Weight loss predicting factors for patients submitted to Roux-en-Y Gastric Bypass

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Abstract:

Objective: To identify the predictive factors of patients who were submitted to Roux –en-Y-gastric by-pass (RYGBP). Material and Methods: A descriptive, cross sectional study was performed with surgical patients using non-elastic silicone ring, between 2000 and 2007. It was evaluated 410 patients on their appointment returns in a period of two and five years through a database. Gender, age, weight BMI, percentage excess weight loss (%EWL),Percentage excess BMI loss (%EBMIL) and predictor factors for weight loss were assessed. Results: Age 36.81 years old, weight 122.85 ± 22.22 Kg, BMI 45.56 ± 6.86 Kg/m². 73.41% of the patients returned after 2 years, 39.5% after 5 years and 35.5% both at 2 and 5 years. The average weight achieved was 75.72 Kg at 2 years and 81.65Kg at 5 years and the % EWL was 75.69% at 2 years and 64.47% at 5 years. Age ≥ 37.76 years old and initial BMI≥ 47 Kg/m² were the variables showed as predictor factors for weight regain. Conclusion: Weight regain was observed after 2 years. Age and initial BMI showed as important modulators of the results and they should be considered during both pre operative and patient’s evolution.

Keywords: bariatric surgery; weight loss; weight regain; predictors.

Introduction:

Obesity is a disease that requires treatment follow-up for a long period of life [1]. An average of 5% of the US population is morbid obese. The comorbidities are refractory in both dietary treatment and pharmacological therapy, but they respond well to surgical treatment to obesity [2]. Bariatric surgery is currently accepted as the most efficient tool in the control and treatment of morbid obesity and the main benefits from the surgery are weight loss and maintenance of body weight in a long term, improvement of the associated diseases, better perception of nutritional behavior, and consequently an improvement of quality of life [3]. Roux-en-Y Gastric Bypass (RYGBP) is considered as gold standard due to its low morbidity, mortality and high efficiency [4].

Studies demonstrated a good weight loss in the period of 18 to 24 months after the surgery, however, after this period; the weight regain begins [5]. RYGB induces an average weight loss of 60 to 75% of excess of weight loss (% EWL). The peak of weight loss occurs after 12 to 18 months of post-operative, although the mechanism in which the weight loss occurs is not completely elucidated, it seems that the reduction of calorie ingestion by the size of the gastric pouch is the main factor [6]. After the weight loss stabilizes a period of weight regain (WR) starts which occurs between 2 and 5 years after the gastric bypass. Some factors that influence the weight maintenance or weight regain after the surgery includes: type of surgery that the patient was submitted, if the patient has inadequate nutritional behavior, and it includes the possibility of an eating disorder such as Binge-Eating [7], and the adhesion or not of supporting groups, besides pre-operative BMI or elevated weight. Hsu [8] found non-chirurgical factors that influence surgery’s results and that in 30% of the patients the weight regain occurred in the period of 18 to 24 months after the surgery. WR after the surgery demonstrates that obesity is a chronic and progressive disease and it requires constant follow-up [9].

The main objective of this study was to identify the predictor factors and the weight loss of patients submitted to RYGBP in the period of two and five years of post-operative.
Materials and Methods:

A descriptive cross-sectional study was developed by Bariatric Surgery Group from Valinhos (GCBV) – São Paulo State, Brazil. In the period of 2000 to 2007, 1400 patients were submitted to RYGBP with silicone inelastic ring. Their BMI was ≥ 35kg/m² associated with comorbidities, or BMI ≥ 40Kg/m². Patients included in this study were the ones who returned to reevaluation post operatory appointments in the periods of 2 and 5 years or in only one of these periods. Inclusion tolerance in this study was the returning at most in ± 2 months for the evaluated period.

Data were collected by means of the data base of GCBV and 410 patients were evaluated and the following information was collected: gender, age, weight, BMI, %EWL, Percent excess BMI loss (% EBMIL) for periods and 2 and 5 years of post-operatory.

A 24 month period was used as a base to evaluate the best weight loss. Such measure was taken based on the number of returns to the appointments that was more relevant in this period, instead of 18 months of post-operatory period, in which the patients also should return to evaluation with the multidisciplinary team.

Results:

The characteristics of evaluated patients are demonstrated on Table 1. From the total of 410 evaluated patients, 83.41% (342) were female, 16.59 % (68) were male, with an age variation between 36.81±11.01 years, average initial weight 122.85 ± 22.22Kg, average initial BMI of 45.56 ± 6.86Kg/m².

It was found that 73.41% (300) patients were reevaluated after 2 years of surgery, 39.51% (162) after 5 years, and for the period of 2 and 5 years 35.13% (144) of the patients were reevaluated consecutively. It was obtained a follow-up in the correct periods of post-operatory of 410 patients (25%). This percentage was due to the non-inclusion after the pre established period, according to the study criteria (± 2 months).

