

"Post-Bariatric" Diseases of the Operated Stomach: Causes, Diagnosis, Treatment

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Abstract The authors report that bariatric surgery (BS) in individuals with any degree of obesity is currently recognized worldwide as the most effective measure for reducing body weight and hyperglycemia. However, the course of the early postoperative period (in the first 30 days after mini-gastric bypass surgery) is often marred by the development of postoperative complications, including "adductor loop syndrome". The authors conclude that further search for alternative surgical methods is necessary that would reduce the likelihood of surgical complications and reduce the cost of bariatric surgeries for obesity associated with type DM.

Keywords Obesity, Type 2 diabetes mellitus (T2DM), Bariatric surgery (BS), Gastric bypass surgery (GBS), Body mass index (BMI)

1. Introduction

According to WHO, about 7% of the world's adult population is obese, while in developed countries about a third of the population (33.3%) is overweight [21,47,48]. At the European Congress on Obesity in Vienna, it was noted that by the middle of the 21st century, 22% of humanity will be obese [37,41,53].

The global epidemic of type 2 diabetes mellitus (hereinafter referred to as T2DM) is spreading at a rate significantly ahead of forecasts. According to experts from the International Diabetes Federation, by 2045 this contingent will amount to 629 million people [30]. The main etiological factor in the development of diabetes is obesity.

A direct relationship has been established between the increasing prevalence of obesity and the increase in cases of type 2 diabetes. According to WHO data, the likelihood of developing diabetes increases by 20% with an increase in BMI by every 1 kg/m² [14,17,27,32].

In modern conditions, obesity and type 2 diabetes are a medical problem that is of a pandemic nature, is associated with an increased risk of morbidity and mortality, and requires new approaches to treatment [8,17].

Such a rapid increase in the incidence of diabetes served as the reason for the adoption of UN Resolution 61/225 of 20.12.2006 on diabetes mellitus, and in 2011 - the UN Political Declaration addressed to national health systems as

one of the leading causes of disability and mortality of the population [18,39,42].

Thus, obesity in combination with type 2 diabetes mellitus is the cause of renal failure in 40-55% of cases, coronary artery disease and the cause of lower limb amputations in 50-60% of cases, which reduces the life expectancy and quality of life of the population [26,41,46,14].

According to sad statistics, obesity and associated diseases cause the death of about 300 thousand people in the United States every year, and the financial costs of temporary disability exceed \$100 billion, which is 5.5-7% of the annual healthcare budget [3,4,9,25,29].

Currently, conservative treatment of obesity is an extremely difficult task [19]. According to the US National Institute of Health, with obesity, about 40% of patients maintain the effect of conservative treatment for 5 years, and with morbid obesity - only 5-10% [1,24].

Therefore, in recent decades, there has been a high interest all over the world and the high efficiency of bariatric surgeries has been proven as an effective way to reduce body weight in patients with obesity, as well as a pathogenetically substantiated method of treatment, primarily for type 2 diabetes [3,7,65].

According to literature, post-gastrectomy disease develops in 20-45% of patients after removal of 2/3-3/4 of the organ, vagotomy and antrectomy. In 2.5-3% of patients, the severity of the clinical picture of the operated stomach exceeds the severity of the primary disease.

In 3.4-35% of patients operated on using the Billroth II method, dumping syndrome develops, in 3-29% - afferent loop disease, in 5-10% - hypoglycemic disorder. Post-gastrectomy anemia is detected in 10-15% of those operated on, postoperative dystrophy - in 3-10%, peptic ulcers - in 1-3%.

Postvagotomy dysphagia affects 3-17% of patients. Ulcer recurrence is observed in 10-30% of cases. In 8-15% of patients, gastric stump cancer occurs within 20-25 years [52].

It is well known that the most formidable complication of the early postoperative period in gastric surgery is the failure of gastric sutures and anastomoses, which develops in 0.1-1.3% of cases.

It is precisely for the prevention, first of all, of this complication that some specialists advocate gastric bypass with one anastomosis.

However, in this case, bile reflux may develop as a manifestation of afferent loop syndrome, which, along with ischemia in the gastroenteroanastomosis zone and the use of suturing devices, can lead to the appearance of an ulcer in the anastomosis zone (up to 16% of patients) with subsequent development of bleeding, perforations, malignancy or stenosis of the gastroenteroanastomosis (up to 20%) [2,10,43].

The risk of death due to complications from surgery is 0.02-0.05%. This is lower than, for example, when removing the gallbladder or appendix.

The most common immediate (early - 0-30 days after surgery) complications are bleeding (1%), suture failure (0.5-0.8%) and intestinal obstruction (0.16-0.8% depending on the surgical method).

Thrombosis or thromboembolism of the pulmonary artery - in 0.1% of patients. The risk is minimized by early movement, compression stockings and blood thinners. The probability of emergency surgery due to complications is about 1%.

