
REVIEW

THE ROAD FROM BARIATRIC SURGERY TO METABOLIC SURGERY. FAR AWAY FROM AN AESTHETIC SURGERY: EVIDENCE AND DISCUSSIONS

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ABSTRACT

According to the WHO 2012 report, the top 10 causes of death worldwide are: ischemic heart disease, stroke, chronic obstructive pulmonary disease, respiratory infections, lung cancer, HIV / AIDS, diarrhea colitis, diabetes, traffic accidents and hypertensive disease. What can many of these have in common? Increased incidence among the obese population. We are currently talking about the beginning of a new era, that of an obesity epidemic, in the last 30 years there has been a sustained increase in BMI among the global population, this phenomenon turning into a real health crisis. In 2008, the WHO confirmed the doubling of the incidence of obesity worldwide, compared to 1980, estimating for Europe that > 50% of the adult population is overweight, of which 23% of women and 20% of men have varying degrees of obesity. In this article, we will review the literature regarding the options and health benefits of bariatric surgery which by current evidence should be considered metabolic surgery. Although in the beginning these interventions were focused on the aesthetic benefits, now they are shifting more and more to metabolic benefits. The field of metabolic surgery is one in expansion and with vast possibilities of evolution. Additional studies are needed to establish criteria for inclusion in surgical groups and to choose the optimal procedure for each patient.

KEYWORDS: bariatric surgery, metabolic surgery, medical history

INTRODUCTION

European countries with statistics conducted up to 2000, confirm in Romania, 7.7% of men and 9.5% of women as obese individuals and respectively 38.1% men and 28.6% women are overweight. [1], [2], [3].

A study published in the USA in 2008 [1], [2], [3], estimates for the year 2030, according to the current upward trend, a number of 2.16 billion overweight people and 1.12 billion obese individuals, thus marking the importance of prevention programs worldwide. Attention is also drawn to the risk of long-term childhood obesity (60% of obese children in adolescence will become obese adults), with a much

higher incidence of diabetes, cardiovascular, orthopedic and psychiatric disorders

For the inclusion in the risk groups, a body mass index (BMI) is used, calculated as follows: the weight expressed in kg divided by the square of the patient's height, expressed in meters. (kg/m²) [4]. Overweight patients: BMI \geq 25. Obese patients: BMI \geq 30. Subclasses of obesity, according to BMI: (WHO 2004). Obesity grade I: 30.00-34.99. Obesity grade II: 35.00-39.99. Obesity grade III: \geq 40

Bariatric surgery represents a group of surgical interventions of the digestive tract, dedicated to the weight loss of the patient. Follow-up of these patients demonstrated the magnitude of the health benefits brought by this type of surgery: amelioration of metabolic syndrome, a decrease of cardiovascular

risk, amelioration of psychological, orthopedic, and gynecological pathologies, a global decrease of mortality [5].

All these elements led to the transformation of bariatric surgery into a "metabolic" surgery, [6] involved in the treatment of the patient with active metabolic syndrome, regardless of its weight [6].

One definition of this is [7]: "surgical manipulation of a normal organ or organ system to obtain biological results with a potential health benefit".

The positive metabolic effects are not only due to the low caloric intake and weight loss but also to the endocrine changes [7] resulting from the surgery that alters the architecture of the digestive tract [8].

Inclusion criteria – surgical indications

There is some consensus [9] for the indication to perform a bariatric surgical procedure: BMI ≥ 40 kg/m², with or without comorbidities, BMI ≥ 35 kg/m², with at least one of the following comorbidities: type 2 diabetes, hypertension, hyperlipemia, obstructive sleep apnea, obesity-induced hypoventilation syndrome, Pickwick's syndrome, non-alcoholic hepatic steatosis, NASH, hypertension, gastroesophageal reflux disease, asthma, venous insufficiency, urinary incontinence, arthritis, very low quality of life. BMI: 30-34.9 kg/m² with diabetes or metabolic syndrome. The BMI [10] criterion may be considered either the current BMI or a previously reached maximum that falls within the mentioned limits, with the amendments: There is a weight loss as a result of intensified treatment and regimen before surgery (thus falling below the surgical indication limit). The patient showed significant weight loss in a conservative manner but resumed weight gain at an accelerated rate.

Contraindications: Neoplastic disease (cancer); surgical treatment may come into play after 5 years of complete remission, Extreme ages: under 14 years and over 70 years (relative), Severe heart and respiratory diseases, Mental illness and lack of compliance (requires psychological evaluation), Stomach disorders: ulcer, large Hiatal hernias, Untreated endocrinological diseases: hypothyroidism, hypercorticism, etc.; endocrinological evaluation is mandatory and potentially eliminatory.

