

Mechanism of Weight Loss Surgery for Metabolic Syndrome Based on Magnetic Resonance Imaging

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Abstract: with the improvement of people's living standards, the number of obese people worldwide is growing rapidly. Obesity is a risk factor for cardiovascular and cerebrovascular diseases, diabetes, metabolic syndrome, cancer and other diseases, so people have paid more and more attention to controlling weight and reducing obesity. It is an indisputable fact that metabolic syndrome can be quickly relieved or cured after weight loss surgery. The occurrence of metabolic syndrome will cause diffuse demyelination of neurons and nerve fibers, thus causing damage to brain parenchyma. The key to improve the prognosis of cerebrovascular diseases is to prevent the occurrence of metabolic syndrome, take effective measures and do a good job of early prevention. It is necessary to study the clinical diagnosis of metabolic syndrome in order to improve the differential level of high-risk groups, reduce the risk of cardiovascular disease, implement symptomatic intervention for high-risk groups as early as possible, and improve the prognosis of cardiovascular disease.

1. Introduction

In addition to abundant evidence that bariatric surgery can improve cardiovascular risk factors, including diabetes and metabolic syndrome indicators, in obese patients [1]. At present, bariatric surgery is not only used to lose weight, but more importantly to treat metabolic syndrome. Metabolic syndrome (ms) is a general term for a group of metabolic disorders, with central obesity, insulin resistance, hypertension, hypertriglyceridemia, low high density lipoprotein cholesterol, impaired glucose tolerance or type 2 diabetes as the main manifestations of the syndrome [2]. With the improvement of people's quality of life in the new era and the formation of a lifestyle of eating more and moving less, the incidence of metabolic syndrome in china is increasing day by day, which has gradually aroused widespread concern in the whole society [3]. Traditional diet, exercise and drug methods are often ineffective and unsustainable in the treatment of severe morbid obesity. For some patients, surgery has gradually attracted attention. It is an indisputable fact that metabolic syndrome can be quickly relieved or cured after weight loss surgery [4]. The occurrence of metabolic syndrome will cause diffuse demyelination of neurons and nerve fibers, and then cause damage to the brain parenchyma. Obese patients with metabolic syndrome can be significantly improved in blood glucose, blood lipids and blood pressure after surgical treatment, so surgical treatment of patients with metabolic syndrome has become a hot topic in recent years [5].

Preventing the occurrence of metabolic syndrome, taking effective measures, and doing early prevention work are the keys to improving the prognosis of cerebrovascular diseases [6]. The foregut and hindgut theory is the classic hypothesis to explain gastric bypass surgery for metabolic

syndrome, that is, food does not pass through the foregut after gastric bypass, and it causes a series of changes in gastrointestinal hormones by reaching the hindgut earlier. Metabolic syndrome is rapidly resolved [7]. The treatment of acute cerebral infarction by thrombolysis can achieve ideal results, however, the therapeutic effect of thrombolysis is not absolutely ideal, and its safety and feasibility will be interfered by various factors [8]. Other gastrointestinal surgeries also reduce caloric intake during the perioperative period, but have no effect on controlling blood sugar. Instead, they will increase blood sugar due to stress reactions [9]. Compared with non-obese individuals, the proportion of pachyderms / bacteroides increased in obese individuals and the diversity of bacteria decreased. This difference diminishes with weight loss after surgery or diet control. The formation of metabolic syndrome will affect the awareness of thrombolysis. In order to improve the level of clinical identification of high-risk populations and reduce the risk of cardiovascular disease, early symptomatic interventions for high-risk populations are made to improve the prognosis of cardiovascular disease, and the clinical diagnosis of metabolic syndrome is of great significance.

2. How to Grasp the Qualification Criteria for Metabolic Weight Loss Surgery

Traditional ms therapy mainly focuses on weight loss, insulin resistance reduction, blood pressure and blood lipid improvement and strict control of blood sugar. As weight loss and drug therapy are difficult to adhere to for a long time, compliance is poor, and side effects of drugs affect patients, it is difficult to completely and effectively achieve the therapeutic purpose. Only operations involving the stomach can have certain therapeutic effects on metabolic syndrome, while abdominal operations unrelated to the stomach cannot reduce blood sugar. Stomach is a mysterious endocrine organ with many known and unknown endocrine functions. Intestinal flora can promote the body to obtain energy from food intake, but not all bacteria have this effect [10]. Weight loss plays an important role in blood sugar control of diabetic patients, especially obese t2dm patients, which can cause increased expression of insulin receptor and adiponectin level in muscle. Hyperobese patients are at high risk of developing diabetes, hypertension, pulmonary dysfunction, apnea syndrome and asthma [11]. In order to reduce the weight of patients with obesity and avoid obesity related complications, minimally invasive surgery is the best choice. All patients had different degrees of diabetic remission after operation, and the remission rate of total gastrectomy was higher than that of subtotal gastrectomy and endoscopic local gastrectomy.

