



Original/Valoración nutricional

Clinical-nutritional evolution of older women submitted to roux-en-y gastric bypass

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Abstract

The aim of the present study was to describe the clinical-nutritional evolution of older women submitted to Roux-en-Y gastric bypass surgery. A concurrent, retrospective study was conducted involving a sample of 16 older women with morbid obesity submitted to Roux-en-Y gastric bypass surgery between 1997 and 2010. Weight, body mass index (BMI), percentage of weight loss (%WL) and percentage of excess weight loss (%EWL) were evaluated three, six and 12 months after surgery. Preoperative comorbidities, postoperative clinical-nutritional manifestations and peri-operative mortality were also investigated. Mean age was 62.02 ± 2.02 years. A progressive reduction was found in mean body weight (116.04 ± 22.99 to 80.96 ± 21.43 Kg) and BMI (47.13 ± 8.19 to 33.42 ± 9.31 Kg/m²), with a consequent %WL of $28.60 \pm 8.59\%$ and %EWL of $64.79 \pm 3.99\%$ throughout the one-year follow-up period ($p < 0.05$). All patients has diseases associated with obesity, the most frequent of which were arterial hypertension ($n = 16$), arthropathy ($n = 11$), dyslipidemia ($n = 9$) and diabetes ($n = 7$). The following clinical-nutritional symptoms were reported: alopecia ($n = 9$), nausea/vomiting ($n = 7$), constipation ($n = 5$) and food intolerance ($n = 4$). One patient was diagnosed with malnutrition one year after surgery. No deaths occurred within 30 days after surgery. At the one-year evaluation, surgical success was evidenced by the significant reductions in mean weight and BMI and the more than 50% loss of excess weight.

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Key words: *Bariatric surgery. Gastric bypass. Elderly. Weight loss.*

EVOLUCIÓN CLINICO-NUTRICIONAL DE MUJERES MAYORES SOMETIDAS A BYPASS GÁSTRICO EN Y DE ROUX

Resumen

El objetivo de este estudio fue la descripción de la evolución clínico-nutricional de mujeres mayores sometidas a cirugía de bypass gástrico en Y de Roux. Se desarrolló un estudio concurrente, retrospectivo, que incluyó una muestra de 16 mujeres mayores con obesidad mórbida sometidas a bypass gástrico en Y de Roux entre 1997 y 2010. Se evaluó el peso, índice de masa corporal (IMC), porcentaje de pérdida de peso (%WL) y porcentaje de pérdida de peso excesivo (%EWL) tres, seis y doce meses después de la cirugía. También se investigó las comorbilidades preoperatorias, manifestaciones clínico-nutricionales postoperatorias y mortalidad perioperatoria. La edad media fue $62,02 \pm 2,02$ años. Se detectó una reducción progresiva en el peso medio corporal ($116,04 \pm 22,99$ a $80,96 \pm 21,43$ Kg) e IMC ($47,13 \pm 8,19$ a $33,42 \pm 9,31$ Kg/m²), con un consecuente porcentaje de pérdida de peso (%WL) de $28,60 \pm 8,59\%$ y %EWL de $64,79 \pm 3,99\%$ a lo largo del periodo de seguimiento de un año ($p < 0,05$). Todas las pacientes tenían enfermedades relacionadas con obesidad, siendo la más frecuente hipertensión arterial ($n = 16$), artropatía ($n = 11$), dislipidemia ($n = 9$) y diabetes ($n = 7$). Se comunicaron los siguientes síntomas clínico-nutricionales: alopecia ($n = 9$), náusea/vómitos ($n = 7$), estreñimiento ($n = 5$) e intolerancia a la comida ($n = 4$). Una paciente fue diagnosticada de malnutrición un año después de la cirugía. No se registraron muertes tras 30 días de la cirugía. En la evaluación a un año, el éxito quirúrgico quedó constatado por las reducciones significativas en peso medio e IMC, además de más de un 50% de pérdida de peso excesivo.

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Palabras clave: *Cirugía bariátrica. Bypass gástrico. Mayores. Pérdida de peso.*

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Introduction

Overweight and obesity are defined as an abnormal, excessive buildup of fat tissue that is harmful to one's health. The prevalence of obesity has more than doubled throughout the world since 1980 and it is estimated that more than 1.5 billion individuals will be obese by 2015¹.

