Epidemiological Profile of Patients Undergoing Metabolic Surgery in the City of Teresópolis - Brazil

Abstract

Objective: To recognize the profile of the patients who undergo surgical therapy for weight loss in the city of Teresópolis - Brazil.

Material and Methods: In this sectional study, data from 145 patients who underwent metabolic surgery from October 2015 to January 2017 were evaluated. The following variables were analysed: age, gender, ethnicity, prevalence of Diabetes Mellitus and arterial hypertension, weight, body mass index (BMI), waist circumference, serum levels of glucose, total cholesterol, HDL, LDL, and triglycerides, and surgical technique.

Results: Most patients were female (86.21%) and of white ethnicity (92.5%). Patients’ age was 37.7 ± 9.8 years, with mean BMI, weight, and waist circumference corresponding to 44.44 ± 5.76 kg/m2, 118.8 ± 22.1 kg, and 126.5 ± 13.4 cm, respectively. The prevalence of arterial hypertension was 44.8%, whereas 26.2% were diabetics. These subjects had elevated mean glucose (104.5 ± 45.7 mg/dL) and triglycerides (167.1 ± 81.2 mg/dL) levels, while mean total cholesterol (199.1 ± 39.4 mg/dL), HDL (47.8 ± 11.6 mg/dL), and LDL (LDL = 118.6 ± 34.4 mg/dL) were within the normal reference levels. Most patients treated in Teresópolis were submitted to a laparoscopic sleeve gastrectomy (LSG: n = 86; 59.3%) and, in the remaining 59 (40.7%), a Roux-en-Y gastric bypass (RYGB) was the surgical technique. The two subgroups did not differ in terms of demographics, anthropometric measures, or biochemical profile. Nevertheless, the statistical analysis indicated differences in the prevalence of history of Diabetes (more frequent in the RYGB subgroup – p = 0.0057) and in the mean diastolic pressure (higher in the LSG subgroup – p = 0.0093).

Conclusion: The epidemiological profile of the patients evaluated in the present study is in accordance with data from the literature. Most obese patients who sought metabolic surgery were female, young, of white ethnicity and whose main comorbidity was arterial hypertension.

Keywords: Obesity; Metabolic Surgery; Bariatric Surgery; Systemic Arterial Hypertension; Diabetes Mellitus; Visceral Fat

Abbreviations

BMI: Body Mass Index; DSS-II: 2nd Diabetes Surgery Summit; HDL: High Density Lipoprotein; LDL: Low Density Lipoprotein; LSG: Laparoscopic Sleeve Gastrectomy; RYGB: Roux-Y Gastric Bypass

Introduction

Obesity remains one of the most important therapeutic challenges of the present century especially due to its association with cardiometabolic morbidity and mortality [1-3]. In contrast, weight loss can revert some of the comorbidities and potentially improve...
quality of life and survival of obese subjects [4-6].

However, the clinical treatment with adequate diet, exercise, and anti-obesity drugs has been more successful in short-term basis, considering that most subjects regain the initial weight after two years of conventional treatment [7-9].

In this context, metabolic surgery has been gaining more attention, based on the induction of short- and long-term weight loss, improved control or remission of comorbidities – particularly the cardiovascular-related – and decreased mortality [10-14].

Over the years, distinct groups have been accumulating experience with numerous surgical techniques and data of randomized control trials comparing metabolic surgery with medical treatment of type 2 Diabetes Mellitus have been published. Despite the differences in study design, the literature has been consistent in favouring surgical treatment in this type of Diabetes [15-23]. Since the year of 2000, our multidisciplinary group have been treating obese patients with bariatric surgery. This study aimed at recognizing the profile of the patients who undergo surgical therapy for weight loss in the outskirts of Teresópolis (Brazil) and compare our data to the literature.

Materials and Methods

Study design

In this sectional study, data from 145 patients who underwent bariatric surgery from October 2015 to January 2017 were evaluated. The following variables were analysed by the time of the pre-operative evaluation with an endocrinologist (E.C.O.N.): age, gender, ethnicity, prevalence of Diabetes Mellitus and arterial hypertension, weight, height, body mass index (BMI), waist circumference, and serum levels of glucose, total cholesterol, HDL, LDL, and triglycerides.

Inclusion criteria: BMI equal or above 35 kg/m² (if BMI ≥ 40 kg/m²: no need of association with comorbidities or complications of obesity; if BMI 35 - 39,99 kg/m²: association with comorbidities or complications of obesity)

Exclusion criteria: Age below 16 years-old.

All the surgical procedures were performed by the same surgeon (M.S.P) at the São José Hospital in the city of Teresópolis – Brazil. The surgeon provided the data about the technique used posteriorly in each specific subject referred for metabolic surgery.

Measurements

Total body weight was measured on a standardized spring balance scale (Filizola, São Paulo, Brazil) with participants dressed uniquely in underwear. Weights were recorded to the nearest .1 kg.

Standing height was measured without shoes with a stadiometer (Filizola, São Paulo, Brazil) and recorded to the nearest .5 cm.

BMI was calculated by dividing the total body weight (kg) to the squared standing height (m²).

A non-elastic flexible measuring tape was used to measure waist circumference. Measures were recorded to the nearest .1 cm. Waist circumference was measured at the mid-distance between the lower rib and the iliac crest.

Blood pressure was measured in the right arm with a standard aneroid sphygmomanometer (Tycos, USA).

Statistical Analysis

Data are presented in the mean ± standard deviation format unless otherwise specified. The unpaired Mann-Whitney test was used to compare means between two groups and the chi-square test analysed categorical variables. The statistical significance was set as 5%. The statistical analysis was performed using Epi Info™ version 7.2.0.1 (Centers for Disease Control and Prevention, USA).

Ethical Approval and Informed Consent

Patients were appropriately informed regarding the aims of the study and signed an informed consent document. The project was approved by the Ethics Committee of the Serra dos Órgãos University Center.

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Results and Discussion

The criteria of the Brazilian Association for the Study of Obesity (ABESO) for the indication of surgical treatment for obesity are based on the BMI. According to these criteria, subjects with class III obesity (BMI ≥ 40 kg/m²) have automatic indication for metabolic surgery even without comorbidities, while class II obesity (BMI ≥ 35 kg/m²) accompanied with comorbidities or complications is also an indication criterion [24]. Only patients who fulfilled these criteria were included in the present study.

Most of the 145 patients submitted to bariatric surgery were women (n = 125; 86.2%). The present results are in accordance with data from the SOS study in which women corresponded to more than 70% of the surgically treated patients [14] and with the baseline data from the randomized controlled studies [15-18, 20] except for the reports from Ikramuddin., et al. [19], in which the prevalence of women in the surgically treated group was 57%, and Mingrone., et al. [21], with a prevalence of 60% of women.

The information about ethnicity was provided by only 88 subjects among which the majority had declared having a white ethnicity (n = 81; 92.5%). This prevalence was higher than the data reported by some randomized controlled studies [16,18,19], while Parikh., et al. [15] studied mainly Hispanics. However, since ethnicity was self-reported in our study and almost half of the patients did not provide information on this categorical variable, it is questionable if the higher prevalence of white ethnicity in comparison with other studies bares any epidemiological significance.

Mean age by the time of the metabolic surgery was 37.7 ± 9.8 years. The youngest patient was 17 and the eldest was 70 years old. The mean age of this group was lower than that of the SOS study [14] and some randomized controlled trials [15-20]. Nonetheless, the age range was similar to those of the patients studied by Cummings., et al. [16] and Wentworth., et al [23].

Most patients were non-smokers (n = 136; 93.8%), a percentage higher than the one informed by the SOS study, in which more than 25% of the subjects were smokers [14].

Sixty-five patients informed a personal history of arterial hypertension (44.8%), while more than a quarter of the subjects (25.6%) had a history of Diabetes Mellitus and were receiving treatment with antidiabetic medications by the time of the pre-operatory evaluation. The prevalence of Diabetes was higher than the 10% indicated in the SOS study [14] and the prevalence of arterial hypertension was also higher than the Triabetes Study [17].

Mean weight was 118.8 ± 22.1 kg (minimum = 78.0 kg and maximum = 200.5 kg). BMI reached 44.44 ± 5.76 kg/m² (minimum = 35.49 kg/m² and maximum = 66.45 kg/m²). Mean waist circumference obtained in the study was 126.5 ± 13.4 cm (minimum = 90.0 cm and maximum = 163.5 cm). These anthropometric data were very similar to those reported in the SOS [14] and Mingrone., et al. [21] studies. Some of the randomized controlled trials that compared medical to surgical treatment in type 2 Diabetes analysed patients with lower BMI (25 - 35 kg/m²) and/or waist circumference [15-21,23]. Nevertheless, these studies tended to favour the surgical treatment for achieving higher rates of type 2 Diabetes remission than the medical approach.

