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SOME FACTORS INFLUENCING THE DEVELOPMENT OF ANEMIA AFTER BILIOPANCREATIC BYPASS

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Summary. If the patient develops ACD, in the absence of iron deficiency, taking iron preparations is inappropriate. Treatment in this case should be aimed at stopping the chronic inflammatory process in the remodeled small intestine.

Key words: obesity, obesity treatment, bariatric surgery, laparoscopic longitudinal resection of the stomach, bariatric surgery, sleeve gastrectomy.

Relevance. The results of conservative methods of treating obesity remain unsatisfactory: only 5-10% of patients manage to lose weight and maintain the result. The vast majority of people suffering from obesity, despite the prescribed diet, exercise and drug therapy, experience an increase in body weight by 1.6-2% per year [11,13,15]. The frequency and nature of the development of postoperative complications, including anemia, depend on the type of bariatric surgery. The most frequently performed restrictive surgeries (aimed at reducing the volume of the stomach) are banding and longitudinal resection of the stomach [1,2,6,8,10]. Laparoscopic longitudinal resection of the stomach (LRG) involves reducing the volume of the stomach by removing a fairly significant part of it, including the greater curvature and fundus, while preserving the cardiac sphincter and pylorus. As a result, the stomach takes the form of a narrow tube with a volume of 100-200 ml. In addition, there are more complex bariatric interventions that combine restrictive and bypass (excluding a significant portion of the small intestine from digestion) components. Such surgeries include gastric bypass (GB) and biliopancreatic bypass (BP). With GB, a "small stomach" with a volume of up to 20-30 ml is formed in the upper part of the stomach by cutting through it, to which a loop of the small intestine is sewn. Most of the stomach, the duodenum, and the initial section of the jejunum are excluded from digestion, bile and pancreatic enzymes interact with food at the level of the small intestine, which contributes to malabsorption. With BP, the duodenum and most of the small intestine are excluded from digestion, as with GB, and most of the stomach is resected

(longitudinal or distal resection). The small intestine is divided into 3 segments (alimentary, biliopancreatic and common loops). Pancreatic enzymes and bile combine with food at a distance of 75-100 cm from the ileocecal valve, due to which digestion of food and absorption of nutrients occurs in a section of the small intestine 75-100 cm long. Skroubis et al., in turn, also compared two groups of patients in their prospective study. One group underwent GS, and the other - BPSH. In the two groups, which differed from each other in the length of the absorptive surface of the small intestine, equivalent ferritin levels were observed after 2 years [23,24,25,26]. However, another intergroup study, smaller in the number of subjects (n = 103), did not show a significant difference in ferritin levels in patients after BPSH in the Hess-Marceau modification and BPSH in the Scopinaro modification [87]. Thus, the only truly effective method of treating morbid obesity at present is bariatric surgery. Bariatric operations significantly reduce both the incidence of obesity-related diseases and the mortality rate of patients. In addition, they allow for a significant reduction in the financial costs of treating obesity-related diseases [3,4,20,21,22].

However, despite good results in terms of weight loss, bariatric surgeries are associated with disruption of the physiologically balanced and holistic digestion process, and therefore are not without the development of a number of long-term metabolic complications.

Purpose of the study. Optimize algorithms for examination and treatment of patients with anemia after various types of bariatric surgeries

Materials and methods. This work is based on an analysis of the results of examination and treatment of 159 patients with various types of external hernias of the anterior abdominal wall, who were examined and inpatiently treated in the 1st surgical department of the Bukhara Regional Multidisciplinary Medical Center and the Department of Thoracoabdominal Surgery of the Multidisciplinary Clinic of the Tashkent Medical Academy for the period from 2011 to 2023 The analyzed material included women of reproductive age who planned to have children in the future. The control group consisted of all women with hernias of the anterior abdominal wall who underwent traditional hernial orifice repair without the use of allomaterial. The main group is all women with hernias of the anterior abdominal wall who underwent alloplasty according to our recommendations. Research results and discussion.

In 7 patients (8.75%), normochromic normocytic anemia was diagnosed at various times after the BPSH operation: after 3 months (1 patient), after 6 months (2

patients), after 9 months (3 patients), after 2 years (2 patients). It is noteworthy that in patients with normochromic normocytic anemia, hemoglobin and serum iron levels ($r = 0.232$, $p = 0.6$ 36 months after surgery), as well as hemoglobin and ferritin levels ($r = 0.458$, $p = 0.31$ 36 months after surgery) did not correlate significantly, in contrast to patients with iron deficiency anemia, who had a positive correlation between the level of hemoglobin and serum iron ($r = 0.842$, $p = 0.006$ 36 months after surgery) on the one hand, and between hemoglobin and ferritin ($r=0.934$, $p=0.0236$ months after surgery) – on the other. To confirm the hypothesis about the relationship between normochromic normocytic anemia and chronic inflammation, we considered it appropriate to compare the levels of CRP and ferritin in patients with this type of sanemia and in other patients. It was revealed that patients with normochromic normocytic anemia have higher levels of CRP, the main laboratory marker of inflammation, already 3 months after surgery (7.13 ± 1.98 mg/l in patients with normochromic anemia and 1.97 ± 1.67 mg/l in other patients, $p=0.0000001$), and the trend continues thereafter. There were no initially significant differences in the level of C-reactive protein between the two groups of patients. In addition, patients with normochromic normocytic anemia had significantly higher levels of ferritin (an inflammation marker) starting from the 9th month after surgery compared to other patients. There were no significant differences in ferritin levels between the two groups at baseline. One patient out of 80 (1.25%) was diagnosed with B12-deficiency anemia 3 years after surgery (initially, hemoglobin and vitamin B-12 levels were normal). Another 2 patients had a decrease in vitamin B12 levels below normal with normal hemoglobin levels. One patient had a decrease in folic acid levels with normal hemoglobin levels; there were no cases of folate deficiency anemia. A positive correlation was found between the initial hemoglobin level and its value over time. Moreover, in the overwhelming majority of specific observation periods (after 6, 9 months, 1, 1.5, 2, 3 years, 6 years) the correlation coefficient was very high (over 0.9, $p<0.05$). Thus, the higher the patient's initial hemoglobin level, the less hemoglobin decreased over time, i.e. the lower the probability of developing anemia.

A similar trend was also observed for ferritin (positive correlation between the initial level and its value over time). The correlation coefficient was very high after 1, 1.5, 2, 3, 4, 5 and 6 years. The patients initially observed after BPSB differed in the length of the suction surface of the common loop (from 55 to 100 cm). To confirm the hypothesis that patients with a longer loop would be less likely to develop iron deficiency anemia, the correlation coefficient between the length of

the common loop and the hemoglobin level over time was calculated. A very high negative correlation ($p < 0.05$) (the shorter the initial common loop, the lower the hemoglobin over time) was found only after 4 and 5 years after the operation. At earlier observation periods, the length of the common loop did not significantly correlate with the hemoglobin level. The serum iron level began to correlate with the length of the common loop 6 months after the operation. Very high correlation was also observed at 1.5, 2 and 4 years after BPSH. At other observation periods, the serum iron level did not significantly correlate with the length of the common loop. The ferritin level at all observation periods did not significantly correlate with the length of the common loop.

Conclusions: In 7.85% of patients after BPSH surgery, normochromic normocytic anemia was diagnosed, characterized by normal serum iron content and elevated ferritin and C-reactive protein levels. The pathogenetic mechanism of this anemia may be a chronic inflammatory process in the small intestine, developing after operations with a bypass component.

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