Analysis of obese patients’ medical conditions in the pre and postoperative periods of bariatric surgery

Análise das condições clínicas de pessoas obesas em período pré e pós-operatório de cirurgia bariátrica

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ABSTRACT

Objective: to compare the clinical conditions of obese patients in the pre and postoperative period of bariatric surgery. Methods: we carried out a descriptive, retrospective, quantitative study by consulting the charts of 134 patients who underwent bariatric surgery in the period from 2009 to 2014. We collected the data between September and November 2015. We performed a descriptive statistical analysis and comparative analysis of anthropometric, metabolic, biochemical and clinical variables, considering six months before and after surgery. Results: the majority of the patients were female (91.8%), with a higher prevalence (35%) in the age group 18-29 years old, complete high-school education (65.6%) and grade III obesity (60.4%). Six months after surgery, weight and lipid profile reduction were significant in both genders, but the impact on biochemical, anthropometric, metabolic and clinical parameters was significant only in female subjects, with a reduction in morbidities associated with obesity, such as arterial hypertension, diabetes mellitus, dyslipidemia and metabolic syndrome and in the use of drugs to control them. Conclusion: bariatric surgery was effective in weight loss, with improvements in anthropometric, metabolic and biochemical parameters and in the reduction of morbidities associated with obesity.

Keywords: Obesity. Bariatric surgery. Nutrition Assessment.

INTRODUCTION

The demographic, epidemiological and socioeconomic transition, and its consequent changes in life and alimentary habits, are determinant factors for the obesity increase in the population, mainly in developed and highly industrialized countries. Obesity, in turn, triggers social and psychological damages such as depression, low self-esteem and social isolation, with negative effects on quality of life¹².

The Brazilian Ministry of Health estimated that in 2014, 52.5% of the country’s population was overweight, a considerable increase of 9.5% in the index compared with the year 2006³. It emphasized that, of the people with excess weight in the age group between 35 and 64 years, 17.9% are females, are already obese, and with low schooling. Obesity favors the increase of chronic diseases, such as systemic arterial hypertension, diabetes mellitus and cancer, responsible for 72% of deaths in the country³.

Bariatric surgery is a viable option for the significant and rapid weight loss and also as a strategy to maintain metabolic rates, and even for the reduction and remission of obesity-related chronic diseases⁴. Surgical indication must occur after a rigorous multiprofessional evaluation, with assessment of nutritional status, anthropometric measures, and psychological conditions to follow medical and nutritional recommendations after the procedure. This is because the success of surgical treatment essentially depends on the emotional balance and changes in the individual’s lifestyle⁴⁵.

Bariatric surgery has been innovating over the years and its technique has become less and less invasive, providing fast and better recovery⁶. It allows weight loss of about 40% of the initial weight in a period of six to 12 months, generating large changes in daily habits and attributions, whether in a social or family environment and also in body image⁷⁸.

In this aspect, knowing the benefits of the surgical procedure, such as weight loss and the improvement of the metabolic parameters, is relevant for proposing actions that can avoid complications, promoting self-care and improving the quality of life⁶. Thus, the objective of this study was to compare the

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clinical conditions of obese people in the pre and postoperative period of bariatric surgery.

METHODS

This is a descriptive, retrospective, quantitative study conducted at a Bariatric Surgery Institute that performs on average eight bariatric surgeries per month, by the same medical professional, located in the city of Maringá - PR.

We collected data from September to December 2015, based on the medical records of individuals who underwent bariatric surgery in the period from 2009 to 2014. For this purpose, was used a script consisting of the following variables: a) nutritional status (weight, height, body mass index – BMI); b) presence of associated morbidities (systemic arterial hypertension – SAH, diabetes mellitus – DM, metabolic syndrome – MS, dyslipidemia, hepatic steatosis and cardiopathies); c) biochemical parameters: fasting glycemia, erythrocytes, total cholesterol, LDL and HDL cholesterol, triglycerides, transaminases (AST, ALT), alkaline phosphatase and gamma-gt – GGT; and d) use of medications. All collected variables related to the pre and postoperative periods.

We defined as eligible for the study every patient whose charts contained data records of the period of six months before to six months after surgery. Thus, we included 134 patients.

