastric bypass, biliopancreatic bypass. At the same time, the “gold standard”, the operation of choice in the combination of obesity and DM 2, is precisely GSh. At the same time, the so-called mini-gastric bypass (MGSH) is beginning to gain popularity. The essence of the operation is to isolate the "small" stomach (50-60 ml) and, unlike the classical GS, the formation of only one anastomosis - between the "small" stomach and the small intestine at a distance of 150-200 cm from the duodenojejunal ligament of Treitz. For the first time, a study where patients underwent MGS was described in 2001. Surgery has been presented

as an effective alternative to GS for the treatment of morbid obesity and type 2 diabetes.

The International Diabetes Federation (IDF) has proposed the following goals:

• loss of MT more than 15% of the original;

• achievement of the level of HbA1c≤6%;

• absence of hypoglycemia;

• reducing the dose or number of hypoglycemic drugs taken;

• achievement of total cholesterol level <4 mmol/l,

low-density lipoprotein cholesterol (LDL-C) <2 mmol/l, triglycerides <2.2 mmol/l;

• maintaining blood pressure (BP) <135/85 mm Hg;

• improving the quality of life and the course of diseases associated with obesity.

At the same time, it is recommended to consider as a significant improvement:

• decrease in HbA1c level by more than 20% from the initial level;

• reducing the dose or number of hypoglycemic drugs taken;

• achievement of LDL-C level <2.3 mmol/l;

• maintaining the level of blood pressure <135/85 mm Hg.

According to the 2014 European Interdisciplinary Guidelines for Metabolic and Bariatric Surgery, in the presence of type 2 diabetes, surgical treatment can be considered effective if:

• HbA1c level decreased by more than 0.5% within 3 months or reached a level of <7.0%;

• the dose of insulin after the operation decreased by 25% or more from the preoperative one;

• the dose of oral hypoglycemic drugs decreased by 50% or more from preoperative.

In accordance with the 2014 European Interdisciplinary Guidelines for Metabolic and Bariatric Surgery, it is proposed to consider criteria:

1) partial remission:

- maintaining the level of HbA1c<6.5%;

- maintaining a fasting plasma glucose level of 5.6-6.9 mmol/l (100-125 mg/dl) for at least 1 year after surgery in the absence of pharmacotherapy;

2) complete remission:

- maintaining the level of HbA1c<6%;

- maintenance of fasting plasma glucose levels <5.6 mmol/l (<100 mg/dl) for at least 1 year after surgery in the absence of pharmacotherapy;

3)prolonged remission:

-the presence of complete remission for 5 years of observation.

In the work of A.P. Torgunakov, it is said that the prevalence of this incurable disease does not noticeably change for the better due to the fact that its prevention is not actively carried out, very little attention is paid to the possibilities of surgical prevention and correction of carbohydrate metabolism disorders (CMD).

In his papers, Rutledge confirms his position that minigastric bypass is primarily a malabsorptive bariatric operation, and he recommends a large width of the gastroenteroanastomosis, reaching a diameter of 5–6 cm. Explaining the expediency of a large anastomosis, Rutledge points out that food should not linger in the stomach for a long time.

At the same time, Carbajo emphasizes the importance of performing a relatively narrow gastroenteroanastomosis - no more than 3 cm and the requirement for the obligatory creation of an antireflux "spur". According to Ospanov's experience, the width (diameter) of the gastric pouch is more important for the prevention of enterogastric reflux than the width of the gastroenteroanastomosis due to the fact that the gastrointestinal intracavitary pressure gradient increases due to the narrowing of the tubular shape of the small ventricle in accordance with the Hagen–Poiseuille law.

Thus, based on the review data of the above sources, at present, studies on the study of the clinical and morphological state of the gastrointestinal tract after MGS surgery require a deeper analysis, and the problem of the outcome and complications of such operations is subject to a deeper scientific discussion.

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