The mean systolic arterial pressure reached 132.2 ± 12.6 mmHg (minimum = 110 mmHg and maximum = 180 mmHg), while the mean diastolic arterial pressure was 73.8 ± 7.9 mmHg (minimum = 60 mmHg and maximum = 90 mmHg) – both means were lower than the data from the SOS [14] and Mingrone., et al. [21] studies, but resembled the reports from Cummings., et al. [16], the Triabetes Study [17], Halperin., et al [18], and Ikramuddin., et al. [19], while the mean diastolic pressure approximated the baseline findings of Parikh., et al. [15]. Only 44 patients (41.5%) were receiving pharmacological treatment for hypertension when enrolled in the present study.

Mean fasting glucose levels were 104.5 ± 45.7 mg/dL (minimum = 68.3 mg/dL and maximum = 400.0 mg/dL) - higher than the reports of SOS study [14] and lower than studies with type 2 diabetics [15,17-19,21]. Based on the individual results, 26.2% of our patients were diabetics (n = 38), 29.7% had elevated fasting glucose levels (n = 43), and 1.3% glucose intolerance (n = 2). The 2nd Diabetes Surgery Summit (DSS-II) concluded that the numerous randomized controlled trials have demonstrated that metabolic surgery leads to excellent glycaemic control and reduces cardiovascular risk factors and recommended this treatment for type 2 diabetics with class III obesity and
for those with class II obesity when hyperglycaemia is inadequately controlled by lifestyle and optimal medical therapy. According to the DSS-II, surgery should also be considered for patients with class I obesity if hyperglycaemia is inadequately controlled despite optimal treatment with oral or injectable medications [25].

When the lipid profile of these patients was obtained, the mean total cholesterol reached 199.1 ± 39.4 mg/dL (minimum = 95 mg/dL and maximum = 321 mg/dL), with mean HDL levels of 47.8 ± 11.6 mg/dL (minimum = 21 mg/dL and maximum = 84 mg/dL) and mean LDL levels of 118.6 ± 34.4 mg/dL (minimum = 29 mg/dL and maximum = 210 mg/dL), while the mean levels of triglycerides were 167.1 ± 81.2 mg/dL (minimum = 52 mg/dL and maximum = 429 mg/dL). During the anamnesis, only 60 patients provided information about the history of dyslipidaemia; among them, 11.67% confirmed the diagnosis of dyslipidaemia and reported the use of statins (n = 7). The prevalence of history of dyslipidaemia was comparable to the reports from the Triabetes Study [17] and lower than the one from Ikramuddin., et al [19]. The lipid profile found in our sample was comparable to data from the SOS study [14], Parikh., et al [15], and Ikramuddin., et al [19]. The Triabetes Study [17], Halperin., et al [18], and Mingrone., et al [21] reported lower mean baseline HDL and triglycerides levels.

Most patients treated in Teresópolis were submitted to a laparoscopic sleeve gastrectomy (LSG: n = 86; 59.3%) and in the remaining 59 (40.7%), a Roux-en-Y gastric bypass (RYGB) was the surgical technique. Our data is in accordance with those of the study of Parikh., et al [15] in which 55% were submitted to a LSG. In the randomized controlled studies by Cummings., et al [16], Halperin., et al [18], and Ikramuddin., et al [19], the only technique employed was RYGB.

Table 1 exhibits the comparison between the characteristics of the patients who were referred for LSG and RYGB in the present study. The two subgroups did not differ in terms of demographics, anthropometric measures, or biochemical profile. Nevertheless, the statistical analysis indicated significant differences in the prevalence of history of Diabetes (more frequent in the RYGB subgroup – p = 0.0057) and in the mean diastolic pressure (higher in the LSG subgroup – p = 0.0093).