The multifactor etiology of obesity is complex and results from a combination of genetic, environmental, emotional and lifestyle factors. One's energy balance is altered by an increase in calorie intake and/or a reduction in energy expenditure². Based on data from a household survey conducted by the Brazilian Institute of Geography and Statistics, overweight and obesity (as determined by the body mass index [BMI]) in Brazil increases with age until the 45-to-54-year-old range for men and the 55-to 64-year-old range for women, declining thereafter³.

The population of older adults has been growing throughout the world. The World Health Organization considers older adults to be those aged 65 years or older in developed countries and those aged 60 years or older in developing countries⁴. According to censuses conducted by the Brazilian Institute of Geography and Statistics, individuals aged 60 years or older accounted for 7.3% of the Brazilian population in 1991 and 8.6% of the population in 2002. Thus, the population of older adults increased by nearly four million individuals in the period as a result of the gradual increase in mean life expectancy⁵.

Among older adults, obesity aggravates the diminished physical function related to the ageing process and causes frailty or sarcopenic obesity. It is therefore particularly important to encourage weight loss as a means for improving physical function among obese older adults and preventing or ameliorating clinical and metabolic complications associated with obesity⁶. Due to the increased risk of disease and death among individuals with morbid obesity, patients who are unable to achieve significant weight loss with a change in life style and/or drug therapy may benefit from surgical treatment^{2,6}. The best results are achieved with gastric bypass surgery⁷. Studies report the effectiveness of bariatric surgery in elderly patients for the resolution of comorbidities, significant weight loss and an improvement in quality of life^{8,9,10,11,12}. However, divergent opinions are found regarding what constitutes adequate treatment for older adults. While weight loss following bariatric surgery leads to a reduction in health risks, such weight loss may have harmful effects on older adults, such as an increased risk of mortality, the aggravation of the loss of muscle mass related to the ageing process and the loss of bone mineral density^{13,14}.

Considering the lack of studies on the effects of gastric bypass surgery in older adults, the aim of the present study was to describe the clinical-nutritional evolution of older women submitted to Roux-en-Y gastric bypass surgery.

Methods

A concurrent, retrospective study was conducted involving a sample of 16 older women (aged 60 years or older) with morbid obesity submitted to Roux-en-Y gastric bypass surgery at the hospital of the Federal University of Pernambuco (Brazil) between 1997 and 2010. Data were collected from the patient charts, which contained the results of the follow-up evaluations of the multidisciplinary healthcare team. Information was collected on socio-demographic characteristics (age, ethnicity, schooling, marital status and occupation), clinical history of weight gain, preoperative comorbidities, postoperative clinical-nutritional signs and symptoms and the occurrence of peri-operative death (defined as death due to any cause within 30 days following bariatric surgery).

Nutritional status was determined based on height (m), preoperative weight (Kg) and current weight (Kg). The BMI was calculated as weight/height². Evaluations were conducted in the preoperative period as well as three, six and 12 months after bariatric surgery for the determination of absolute weight loss (Kg), postoperative BMI, percentage of weight loss (%WL) and percentage of excess weight loss (%EWL) using the following formulas: 1) postoperative BMI = (current weight/height²); 2) %WL = (preoperative weight – current weight)/preoperative weight x 100; 3) %EWL = (preoperative weight – current weight)/(preoperative weight – ideal weight) x 100. Ideal weight was calculated using a specific formula described by Deitel and Greenstein (2003) for individuals with morbid obesity: $53.975 + [(height - 1.524) \times 53.5433]$ for the female gender¹⁵. For %EWL, a modified version of the classification proposed by Reinhold (1982)¹⁶ was used, which considers more the 75% excess weight loss to be excellent and 50 to 75% to be good, whereas less than 50% indicates treatment failure¹⁷.

Statistical analysis

The descriptive analysis was performed with the aid of the Sigma Stat program for Windows (version 3.5). The data were presented in tables. Continuous variables with normal distribution were expressed as mean and standard deviation. Variables with non-normal distribution were expressed as median and 25th to 75th percentiles. Categorical variables were expressed as whole numbers. The level of significance was set to 5% ($p < 0.05$).