Complications that develop after the 30th postoperative day are considered late. The most common complications after gastric bypass surgery are internal hernia with intestinal obstruction; iron deficiency anemia; severe dumping syndrome and peptic ulcer of the anastomosis, gastroesophageal reflux and severe dumping syndrome [23].

Afferent loop syndrome (ALS) can occur as a result of various gastric surgeries that involve an anastomosis between the stomach or esophagus and the jejunum.

This pathology occurs in 3-29% of cases after gastric resection according to Billroth-II due to a violation of the evacuation of duodenal contents and the entry of part of the eaten food not into the efferent, but into the afferent loop of the jejunum [13,31,51].

Adductor loop syndrome is caused by distal obstruction, which causes stretching of the adductor branch due to the accumulation of bile, pancreatic secretions and proximal parts of the small intestine, food eaten the day before [34].

The mechanism of development of the afferent loop syndrome is associated with the disruption of the natural passage, its reflux into the gastric stump. The appearance of mechanical or functional obstacles to the outflow of the

contents of the stump into the efferent loop provokes duodenostasis, aggravated by jejuno gastric reflux with the occurrence of vomiting, alkaline gastritis, esophagitis.

Due to the constant loss of duodenal contents with vomit, the disease of the afferent loop is complicated by secondary pancreatic insufficiency and intestinal dysbacteriosis [33,12].

The afferent loop syndrome is based on functional and mechanical components. The functional component occurs as a result of dyskinesia of the duodenum, afferent loop, sphincter of the hepatopancreatic ampulla, and gallbladder [28]. The mechanical factor is caused by an organic obstruction [33,44].

Any obstructive process in the area of the afferent loop or in the distal part of the anastomosis, as well as an adhesive process, can lead to afferent loop syndrome [11].

Due to the increasing prevalence of obesity in recent decades, the number of patients who have undergone bariatric surgery has increased, which is often accompanied by the development of afferent loop syndrome, which manifests itself as a bursting pain in the right hypochondrium, epigastrium, nausea, and bad breath. With a long course of the disease, the patient's general condition quickly deteriorates [15].

Classification of afferent loop syndrome. There are three degrees of severity of afferent loop syndrome (mild, moderate, severe). I. by etiopathogenesis; II. by course (acute; chronic) [33].

Diagnosis of afferent loop syndrome is based on X-ray, endoscopic, ultrasound examination, and computed tomography data. Radiological signs of the syndrome are an increase in the volume of the stomach, its hypotension, and a prolonged retention of contrast in the stomach and afferent loop of the jejunum [35,38,45,51].

Endoscopic examination reveals dilation of the gastric stump and afferent loop, and stagnant contents in them. Ultrasound examination of the abdominal organs reveals dilation of the afferent loop of the jejunum. Computed tomography reveals similar data - dilation of the afferent loop of the jejunum [6,35,45].

In the development of afferent loop syndrome, ineffectiveness of conservative therapy, it is indicated to perform etiopathogenetically substantiated reconstructive interventions that promote the restoration of natural, physiological relationships between organs and tissues; if possible, the previous (preoperative) passage of food through the gastrointestinal tract [40].

Treatment of afferent loop syndrome. In mild cases, a special diet, anti-inflammatory and antibacterial drugs, and gastric stump lavage are prescribed [12,16,28,33].

In moderate and severe cases, treatment is surgical [12,33,16].

The volume and type of surgical intervention may vary and depend on the cause of the complication [16,33,40,44].

Conservative treatment of the afferent loop syndrome is ineffective, can be used only in its mild degree and is reduced to a gentle diet, anti-inflammatory therapy, repeated gastric

lavage. Hypoproteinemia and anemia are eliminated. Blood and plasma transfusions, antispasmodics and vitamins are prescribed.

There are several types of surgical interventions for afferent loop syndrome:

- 1) Reconstructive gastrojejunoduodenoplasty;
- 2) Reconstructive Y-shaped anastomosis according to Ru;
- 3) Duodenojejunostomy;
- 4) Enteroenteroanastomosis according to Brown;
- 5) Resection of the duodenum;
- 6) Suturing the afferent loop to the lesser curvature of the stomach;
- 7) Translation of gastric resection according to Bilroth-2 to Bilroth-1;
- 8) Suturing the afferent and abductor loops to the posterior parietal peritoneum [50].

2. Summary

Thus, at present there are more than 40 different types of bariatric surgeries, conventionally divided into 3 groups, which indicates the absence of a unified approach to solving this pathology, which dictates the need for further analysis.

Bariatric surgery in individuals with any degree of obesity is recognized worldwide as the most effective measure for reducing body weight and hyperglycemia.

However, the early postoperative period (in the first 30 days after mini-gastric bypass surgery) is often marred by the development of postoperative complications, including "adductor loop syndrome". Therefore, it is necessary to further search for alternative surgical methods that would reduce the likelihood of surgical complications and reduce the cost of bariatric surgery for obesity against the background of type DM.

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