The aim of our study was to present the evolution of bariatric surgery and bring forth the role it plays in metabolic diseases.

MATERIAL AND METHOD

The articles for the respective review were obtained from the PubMed medical database. The search excluded articles published before 1990. A

literature review was conducted. The period researched spanned 01.01.2000-01.01.2021, however several articles such as the paper published by Kremen et al. in 1954 were included as they had historic importance. The following words were used to conduct the search: "obesity" AND "bariatric surgery". The variables investigated were: demographic data, body mass index, type of surgical intervention practiced, results of the weight loss surgery. The articles were selected with the help of the P.I.C.O.S concept. The quality of the information was taken into consideration using the PRISMA checklist. A number of 56 articles were identified. From these 8 were excluded due to fact that they were duplicates. The full text could not be accessed in the case of 11 articles. Another 3 were eliminated as they were not written in English. As such 34 articles were left for analysis and discussions.

RESULTS AND DISCUSSIONS

Preoperative management

Preoperative evaluation is complex and requires an exhaustive interdisciplinary evaluation: Complete history, including personal and family medical history. Complete clinical examination. Risk evaluation with the patient. Paraclinical investigations: a complete standard set of investigations for complex surgery, upper digestive endoscopy, lung radiography, EKG, abdominopelvic ultrasound. Preoperative consultations: surgeon specialized in bariatric surgery, anesthetist, nutritionist, and metabolic diseases, psychiatrist / psychological counseling, endocrinology, cardiology, pulmonology. Any other necessary specialty can be included in the list, depending on comorbidities. Plastic surgery: pre or postoperatively: the high rate of weight loss leads to an excess of skin ("abdominal apron") which is an indication of abdominoplasty later.

Notions of bariatric surgery

No other field of surgery has seen a greater advance in recent decades than that of bariatrics [12]. Although it has existed for over 6 decades [13]. The main metabolic surgical techniques can be divided into 4 major categories [14] and are performed through open and laparoscopic techniques: Malabsorption procedures: jejunoileal by-pass, biliopancreatic derivation, duodenal switch. Restrictive / malabsorption procedures: gastric bypass with Roux loop in "Y" (short or long loop). Restrictive procedures: gastric banding or vertical gastroplasty with the ring, gastric sleeve (longitudinal gastrectomy), use of gastric balloon. Others, experimental. The first bariatric surgery took place in the early 1950s [15], the pioneer of bariatric surgery

is considered the Swedish surgeon Henriksson, from Gothenburg, who, in 1952, performed with a weight-reducing visa, partial resection of the small intestine. In 1953, Buchwald and Varco performed a termino-terminal anastomosis between the jejunum and ileum, at a distance of 25 cm from the cecum. These procedures generated weight loss by malabsorption. In 1963, J. Howard Payne, Lorent T. DeWind, and Robert R. Commons performed a jejuno-colic bypass, with mediocre postoperative results. Genuine bariatric surgery appeared in 1966 (Edward Mason and Chikashi Ito, of the University of Iowa), with gastric bypass surgery, similar to the Billroth II gastrectomy procedure, with few postoperative complications [16].

Reversibility is an important element in the development of bariatric techniques, as well as the possibility to perform procedures in multiple surgical interventions, depending on the patient's evolution. Other significant contributions: 1978, Wilkinson introduced the notion of gastric banding, and in 1986, Kuzmal invented gastric banding using a silicone ring [17].

Forsell (who holds patent WO1994027504 A1 for adjustable gastric banding) and Belachew began using laparoscopic surgery in 1994. LAP-BAND is becoming one of the most widely used bariatric surgical procedures worldwide. There are currently centers dedicated to bariatric laparoscopy, with optimal long-term results.

Malabsorption surgical interventions

The first surgical interventions performed for weight loss relied on malabsorption due to physiological changes in the activity of the digestive tract. The initial procedures, extremely aggressive, were abandoned or underwent radical changes later. Jejunio-ileal by-pass

It is the main technique performed at the beginning of bariatric surgery. One of its last forms was an adaptation of Scott's 1976 intervention, which recommended a jejunoileal, with the anastomosis of the long segment of the small intestine to the transverse colon or sigmoid. Weight loss has been rapid. It has now been abandoned due to very severe side effects [18] [19]: diarrhea syndrome, night blindness (vitamin A deficiency), osteoporosis (deficiency). vitamin D), protein-caloric malnutrition, intestinal toxicity that may progress to liver failure, arthritis, and severe dermatological problems.

Biliopancreatic derivation

The failure of the eminently malabsorption intervention shifted surgeons' attention to mixed procedures, including the restrictive component. The first attempts in this direction were made in 1979 by

Scopinaro, who modified the jejunoileal bypass procedure with a horizontal gastric reservoir of 250 ml, associated with a distal gastrectomy and the abandonment of the duodenal stump, followed by a gastroenteroanastomosis on a Y-loop. the Roux of 250 cm [20].

From Scopinaro's procedure until now, small technical changes have been made and, the most important added element is that it has been transformed, by laparoscopic approach, into one of the most frequently used elective procedures in the 1980s. The procedure has eliminated unwanted side effects, such as severe diarrhea syndrome, liver failure, bacterial colitis, marginal ulcers, malnutrition [21].

Duodenal switch

The biliopancreatic switch was subsequently improved with 2 elements: the laparoscopic approach and the use of a duodenal switch, elements that led to faster recovery of the patient, less aggressive intervention, and reduced perioperative risks, resolution of postoperative dumping syndrome and decrease the incidence of anastomotic peptic ulcers. The standard technique involves [22]:

- stapler resection of the small intestine, at 250 cm from the ileocecal valve; creation of a biliopancreatic arm by anastomosis of the proximal intestine to the resected loop, 100 cm above the ileocecal valve
- raising the distal loop, with feeding role
- sleeve-gastrectomy
- duodenal division at 3 cm of the pylorus, with duodenal anastomosis on the feeding loop

The size of the arm loops determines the postoperative complications and the level of weight loss. A common loop of 60-100 cm and a feeding loop of 200-360 cm is recommended. In the first months, the weight loss is increased than it stagnates with time and there is even the possibility of weight regain. From the point of view of comorbidities, surgery helps to lower blood sugar [23] and blood pressure, the disappearance of symptoms associated with sleep apnea.

The procedure is very efficient, patients with BMI > 35 kg/m² with comorbidities, have the most to gain in the long run, but it is the procedure with the highest mortality rate and perioperative risks [24].

Although effective, the technique is reserved for super-obese patients with a BMI >55 kg/m² or, in selected cases, as a procedure for "correcting" other failed bariatric interventions.

Restrictive/malabsorption procedures

The prototype of the intervention is the gastric bypass procedure Billroth II but without removal of the distal part of the stomach. The procedures have evolved technically since 1969 from

the Mason / Ito technique, without gastric resection, to the present technique of gastro-jejunoanastomosis on the Y-loop, the most used laparoscopic procedure in the 1990s and 2000s.

Gastric by-pass with Roux loop in “Y” (short or long loop)

It can be performed both laparoscopically and open; a portion of the stomach is mechanically or manually isolated, a gastrojejunal-anastomosis. The jejunum is resected at 25-50 cm from the Treitz ligament. [25] The mouth of the anastomosis is reduced to 10 mm, the distal stomach, the duodenum, and the first 50 cm of the jejunum are excluded from transit, resulting in a feeding path of 150 cm intestine [25].

Common complications: anastomosis fistulas or fistulas on the staple line [26], high risk of postoperative hemorrhage, small bowel obstructions, anastomotic strictures, gastrointestinal fistulas [26], weight gain, dumping syndrome, and severe nutritional deficiencies.

Restrictive procedures

Gastric banding

The procedure began in the early 1970s, performed by Mason and Printen, as a gastroplasty. The procedure initially involved placing an inflatable device around the heart, 1 cm below the eso-gastric junction, connected to a subcutaneous port fixed on the right abdominal muscle. The injection of saline into the port narrows the stomach at the level of the device. Later, adjustable rings were used, inserted laparoscopically/ The procedure has few complications, is not accompanied by anemia or dumping syndrome, is reversible, and has positive effects on the diabetes clinical evolution. The patient is dependent on the moments of adjustment of the ring, has a progressive weight loss (especially in BMIs <35 kg / m²) [27] and more than 25% of patients do not have a sustained weight loss at 5 years. It is a much safer procedure and is preferable to gastric Y-loop bypass.

Gastric sleeve (longitudinal gastrectomy)

Longitudinal gastrectomy (Gastric sleeve) involves removing the lateral portion of the large gastric curve, resecting the stomach along the small curvature, from the Hiss angle to the antrum. The tendency to choose as the first therapeutic intention of this procedure is one supported by the international specialized studies, based on arguments such as: very wide categories of patients to whom it is addressed, patients with severe comorbidities associated with obesity, not impeded by age or BMI criteria; Rapid postoperative recovery, with minimal complications in the following periods; Important weight loss, especially in the first years after the operation; It may remain as a single intervention or, in the case of

super-obese patients or insufficient weight loss or subsequent weight gain, gastric sleeve may be associated with a new intervention (gastric bypass, biliary-pancreatic diversion); The surgeon's learning curve is smaller than in the rest of the procedures; Does not require additional therapeutic elements (e.g. ring, balloon); Optimal cost/benefit ratio and risk/benefit; The intervention can also play an additional therapeutic role in patients with previously diagnosed gastric pathologies: polyps, ulcers.