This study received approval from the Human Research Ethics Committee of the Federal University of Pernambuco (Brazil) under process number and was conducted in compliance with Resolution n°466/12 of the Brazilian National Board of Health for research involving human subjects. The patients received clarifications regarding the procedures, risks and benefits of the study and agreed to voluntary participation by signing a statement of informed consent.

Table I

Preoperative socio-demographic characteristics of older women submitted to Roux-en-Y gastric bypass surgery, Federal University of Pernambuco hospital, Recife, Brazil, 1997 - 2010

<i>Variables and categories</i>	<i>n</i>
Ethnicity	
Caucasian	16
Marital status	
Single	2
Married	6
Divorced	1
Widowed	7
Schooling	
Primary school	9
High school	5
University	1
Illiterate	1
Occupation	
Actively employed	2
Unemployed/homemaker	4
Retired/receiving pension	10

Number of patients (n = 16)

Results

Table I displays the socio-demographic characteristics of the 16 older women submitted to gastric bypass surgery. Mean age was 62.06 ± 2.02 years, mean weight was 116.04 ± 22.99 Kg, mean height was 1.57 ± 0.06 m and mean preoperative BMI was 47.13 ± 8.19 Kg/m². Six patients reported that the excessive gain in weight occurred during or after a pregnancy, five reported becoming obese in adulthood, four reported becoming obese in childhood and one reported becoming obese during adolescence. All patients had diseases related to obesity (Table II). Table III displays the most frequent clinical-nutritional signs and symptoms recorded during the 12-month follow-up period.

A statistically significant progressive reduction in body weight and BMI occurred throughout the follow-up period (3, 6 and 12 months), along with a significant increase in both %WL and %EWL, with the exception of %EWL between the three-month and six-month evaluation, in which the increase did not achieve statistical significance (Table IV). Despite the significant reduction in mean weight, only one patient had reached her ideal weight by the 12-month evaluation. Based on the %EWL at the 12-month evaluation (n = 12), one patient achieved excellent results, five achieved good results, five achieved insu-

Table II

Preoperative comorbidities among older women submitted to Roux-en-Y gastric bypass surgery, Federal University of Pernambuco hospital, Recife, Brazil, 1997 - 2010

<i>Comorbidities</i>	<i>n</i>
Hypertension	16
Arthropathy	11
Dyslipidemia	9
Diabetes mellitus	7
Gastritis	7
Steatosis	5
Cholelithiasis	4
Dyspnea	3
Gastroesophageal reflux disease	3
Depression	3
Sleep apnea	2

Number of patients (n = 16)

fficient results and one patient had excess weight loss of 144.1%, with a BMI of 17.89 Kg/m², and was diagnosed with malnutrition. An increase in mean %EWL occurred throughout the study (Fig. 1).

There were no occurrences of death within 30 days following gastric bypass surgery. However, after six months, one patient suffered complications during orthopedic surgery for the placement of a prosthetic knee, leading to malnutrition, septic shock and death.

Table III

Postoperative clinical-nutritional signs and symptoms among older women submitted to Roux-en-Y gastric bypass surgery, Federal University of Pernambuco hospital, Recife, Brazil, 1997 - 2010

<i>Signs and symptoms</i>	<i>n</i>
Alopecia	9
Nausea/vomiting	7
Constipation	5
Food intolerance	4
Diarrhea	3
Epigastralgia	3
Brittle nails	3
Flatulence	2
Dry skin	2
Dumping syndrome	1

Number of patients (n = 16)

Table IV

Anthropometric variables in preoperative period and at three-month, six-month and 12-month evaluations among older women submitted to Roux-en-Y gastric bypass surgery, Federal University of Pernambuco hospital, Recife, Brazil, 1997 - 2010

