

# Suitability and preparation of obese patients for bariatric surgery

## Introduction

Obesity, defined by a Body Mass Index (BMI)  $\geq 30\text{kg/m}^2$ , is the most prevalent metabolic disease worldwide and constitutes a major public health problem.<sup>1-4</sup> Type 2 Diabetes (T2DM), Hypertension, Dyslipidemia, Stroke, Coronary Heart Disease (CHD), Obstructive Sleep Apnea (OSA), Obesity-Hypoventilation Syndrome (OHS), Non-Alcoholic Fatty Liver Disease (NAFLD) or Non-Alcoholic Steato Hepatitis (NASH), Gallbladder Disease, Osteoarthritis, Infertility, Cancer, Psychological difficulties are frequent comorbidities in the obese population, which can be prevented or improved with weight loss.<sup>5-7</sup>

Bariatric surgery is the most effective treatment for morbid obesity, improving the overall quality of life, comorbidities and mortality.<sup>8,9</sup> However, surgery is not recommended to all obese patients.<sup>5,6</sup> The potential benefits, indications, risks, contraindications for bariatric surgery must be considered for each patient, and an extensive work-up to assess the suitability and to prepare the surgical candidate must be provided by an experienced multidisciplinary team, which should involve endocrinologists, bariatric surgeons, nutritionists, psychologist and/or psychiatrist, specialized nurse, social worker, and occasionally other specialized physicians, such as cardiologists, pneumologists or gastroenterologists.<sup>10,11</sup>

Suitable candidates for a bariatric surgery includes patients with BMI  $\geq 40\text{kg/m}^2$  without comorbid illness, or BMI between  $35.0-39.9\text{kg/m}^2$  with at least one obesity-related comorbidity, including T2DM, OSA, OHS, Pickwickian syndrome (combination of OSA and OHS), asthma, hypertension, dyslipidemia, NAFLD/NASH, pseudotumor cerebri, gastroesophageal reflux disease, venous stasis disease, severe urinary incontinence, debilitating osteoarthritis, impaired quality of life and disqualification for other surgeries due to obesity.<sup>5,6,11-13</sup> Bariatric surgery has proven a remarkable positive effect in T2DM, leading to high rates of diabetes remission and reduction of diabetes-related mortality.<sup>14</sup>

The International Diabetes Federation and some bariatric centres support the surgical indication for patients with BMI between  $30.0-34.9\text{kg/m}^2$  and poorly-controlled T2DM.<sup>11,15</sup> The surgical candidates must be motivated to lose weight and/or fail to achieve or maintain satisfactory weight loss with behavioural treatment (with or without pharmacotherapy). Moreover, surgical candidates must undergo a detailed psychosocial evaluation, and also demonstrate understanding about surgical procedures and commitment to the long-term follow-up plan.<sup>5,6,11-13</sup>

Patients with severe, untreated or active psychosis, major depression, binge-eating disorders, dependence of alcohol or drugs and those unable to comply with nutritional and lifestyle requirements after surgery are considered unsuitable for surgery.<sup>6,16,17</sup> Bariatric surgery is contraindicated in case of severe cardiac disease, coagulopathies or other conditions carrying relevant surgical/anaesthetical risks or threatening life in short-term.<sup>10,11,18</sup> Some guidelines restrain bariatric surgery for patients up to 60 years,<sup>6,10</sup> although others established higher age-cutoffs at 65-70 years.<sup>8,11</sup>

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Data about regarding age as restrictive factor for surgery is conflicting:<sup>19-23</sup> patients older than 55 years were found to have increased risk for mortality,<sup>19</sup> and DeMaria<sup>20</sup> identified advanced age ( $\geq 45$  years) as a preoperative risk factor for morbidity and mortality following surgery,<sup>20,21</sup> however, age was not found to be a relevant surgical risk factor in other series.<sup>22,23</sup> Likely, clinical evaluation and individualized decisions, regardless the absolute or specific age, are more appropriate to select patients for surgery.<sup>18,24</sup> Older patients should be extensively evaluated in terms of surgical risks, existence of comorbidities, life expectancy, benefits of weight loss and quality of life.<sup>8,24</sup>

A comprehensive assessment should be offered to every surgical candidate by an experienced multidisciplinary team in order to determine their surgical suitability and to optimize their preoperative status, and at same time to ensure that the patient is completely informed about the surgical procedure and postoperative program, required for a sustainable weight loss/maintenance.<sup>8,11</sup>