The efficiency of longitudinal gastrectomy in the treatment of obesity has a complex determinism, combining restrictive mechanisms with other neuroendocrine ones.

The mechanisms that support the influence of energy balance and food intake are [27]:

1. reduction of the capacity of the gastric reservoir;
2. decreased appetite due to decreased plasma levels of ghrelin - a hormone produced mainly by P / D1 cells located in the stomach at the level of the gastric fundus (surgically removed) and epsilon cells in the pancreas
3. installation of an early feeling of satiety, quickly after ingestion - transmitted centrally through vagal conduction pathways

Laparoscopic gastric sleeve gastrectomy is a major surgical procedure that requires a standard laparoscopy kit, complete with a liver retractor, special gripping forceps, electrical or harmonic devices, mechanical staplers with multiple.

Other procedures, experimental or very rarely used: Vagal stimulation [28]. Myo-electric gastric stimulation. Gastric bypass on the omega loop. Duodenoileal bypass with gastric sleeve. Gastric folding using adjustable ring [29]. Intra-gastric balloon. Ileum transposition

Bariatric/metabolic surgery in adolescents and young people

Childhood and adolescent obesity are an increasingly common condition [30]. Thus, bariatric surgery is also addressed to this group of patients [31], with all the moral, ethical, and legal implications derived from the assumption of procedural risks by persons without their consent.

The surgical approach to juvenile obesity has become a priority, given the panoply of comorbidities, physical, and mentally associated with this pathology, in the immediate and long term. European and Australian guidelines set out the following guidelines for bariatric surgery in children/adolescents: Choosing a center with experience in adult therapy and which has a department of pediatric surgery and multidisciplinary pediatrics. BMI > 40 kg / m² and at least one

comorbidity, including type II diabetes. Followed at least 6 months of nutritional therapies and food diets. Presents musculoskeletal and physiological maturity. Shows the ability to adhere to the perioperative lifestyle. Agreed procedures [32]: laparoscopic approach, either adjustable banding or gastric bypass on Roux-Y.

Bariatric surgery in the elderly

Age over 60 years; the patient must be submitted to an interdisciplinary evaluation commission; the indications are very limited and adapted to each case.

Obesity is a historical-cultural component of the evolution of society. Currently, bariatric surgery has lower mortality risks (0.1%) than most routine surgeries. Malabsorption procedures are abandoned, with restrictive ones being preferred, safer for the patient, minimally invasive, with low costs and maximum benefits. Of the available procedures, the gastric sleeve is the safest and easiest to perform, with optimal results in the short and medium-term on diabetes, dyslipidemia, hypertension, and reflux disease, but the lack of clear guidelines leaves it to the discretion entity surgeon-patient choice of surgical technique.

Metabolic surgery can lead to complete remission of diabetes and improvement or disappearance of metabolic syndrome.

Improvement of metabolic syndrome, dyslipidemia, and hypertension may be due to both postoperative weight loss and changes in the patient's neuro-endocrine status resulting from manipulation of the digestive tract.

The evolution of patients may lead to the need of secondary or revision procedures, in which case a careful paraclinical evaluation of the anatomy and clinical status is required, subsequently opting for the least aggressive procedure at the time of evaluation [27].

The reasons for revision surgery can be: Failure of the procedure, no weight loss is recorded or there is a recurrence of obesity. Occurrence of severe secondary complications. The need to reverse the procedure

Given that reoperation can be very risky for the patient, there is the possibility, especially after gastric bypass with Roux en Y, to perform endoscopic procedures [33], such as endoscopic suturing of the anastomosis mouth or perianastomotic mucosal ablation [34].

Anastomotic ulcers, severe reflux disease, occlusion, require reintervention and modification of the procedure used, most often the replacement of a gastroplasty, or gastrojejunostomoses with a Roux en Y complex.

Revision surgery should be reserved for centers with significant experience in bariatric

surgery, opting for either gastric bypass or endoscopic procedures, most commonly. Preoperative investigations include: barium transit, upper digestive endoscopy, and CT examination.

Postoperative follow-up of the patient's evolution is a key element in assessing the efficiency of the procedure. Evolution criteria, according to the European metabolic surgery guide.

CONCLUSION

The field of metabolic surgery is one in expansion and with vast possibilities of evolution. Additional studies are needed to establish criteria for inclusion in surgical groups and to choose the optimal procedure for each patient.

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