Variables	Preop	3 months	p	6 months	p	12 months	p
Weight (Kg)	116.04 ± 22.9	95.30 (79.32-97.95)	0.015*	91.13 ± 23.34	0.011*	80.96 ± 21.43	<0.001*
BMI (Kg/m ²)	47.13 ± 8.19	39.08 ± 9.28	0.025*	36.657 ± 10.033	0.006*	33.42 ± 9.31	<0.001*
%WL	-	15.95 ± 4.60	-	22.51 ± 8.13	0.031*	28.60 ± 8.59	<0.001*
%EWL	-	33.53 (24.71-39.85)	-	41.51 (28.09-71.51)	0.264	59.85 (38.36-72.09)	0.018*

BMI: body mass index; %WL: percentage of weight loss; %EWL: percentage of excess weight loss; preoperative: n = 16; 3-month and 6-month postoperative evaluations: n = 11; 12-month evaluation: n = 12; data expressed as mean and standard deviation or median and 25th to 75th percentiles; weight and BMI at 3, 6 and 12 months compared to preoperative weight and BMI; %WL and %EWL at 6 and 12 months compared to values at 3 months; * p < 0.05 (Student's t-test or Mann-Whitney test).

Discussion

The increase in the elderly population has been accompanied by an increase in the prevalence of overweight and obesity in this age group¹⁸. Thus, researchers have reassessed the possibility of bariatric surgery for older adults, who were once considered too old to benefit from this procedure¹⁹. While previous reports expressed concerns due to higher rates of complications, recent studies have demonstrated that bariatric surgery can be performed safely on older adults with satisfactory results and that age *per se* should not be considered an absolute contraindication for surgery^{14,19,20,21,22}.

In a review of the literature on obesity among older adults, Houston et al. (2009)¹⁸ found that most bariatric patients are women and Roux-en-Y gastric bypass (RYGB) is the most frequent type of bariatric surgery. The present findings are in agreement with these data, as women accounted for 16 of the 17 patients operated during the study period and RYGB was the procedure

performed. Older adults accounted for only 2.95% of the total number of bariatric surgeries performed in the study period. Similar findings are described in previous studies, such as the 2.7% rate described by Varella et al. (2006)⁶ and the 1.3% rate described by Nelson et al. (2006)²¹.

According to the Brazilian Obesity Guidelines², obesity is more prevalent in populations with a greater degree of poverty and lower educational level, which may be explained by the better palatability and lower cost of high-calorie foods, such as sugar and fat. All patients in the present study depended on the Brazilian public healthcare system. Moreover, the majority (n = 9) only had a primary school education and one was illiterate, which partially confirms that data described in the aforementioned guidelines.

The increase in the duration of obesity is accompanied by an increase in the incidence of comorbidities and the use of medications¹⁰. The most frequent preoperative diseases were systemic arterial hypertension, dia-

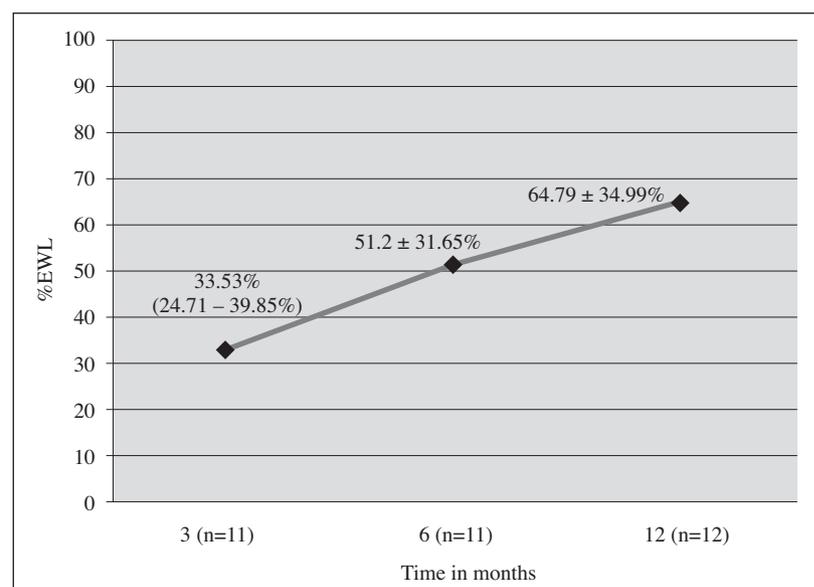


Fig. 1.—Evolution of %EWL throughout postoperative evaluations of older women submitted to Roux-en-Y gastric bypass surgery, Federal University of Pernambuco hospital, Recife, Brazil, 1997 - 2010 p ≤ 0.001.