We used the recommendation of the Brazilian Society of Cardiology, which considers the parameters of NCEP-ATP III, to identify the presence of metabolic syndrome (MS) in the combination of the following components: high blood pressure or use of antihypertensives, high values of triglycerides and cholesterol, abdominal circumference >102cm for men and >88cm for women and high fasting glucose or use of hypoglycemic agents⁹.

| Table 1. Socio-demographic data of patients undergoing bariatric surgery. |
|-----------------------------|-----------------------------|-----------------------------|
|                            | Male                        | Female                      | Total                        |
|                            | N   | %  | N   | %  | N   | %  |
| Age                        |     |    |     |    |     |    |
| 18 to 29 years             | 2   | 18.2| 45  | 36.5| 47  | 35.0|
| 30 to 39 years             | 3   | 27.3| 40  | 32.6| 43  | 32.1|
| 40 to 49 years             | 3   | 27.3| 25  | 20.3| 28  | 20.9|
| 50 to 59 years             | 2   | 18.2| 12  | 9.8 | 14  | 10.5|
| ≥ 60 years                 | 1   | 9.1 | 1   | 0.8 | 2   | 1.5 |
| Study years                |     |    |     |    |     |    |
| Illiterate                 | -   | -  | 2   | 1.6 | 2   | 1.5 |
| Junior-high School         | 2   | 18.2| 6   | 4.8 | 8   | 6.0 |
| High School                | 2   | 18.2| 86  | 70.0| 88  | 65.6|
| College Education          | 7   | 63.6| 29  | 23.6| 36  | 26.9|
| Degree of Obesity          |     |    |     |    |     |    |
| Grade II                   | 3   | 27.3| 50  | 40.7| 53  | 39.6|
| Grade III                  | 8   | 72.7| 73  | 59.3| 81  | 60.4|
| Type of surgery            |     |    |     |    |     |    |
| Gastric Sleeve             | 11  | 100 | 115 | 93.5| 126 | 94.1|
| Gastric Bypass             | -   | -  | 8   | 6.5 | 8   | 5.9 |

Source: Maringá Bariatric Surgery Institute, 2015.
To classify obesity according to BMI, we adopted the criteria proposed by the World Health Organization\textsuperscript{10,11}, recommended by the Brazilian Society of Endocrinology and Metabolism\textsuperscript{12}. According to this criterion, nutritional status is classified as low weight (BMI <18.5), eutrophic (BMI between 18.5 and 24.9 kg/m\textsuperscript{2}), overweight (BMI 25-29.9 kg/m\textsuperscript{2}), obesity grade I (BMI 30-34.9 kg/m\textsuperscript{2}), obesity grade II (BMI 35-39.9 kg/m\textsuperscript{2}) and obesity grade III (BMI >40kg/m\textsuperscript{2}).

We entered the data into the Microsoft Excel 2010\textsuperscript{®} software and, after conference, we transferred them to the IBM SPSS\textsuperscript{®} software, version 20.0. For all statistical tests, we set significance at 5% ($p \leq 0.05$).

We presented the descriptive analysis in absolute frequency and percentage. We used the Shapiro-Wilk test to verify the variables' normality. When the normality assumption was verified, we used the paired “t” test to compare the mean of the anthropometric and biochemical variables in the pre and postoperative period. To measure the association between the explanatory and outcome variables, we used the Pearson chi-square test.

We developed the study in accordance with the ethical precepts disciplined by Resolution 466/12 of the National Health Council and the research project was approved by the Standing Committee on Ethics in Research with Humans (COPEP) of the State University of Maringá (opinion no. 1246542).

### RESULTS

Of the 134 patients evaluated, the majority were female (91.8%). Among them, there was a higher prevalence in the age group of 18 to 29 years (36.5%), complete high-school education (70%) and more than half had grade III obesity (59.3%). Men were more prevalent in the 30-49 age group (54.6%), the majority (63.6%) had college education and grade III obesity.
(72.7%) (Table 1). The most used surgical technique was the Gastric Sleeve, in 94.1% of the patients.

Table 2 shows that the reduction of arterial hypertension, diabetes mellitus, dyslipidemia, metabolic syndrome and use of medications in the postoperative period were only significant for the female patients.

Table 3 presents information related to nutritional status. We observed that grade III obesity was more prevalent among men (72.7%). After surgery, a large part (63.6%) passed into the overweight class. Among women, 59.4% had grade III obesity and in the postoperative period, 49.6% became overweight.

The results of the comparison between the means of the anthropometric variables in the pre and postoperative periods show reduction in both weight and BMI, with significant value in both genders. As for the metabolic parameters, there was a significant increase in the HDL levels in female patients. The values of the biochemical parameters of total proteins, ferritin, AST, ALT and GGT showed a significant reduction in both genders. The values of LDL, total cholesterol and triglycerides also showed a significant reduction in both genders. Erythrocytes, albumin, and alkaline phosphatase presented value changes in the female patients’ results (Table 4).