<table>
<thead>
<tr>
<th>Variable</th>
<th>LSG</th>
<th>RYGB</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women (%)</td>
<td>89.5</td>
<td>81.4</td>
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</tr>
<tr>
<td>Age (years)</td>
<td>38.8 ± 9.6</td>
<td>39.4 ± 10.4</td>
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</tr>
<tr>
<td>Smoking (%)</td>
<td>4.4</td>
<td>10.0</td>
<td>0.3364</td>
</tr>
<tr>
<td>History of hypertension (%)</td>
<td>48.2</td>
<td>38.6</td>
<td>0.3496</td>
</tr>
<tr>
<td>History of Diabetes (%)</td>
<td>16.9</td>
<td>48.0</td>
<td>0.0057</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>117.7 ± 19.9</td>
<td>120.5 ± 25.0</td>
<td>0.8232</td>
</tr>
<tr>
<td>Body mass index (kg/m²)</td>
<td>44.6 ± 5.4</td>
<td>44.2 ± 6.3</td>
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</tr>
<tr>
<td>Waist circumference (cm)</td>
<td>124.6 ± 12.0</td>
<td>132.7 ± 16.0</td>
<td>0.0544</td>
</tr>
<tr>
<td>Systolic pressure (mmHg)</td>
<td>133.5 ± 13.0</td>
<td>130.0 ± 11.8</td>
<td>0.2296</td>
</tr>
<tr>
<td>Diastolic pressure (mmHg)</td>
<td>75.2 ± 7.4</td>
<td>71.1 ± 8.1</td>
<td>0.0093</td>
</tr>
<tr>
<td>Fasting glucose (mg/dL)</td>
<td>103.4 ± 47.8</td>
<td>107.8 ± 39.1</td>
<td>0.1422</td>
</tr>
<tr>
<td>Total cholesterol (mg/dL)</td>
<td>202.7 ± 40.0</td>
<td>188.1 ± 36.1</td>
<td>0.1275</td>
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<td>HDL (mg/dL)</td>
<td>49.3 ± 10.7</td>
<td>43.3 ± 13.2</td>
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<tr>
<td>LDL (mg/dL)</td>
<td>120.4 ± 37.2</td>
<td>113.0 ± 23.2</td>
<td>0.3013</td>
</tr>
<tr>
<td>Triglycerides (mg/dL)</td>
<td>167.3 ± 73.0</td>
<td>166.4 ± 103.9</td>
<td>0.3234</td>
</tr>
</tbody>
</table>

Table 1: Characteristics of the patients treated by LSG and RYGB.
of weight loss with similar impact on type 2 Diabetes, hypertension, or obstructive sleep apnoea syndrome after 2 years [28]. Additional retrospective studies have reported that RYGB is superior in inducing 2-year weight loss, but is similar to LSG regarding type 2 Diabetes remission and improvement of lipid profile [29,30]. A recently published prospective randomized trial confirmed these latter findings concluding that, despite significantly greater weight loss after RYGB, there were similar indexes of type 2 Diabetes remission and psychological improvement after LSG and RYGB at 1 year [31]. The randomized study of Casajoana, et al. [32] concluded that the enhanced GLP1 secretion one month after surgery was a determinant of the glucose metabolism improvement in patients submitted to sleeve gastrectomy, RYGB, and greater curvature plication. Furthermore, a prospective study with obese women submitted to LSG or RYGB demonstrated, via a decrease in the carotid intima-media thickness, a reduced cardiovascular risk after one year [33].

The advent of administrative databases and clinical registries have permitted the identification of patient factors that increase the risk of metabolic surgery such as age (≥ 45 years), male gender, high BMI (≥ 50 kg/m²), hypertension, congestive heart failure, pulmonary hypertension, and severe sleep apnoea with hypoventilation. These factors have been combined in a risk score by DeMaria, et al. [34], which was subsequently validated in a multicentre study [35]. One of the patients included in the present study was 70 years-old by the time of the metabolic surgery. The aspects of weight loss and safety in older adults undergoing LSG and RYGB have been the focus of the study of Casilas, et al. [36] who reported higher weight loss, and complication rates with RYGB, but similar mortality between the two techniques after four years. Twenty-two patients (15.2%) of our group had a BMI ≥ 50 kg/m². Apart from the previous mentions to the aspects of predominance of the female gender and prevalence of hypertension, the present study did not include patients with other risk factors.

Conclusion

This sample of Brazilian obese patients treated with metabolic surgery is in accordance with the literature descriptions regarding demographics, comorbidities, patient risk factors for surgery, anthropometry, and biochemical profile. Most patients who sought surgical treatment were female, young, of white ethnicity, and whose main comorbidity was arterial hypertension.

Conflict of Interest

The authors do not have any conflict of interest.

Bibliography


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