The clinical follow-up and a large number of studies show that the improvement of blood glucose and the increase of insulin receptor level are often earlier than the weight loss. For the selection of operation, we should refer to all the information of medical history. Detailed pregnancy history and cesarean section history are particularly important for female patients. Other factors such as history of hypertension, history of coronary artery disease, history of chronic obstructive pulmonary disease, history of diabetes, history of hepatitis c and aids should also be considered. As one of the metabolic risk factors, most researchers think that hypertension is more complex than other components of metabolic syndrome. Our treatment objectives are different. Weight loss is a secondary issue. The most important thing is to better control blood glucose, blood pressure and blood lipid. Insulin resistance patients with a long course of disease usually have abnormal glucose tolerance, which is also one of the rising risk factors. Diabetes is the result of abnormal glucose tolerance, and the cvd caused by diabetes is also highly likely. Due to the presence of pathogenic factors in the proximal small intestine, food can further promote the production of these pathogenic factors, too much production of a certain hormone, antagonizing the activity of insulin, leading to insulin resistance, blood glucose rise, operation can avoid the stimulation of the secretion site by a certain antagonistic insulin hormone caused by food.

3. Mechanism of Weight Loss Surgery for Metabolic Syndrome

Heredity and related factors existing in patients themselves can also be used as risk factors for metabolic syndrome. However, considering that such risk factors are not as significant as obesity and insulin resistance, they are more heterogeneous. RYGB may reduce the body's ability to obtain

energy from food by changing intestinal flora, or it may play a weight loss role by generating unknown signals that can regulate energy consumption [12]. Genetic factors have far-reaching effects on lipoprotein regulation, so lipoprotein expression in obese or insulin patients is generally heterogeneous. The mechanism of intestinal flora changes after RYGB includes: changes in intestinal anatomy, rapid entry of undigested food into the distal small intestine, and changes in bile, intestine and liver circulation. The level of blood sugar is largely affected by insulin secretion and insulin resistance, which all play an important role in the pathological changes of metabolic syndrome [13]. In the metabolic syndrome, separating obesity from primary insulin resistance is not easy. However, this does not affect insulin resistance as a factor in the pathogenesis of metabolic syndrome. The absence of duodenum and jejunum not only avoids the pathogenic factors of the foregut, but also allows food that has not been fully digested to enter the hindgut in advance. Therefore, the foregut theory can only be determined after excluding the role of the posterior intestine.

Some endocrine factors are also closely related to abnormal body fat distribution, which can directly or indirectly induce metabolic syndrome. When genetics selects genes, they tend to prefer genes that can store energy. When genotypes that store energy appear in a food-rich environment, they are very harmful. Large amounts of stored food can cause obesity and diabetes [14]. The occurrence of metabolic syndrome is actually a process in which multiple risk factors interact under different conditions. The intestine stimulates the release of insulin through the release of endocrine transmitters under the stimulation of food, especially carbohydrates, and the intestinal intake of glucose can cause a higher β -cell insulin secretion response than intravenous injection. Both monocyte macrophages and adipokines can promote the formation of arterial thrombosis, which in turn can cause atherosclerosis or other cardiovascular diseases [15]. The flow of axon direction, myelin sheath, axial laminar flow and other fluids will also affect the anisotropy of brain white matter. Therefore, DTI technology with high sensitivity to anisotropy of brain white matter has become the best way to accurately locate the movement of brain white matter fibers. Genetic factors and environmental factors can affect central obesity and vascular function under different conditions, and eventually cause atherosclerosis.

4. Conclusion

With the development of social economy and the arrival of aging, obesity and metabolic related diseases are becoming more and more popular, seriously endangering human health. Most patients will suffer from systemic skin relaxation and tissue prolapse after weight loss surgery. About half of the patients will choose to undergo systemic plastic treatment 1-3 years after weight loss surgery, and at the same time, the weight will be prevented from rising again after weight loss surgery by removing redundant adipose tissue. To explore the mechanism of weight loss surgery for metabolic syndrome, we should start from the great curvature of the stomach, find this special cell and its secreted hormone, and use hormone antagonists to play the role of treating obesity and metabolic syndrome. Before systemic plastic therapy, the general condition of the patient, the degree of deformity and the thickness of subcutaneous fat should be properly evaluated, and a personalized surgical plan should be drawn up, so as to remove as much excess skin as possible, leave as few incision scars and reduce surgical complications. The key to the long-term benefits of surgery is the close cooperation of physicians, careful preparation before operation and long-term standardized management after operation. Different tissue structures in vivo lead to different directions and velocities of water molecules in the diffusion process. According to the dispersion characteristics of water molecules, DTI can make quantitative and timing analysis, and finally get the accurate data of DTI imaging, which can be converted into images. The incidence of complications after whole body plastic surgery is high, so how to reduce the incidence of complications and improve the quality of life of patients is a subject we need to further study.

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