**DISCUSSION**

The majority of patients undergoing bariatric surgery in our study were female, which corroborates with results of other studies performed in different regions of the country.²,¹³⁻¹⁵

It is noteworthy that six months before surgery, most of the individuals had grade III obesity. The weight loss and the change in obesity classification described in table 3 were also verified in a study that adopted the same parameters and identified that many patients classified as high-grade obese before the surgical procedure presented lower grades and even normal weight six months after surgery.¹⁶

The comorbidities associated with obesity improved between the bariatric surgery pre and postoperative periods. Dyslipidemia, present in most patients of both genders in this study, had a significant reduction in females, which also showed a significant decrease in Total and LDL cholesterol and triglycerides, and an increase in HDL cholesterol. Bariatric surgery allowed changes in eating habits, characterized by the ingestion of foods in small amounts, with lower caloric value and allowed weight reduction and adoption of healthy habits. Studies have shown that reducing dyslipidemia reduces the risk of cardiovascular diseases.¹⁷,¹⁸

We also observed reduction in the percentages of SAH and DM. These results are similar to those of other studies whose results point to a gradual reduction of weight and improvement in metabolism, with a decrease in hypertension and DM.¹⁹ As observed by other authors, there was also a reduction in the use of medications for treatment and control of comorbidities associated with obesity.²⁰,²¹ Ghiassi et al.²¹ found that bariatric surgery was beneficial not only for the patient’s general health, but also for the reduction of costs resulting from the purchase of medications and activities related to the
control of comorbidities. Others, however, found that although there is a reduction in the use of drugs for treatment and control of the main diseases associated with obesity, there is an increase in the use of other medications, mainly nutritional supplements.

In Brazil, we found no studies addressing the reduction of costs related to the purchase of medicines after bariatric surgery. One study, however, has addressed the reduction in drug use to control weight regain. We believe that it is important to quantify the economic impact of non-use of disease control drugs, especially for high blood pressure and diabetes mellitus, most prevalent chronic diseases, and responsible for most causes of death, in the country.

Hepatic steatosis, identified by elevated levels of AST, ALT, GGT and biopsy specimens, also showed reduction after bariatric surgery. Other authors also observed a 46.6% reduction in steatosis among the individuals studied. A meta-analysis carried out in the United Kingdom indicated a reduction of liver enzymes, considered markers of liver function and liver damage, statistically associated with the reduction of hepatic steatosis shortly after surgery. The reduction of hepatic steatosis is due to changes in food habits. On the other hand, the reduction of dietary intake due to gastric reduction, in addition to causing weight loss, generates nutritional deficiencies, especially in the first year after surgery.

In our study, the results pointed to a significant reduction in the number of red blood cells in women due to the reduction of gastric volume and the production of gastric juice, responsible for the initial iron metabolism. With the stomach reduction, the digestion of food becomes more time consuming, Table 4: Comparison of the metabolic, biochemical and anthropometric parameters of obese patients in the pre and postoperative periods of Bariatric Surgery.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Male Preoperative</th>
<th>Male Postoperative</th>
<th>Female Preoperative</th>
<th>Female Postoperative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (kg)</td>
<td>116.1 ± 18.0</td>
<td>81.4 ± 14.3</td>
<td>0.000</td>
<td>107.1 ± 15.6</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>39.4 ± 2.5</td>
<td>27.5 ± 2.4</td>
<td>0.000</td>
<td>40.6 ± 3.7</td>
</tr>
<tr>
<td>HDL (mg/dl)</td>
<td>52.8 ± 32.1</td>
<td>56.8 ± 10.3</td>
<td>0.667</td>
<td>53.1 ± 19</td>
</tr>
<tr>
<td>LDL (mg/dl)</td>
<td>114.5 ± 31.8</td>
<td>96.1 ± 29.0</td>
<td>0.036</td>
<td>114.5 ± 31.7</td>
</tr>
<tr>
<td>TC (mg/dl)</td>
<td>196.6 ± 35.0</td>
<td>168.9 ± 29.2</td>
<td>0.018</td>
<td>195.8 ± 36.5</td>
</tr>
<tr>
<td>TG (mg/dl)</td>
<td>168.1 ± 82.7</td>
<td>97.2 ± 57.8</td>
<td>0.009</td>
<td>150 ± 70</td>
</tr>
<tr>
<td>Fasting glucose (mg/dl)</td>
<td>120.9 ± 31.9</td>
<td>91.5 ± 17.4</td>
<td>0.001</td>
<td>118.6 ± 131.9</td>
</tr>
</tbody>
</table>

Source: Maringá Bariatric Surgery Institute, 2015. * Paired t test (p<0.05); ** Standard Deviation; TC: Total cholesterol; TG: Triglycerides.
especially those rich in protein and fiber, which are also rich in iron, which causes satiety, decreasing the number and quantity of food intake\textsuperscript{29}. The values of ferritin also showed a significant reduction.

We should note that the not significant reduction in vitamin B12 and serum iron levels in both genders may be due to the short postoperative follow-up, a period in which there is still a large reserve of micronutrients\textsuperscript{30}.

Our study demonstrated that bariatric surgery was effective in weight loss, with improvement of anthropometric, metabolic and biochemical parameters, and in the reduction of morbidities associated with obesity.

REFERENCES

Rêgo Rêgo
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