betes mellitus, arthropathy, dyslipidemia, sleep apnea and gastroesophageal reflux disease, which is in agreement with data described in previous studies on older adults submitted to gastric bypass surgery^{10,11,22}. The diagnosis of depression in three patients is in agreement with data reported by O'Keefe et al. (2010)²², who report a 37.9% prevalence rate of depression in the sample analyzed.

Although morbidity and mortality rates are higher among older adults^{14,23}, bariatric surgery is considered as safe as other gastrointestinal procedures in this age group, as the mortality rate following bariatric surgery is lower than the expected mortality rate⁸ and can be as low as 0% in the 30 days following surgery^{19,20}, as occurred in the present study. Fátima et al. (2006)⁸ report a peri-operative mortality rate of 0.7% in a group of 127 patients aged 60 years or older. According to Papisavas et al. (2004)⁹, the use of laparoscopic techniques and the improvement in peri-operative care have made bariatric surgery a safer procedure for older patients.

The most frequent clinical-nutritional manifestations following gastric bypass surgery were alopecia, vomiting, constipation, food intolerance, diarrhea, brittle nails and dumping syndrome, which is in agreement with data reported for the adult population submitted to gastric bypass surgery^{24,25,26,27}. However, no previous papers were found reporting these data only on older adults. Postoperative nutritional and multidisciplinary follow up is essential to avoiding nutritional deficiencies and corrected bad eating habits before and after surgery as well as potentiating the results and patient adherence to treatment^{26,27}.

One patient received a diagnosis of malnutrition. This is a risk associated with all types of bariatric surgery and is largely avoidable through adequate patient selection, preoperative nutritional education, postoperative follow up and patient adherence to treatment²⁸.

As suggested by Deitel et al. (2007)²⁹, the determination of the percentage of excess weight loss is a way to standardize measures when comparing weight loss following bariatric surgery. In the present study, mean %EWL was $64.9 \pm 34.99\%$ at the one-year evaluation, which is considered indicative of surgical success and is in agreement with data reported in the literature for older adults submitted to RYGB. In a series of 80 patients aged 60 years or older treated predominantly with open gastric bypass surgery (65%), Sugerman et al. (2004)¹¹ report 57% excess weight loss in one year of follow up. Analyzing 27 patients aged 65 years or older, Quebbemann et al. (2005)¹⁰ found 72% excess weight loss in the group submitted to gastric bypass surgery ($n = 13$). In a retrospective analysis of 197 patient aged 65 years or older submitted predominantly to gastric bypass surgery (79.3%), O'Keefe et al. (2010)²² report a higher %EWL in comparison to other bariatric techniques, reaching 59.8% one year after surgery. In the present study, the reduction in the

number of patients in the follow up period was due to failure to appear for the evaluations or insufficient information on the patient chart.

The reduction in BMI from 47.13 ± 8.19 to 33.42 ± 9.31 Kg/m² and the $28.60 \pm 8.59\%$ weight loss are similar to data described by Sugerman et al. (2004),¹¹ who report a reduction in BMI from 49 ± 7 to 34.5 ± 7 Kg/m² and 30% weight loss in one year of follow up. Weight loss can reach a mean of 35 to 40% of initial weight between the 12th and 24th months following surgery.²⁹

Conclusion

The present findings demonstrate that older adults account for a very small percentage of bariatric surgeries, despite the occurrence of morbid obesity in this age group. The significant reductions in weight and BMI as well as the greater than 50% loss of excess weight in the first 12 months following gastric bypass surgery indicate good results. However, only one patient reached her ideal weight. The clinical-nutritional signs and symptoms were similar to those reported for the adult population. Multidisciplinary follow up is important to potentiating the beneficial effects of gastric bypass surgery and avoiding complications, such as malnutrition. Further studies are needed to assess the safety and efficacy of bariatric surgery for older adults.

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