Presurgical psychological assessment may identify psychological/psychiatric dysfunctions, such as personality disorders, bipolar diseases, eating behaviour disorders, psychosis, depression, anxiety, which are common in obese individuals.<sup>16,25-27</sup> Kalarchian et al.<sup>28</sup> found that 66% of surgical candidates have at least one lifetime mental disorder, 38% met criteria for mental disorders preoperatively and 29% had more than one mental disorder.<sup>28</sup> These assessments aim to define patient's suitability for surgery, preoperative management in cases that surgery is still an option, and to avoid postoperative psychiatric-related complications or psychiatric-related unsuccessful outcomes.<sup>16,27</sup>

Beyond diagnostic purposes, psychosocial assessment constitutes an opportunity to prepare patients by exploring their vulnerabilities and concerns, to give education, to guarantee an informed/consented decision and to optimize the postoperative outcomes. Education should approach the expectable surgical effects and results, to make sure that patients don't create false or unrealistic expectations, but also to establish/reinforce achievable goals and proper means to reach them.<sup>6,16,17,29</sup>

Preoperative psychological assessments usually involves a standardized questionnaire and an interview.<sup>30-33</sup> They must explore

behavioural patterns through the comprehension of previous weight loss attempts (queries about past treatments, reasons for failed attempts, patterns of weight loss/regain), eating habits (queries about binge-eating, overeating, night time eating, stress-related eating), physical activity (assess the ability to incorporate an exercise plan in the daily life; patient should be encouraged to begin physical exercise prior to surgery), past and current substance abuse (and in which circumstances).

Cognition, motivation and emotional aspects should be also explored: intelligence and knowledge should be assessed (the patient should understand the surgical procedure, risks, complications, and the postoperative behavioural changes; moreover, patients should be educated for obesity itself and weight loss benefits); patients should be trained to develop copying skills, to eliminate maladaptive behaviours. The patient's current life situation should be investigated too. Obtaining information about lifestyle, stressors, physical exercise, social supports, job type and hobbies may be useful.<sup>6,16,17,29,33</sup>

Besides psychosocial evaluation, a medical assessment should be performed, in order to assess comorbidities, reassure surgical appropriateness, optimize and prepare patients for surgery. Generally, every surgical candidate should undergo a low/very low calorie diet, and also be stimulated for physical activity, in order to promote preoperative weight loss. Then, some comorbidities such T2DM, hypertension, dyslipidemia, may ameliorate before surgery; liver volume may reduce, facilitating the surgical procedure and reducing postoperative complications; the postoperatively compliance and results may improve too.<sup>11,14,34-37</sup>

Among morbid obese patients undergoing surgery, 10-20% has T2DM, and an additional 10-30% has reduced glucose tolerance.<sup>38</sup> Preoperatively, obese patients with T2DM should intensify their glucose-monitoring and their glycemic control should be optimized (with diet, exercise and antidiabetic drugs).<sup>11,39</sup> Preoperative caloric restriction and physical activity increase the insulin sensitivity, and consequently patients on glucose-lowering drugs (such sulphonylureas or insulin) may carry hypoglycaemia risk, so adjustments of hypoglycemic-drugs are normally required. If possible insulin secretagogues or insulin should be withdrawn or reduced. Normally, premix or rapid acting insulin should be reduced by 50%, and NPH or long-acting insulin by 30%, aiming for a plasma glucose between 110-140mg/dL; if glycemia is constantly <90mg/dL further reductions should be advised.

Other antidiabetic drugs (metformin, acarbose, glitazones, GLP-1 analogs, inhibitors of dipeptidyl peptidase 4) could be maintained until surgery.<sup>11,14</sup> Elevated preoperative glycemia and HbA1C is correlated with postoperative hyperglycemia, which in turn is associated with wound infections, acute renal failure and decreased T2DM remission rates.<sup>40</sup> The recommended HbA1C for T2DM patients before surgery ranges between 6.5-7.0%, but more liberal targets for patients with advanced micro or macrovascular complications should be considered (7.0-8.0%).<sup>11</sup> The metabolic optimization involve also the preoperative control of dyslipidemia and hypertension, so reasonable aims for total cholesterol, LDL-cholesterol, triglycerides and blood pressure are <155mg/dL, <77mg/dL, <195mg/dL and <135/85mmHg, respectively.<sup>8,10</sup>

Cardiac assessment, beyond an electrocardiogram, should be determined on the basis of clinical history, physical examination and individual cardiovascular risk factors. Patients with significant cardiac risk or suspected/known heart disease should be seen preoperatively by a cardiologist, and might be considered for further non-invasive cardiac testing and/or eventually for angiography

or coronary revascularization if necessary.<sup>11,41</sup> Unstable or active cardiac conditions, such CHD, decompensate/severe heart failure, arrhythmias or valvular disease should be optimized preoperatively. In the presence of two cardiac conditions or three or more cardiovascular risk factors, the use of beta-blockers must be considered, aiming to reduce heart rate and prevent cardiac events.<sup>11,41-43</sup>

From the respiratory point of view, routine preoperative screening for OSA (with polysomnography, eventually together with other tests such spirometry, arterial blood gases) should be offered to obese surgical candidates, considering the high prevalence of OSA in this setting (up to 94%), and the OSA-associated risks for adverse surgical outcomes.<sup>44-48</sup> In case of OSA standard preoperative management with continuous positive airway pressure is recommended.<sup>11,48</sup> Oxygen treatment is indicated in OHS, defined by hypercapnia during the awake period in absence of other reasons for hypoventilation such chest deformities or coexisting pulmonary or neurological diseases.<sup>49,50</sup>

All patients, independently of the existence of respiratory diseases, must stop smoking at least two months before surgery.<sup>49,51</sup> Preoperatively, it is also important to evaluate their upper airway and determine the challenges for intubation, frequently seen in these patients due to restricted neck and jaw mobility and fat deposition in the neck, oropharynx and upper larynx.<sup>11,52</sup>

Before surgery, every patient should eliminate alcohol intake, and a comprehensive nutritional assessment (including micronutrients) should be done in every surgical candidate. Despite the increased food intake normally observed in these patients, the quality of their diet is often poor lacking in many nutritional elements such iron, folic acid, calcium or vitamins D, B12, E, C and D. Nutritional deficiencies are then common in obesity, and might be worsened postoperatively, hence their screening and correction with appropriate supplements/food should be routinely done in every patient.<sup>11,53-56</sup>

Patients with gastrointestinal symptoms should be evaluated prior to surgery, with imaging studies such abdominal ultrasound and/or endoscopy. Routine screening for *Helicobacter pylori* is not recommended, but it should be considered in case of significant dyspepsia and/or in endemic areas, and if positive should be treated before surgery, because of the risk of postoperative ulceration may decrease.<sup>11,57,58</sup> Despite the frequency of NAFLD or NASH in the obese population, a routine abdominal ultrasonography is not recommended in this setting before surgery, except in presence of related complaints or abnormal liver function tests.<sup>11,59,60</sup>

Patients with characteristic symptoms or relevant risk factors for gallstones (e.g. high fat diet, very elevated triglycerides, family history of gallstones), or known personal history of gallstones, should be evaluated with imaging studies and considered for cholecystectomy during the bariatric surgery. Routine prophylactic cholecystectomy in all obese patients undergoing bariatric remains controversial.<sup>61</sup>

Preoperatively, another important aspect to take in consideration is the risk stratification for venous thromboembolism, which should be estimated in every surgical candidate. Those patients identified as high-risk for pulmonary embolism (medical history of thromboembolism, venous stasis disease, inability to ambulate), must be considered for chemoprophylaxis with heparin.<sup>62,63</sup>

The oestrogen replacement should be discontinued at least 3weeks before bariatric surgery in order to reduce postoperative thromboembolism risk. Women candidate for surgery should be counselled to avoid pregnancy in the preoperative period, and also for the next 12 to 18months after bariatric surgery.<sup>11,64</sup>

Subclinical hypothyroidism is frequent in obese patients; however, routine preoperative thyroid function assessment is not recommended due to obesity condition itself, but patients at risk for thyroid dysfunction (e.g. previous radiotherapy, familiar history of thyroid diseases) should be screened.<sup>11,65–67</sup> Prophylactic treatment for gout attacks should be considered for patients with gout history prior to surgery, because active weight loss is known to be an important risk factor for hyperuricemia and acute gout crisis.<sup>11,68</sup>

Bariatric surgery is the most effective treatment for morbid obesity, ameliorating several obesity-related comorbidities and reducing the overall mortality in this setting. Establishment of comprehensive programs from an experienced multidisciplinary team to assess the suitability of patients for bariatric surgery and to optimize their preoperative status is essential to guarantee successful surgical outcomes and to prevent perioperative and postoperative complications.

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## Conflict of interest

Author declares that there is no conflict of interest.

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