Table 1 – Patients Characteristics

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<thead>
<tr>
<th>Characteristics</th>
<th>Number</th>
<th>Percentage</th>
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<tr>
<td>Total number of patients</td>
<td>410</td>
<td>100%</td>
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<tr>
<td>Number of female</td>
<td>342</td>
<td>83.41%</td>
</tr>
<tr>
<td>Number of males</td>
<td>68</td>
<td>16.59%</td>
</tr>
<tr>
<td>Average age (years)</td>
<td>36.81</td>
<td>± 11.01</td>
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The data were modeled using the methodology of generalized linear models. The software used was the Statistical Analysis System, SAS. Graphic 1 demonstrates the analyses of the BMI average in the studied periods, showing that the lowest BMI measurement occurred in the period of 2 years after the surgery. BMI reduction, when compared to the initial BMI was 37.77% for the period of 2 years and of 33.5% for the period of 5 years. If compared, BMI of 2 years with the BMI of 5 years of post-operatory, an increase of 4.27% is obtained, as demonstrated in the Fig. 1.

Fig. 1 - Analysis of average of BMI
Regarding weight, it was found an average value of 76.39 ± 14.01Kg for the period of 2 years and of 81.65 ± 17.08 Kg for the period of 5 years of post-operatory, an average increase of 5.93Kg.

![Fig. 2 - Analysis of the average of % EWL](image)

When the % EWL is analyzed, it was found for 75.69% of EWL for the period of 2 years after the surgery and in 5 years the average was 67.47% of %EWL. For both periods, the average was the expected one but it was observed that a reduction of 8.22% in %EWL between 2 and 5 years of post-operatory had occurred (Fig.2).

<table>
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<th>Table 2: Anthropometric Variables</th>
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<tr>
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<tr>
<td>Weight (Kg)</td>
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<tr>
<td>BMI (kg/m²)</td>
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<td>% EWIL</td>
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<td>%EBMIL</td>
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![Fig. 3- Analysis of average of % EBMIL](image)

The %EBMIL has shown to be higher in the period of 2 years and decreased in the period of 5 years of post operatory. Comparing the %EWL and %EBMIL, both demonstrated to be correlated. It can be observed in the Graphic 5, that the proportions of growth of % EBMIL are proportional to the %EWL (Figure 4).
Fig. 4 - Comparing %EWL with %EBMIL

Regarding the weight, it was found an average value of 76.39 ± 14.01 Kg for the period of 2 years and the value of 81.65 ± 17.08 for 5 years of post-operative, an increase average of 5.93Kg. The table 2 demonstrates the changes of the anthropometric variables through the studied period.

Predictor factors for WR:

From all variables used in the statistical analysis such as age, gender, initial BMI, the variables age and initial BMI were shown to be significant related to weight regain, for this group of evaluated patients. The variables that were presented as predictor factors for a higher WR were age and initial BMI. Therefore, it was demonstrated that older patients than the average who were ≥ 37.76 years old, both %EWL and %EBMIL decreased and as well as patients who were ≤ 37.76 years old tented to higher percentages of both %EWL and %EBMIL. It was found that the patients with initial BMI higher than the average from BMI ≥ 47Kg/m² showed lower % EWL and %EBMIL.

Discussion:

Several studies demonstrate excellent results with the weight loss of patients after the RYGBP, however demonstrated the weight regain in patients after 2 years from the procedure 10, 11.

The consensus between researchers regarding to the criteria of the surgical obesity treatments is that there is a weight loss of at least 50% of the excess of weight, and occurs it’s maintenance remains for a long periods 12. In a recent meta-analysis Buchwald 2, it was demonstrated that patients submitted to RYGBP had average of %EWL of 61.6% after 2 years of surgery.

In this study, the evaluated patients lost 75.69% of %EWL after 2 years of post-operative period, which was the average found in the study of Pories et al [13], with an average of 75 to 80% of %EWL for the same period. However, in the following of his study, from the 5th to the 14th year after the surgery, only 66% of the results remained satisfactory.

When it evaluated the period of 5 years of post operatory of studied patients, it was still found an average acceptable of %EWL, which was of 67.47%, but when compared to the period of 2 years, an increase of 8.22% was noticed.

Many are the factors that can interfere in the WR of obese patients submitted to the gastric bypass. In our study, age was a predictor factor for a higher WR, that is, patients with an average age above 37.76 years old presented a higher weight regain. On the same way the initial BMI higher than 47 Kg/m² was related to lower %EWL. Deitel and Baltasar 14, 15 described that %EBMIL is considered the best parameter for weight loss evaluation once it uses the BMI instead of the weight only. Its inclusion was considered important for a more precise evaluation of the weight loss in the post operatory, also analyzing the variation of BMI in the study period.

Similar studies have demonstrated the occurrence of WR after 2 years of surgery in some groups of patients. The factors can be several such as low adhesion in the following post operatory with the multidisciplinary team, difficulty to promote changes in the lifestyle, including changes in the nutritional behavior and a routine of physical activity 6. Many times some patients that presented a weight regain feel that somehow they failed and they do not return to the follow-up 16.
According to Collen M. [17], the importance of new habits is fundamental and necessary in the follow up of post-operative surgery, much as trying to include in the daily routine the balanced meals, practice of physical activity, hours of sleep. In recent research Faria [18] it was found that patients that have meals with high Glycemic rate also present a decreasing in the weight loss over the post-operatory.

Conclusion:

It was concluded that the RYGB has shown itself as an effective tool for weight loss, but the weight regain was observed after the period of 2 years, demonstrating the difficulty in the maintenance of the lost weight. A longer time is necessary for these patients to determine with accuracy the factors that contribute to the studied event. Age and initial BMI were demonstrated as important modulators of the results and both must be considered during the pre operatory evaluation and the evolution of the patient.

References:
