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Original Article

LONG-TERM MORTALITY OF PATIENTS SUBMITTED TO ROUX-EN-Y GASTRIC BYPASS IN PUBLIC HEALTH SYSTEM: HIGH PREVALENCE OF ALCOHOLIC CIRRHOSIS AND SUICIDES

Mortalidade no pós-operatório tardio da derivação gástrica em pacientes do sistema único de saúde: elevada frequência de cirrose alcoólica e suicídios

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ABSTRACT - *Background*: Bariatric surgery is a valuable therapeutic option to severe obesity. Many researches have assessed the procedure efficiency on weight reduction, improvement in comorbidities and reduction of mortality. However, studies of late mortality and its causes are still necessary, mainly in the Brazilian population. ***Aim*:** To assess late mortality, discriminating causes of death and its association with pre-operative characteristics in a series of patients submitted to bariatric surgery. ***Methods*:** Data analyses of 248 patients submitted to Roux-en-Y gastric bypass through Public Health System, from one up to 12 years of follow-up. The analyzed variables were: gender, age by the time of the surgery, pre-operative body mass index, comorbidities and smoking. The information about mortality was obtained through the Mortality Information System. The deaths were categorized according to International Classification of Diseases 10 and statistics analysis was done through the software STATA™ 9.2. ***Results*:** There were nine deaths, five of them were female. The mean age of the patients who died was 48.3±8.4 years and the pre-operative body mass index was 56.0±7.4 kg/m^2. The causes of death were: alcoholic cirrhosis (n=2), suicide (n=2), infectious causes (n=2), respiratory insufficiency (n=1), agranulocytosis (n=1) and unknown causes (n=1). None of the deaths was directly related to the surgery and there was no association of the pre-operative characteristics in mortality. ***Conclusion*:** There was not any association between late mortality and pre-operative characteristics. The high frequency of suicide and alcoholic cirrhosis mortality indicates the strict follow-up concerns, with appropriate psychological support to the patients.

HEADINGS - Mortality. Gastric bypass. Bariatric surgery.

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RESUMO - *Racional*: A cirurgia bariátrica é uma opção terapêutica valiosa para tratamento de casos graves de obesidade. Sua utilização em larga escala motivou a realização de diversas pesquisas que comprovaram a eficiência do procedimento na redução do peso corporal, melhora das comorbidades e redução da mortalidade em curto e médio prazo. Entretanto, são necessários mais estudos a respeito da mortalidade de médio e longo prazo e suas causas, principalmente na população brasileira. ***Objetivo*:** Avaliar a mortalidade após período mínimo de um ano da operação bariátrica discriminando as causas de óbito e sua relação com características pré-operatórias. ***Métodos*:** Foram analisados os dados de 248 pacientes do Sistema Único de Saúde, com seguimento entre um e 12 anos, submetidos à derivação gástrica em Y-de-Roux. As variáveis analisadas foram: sexo, idade na operação, índice de massa corporal pré-operatório, presença de comorbidades e tabagismo. As informações sobre mortalidade foram obtidas através do Sistema de Informações sobre Mortalidade. Os óbitos foram categorizados segundo o Código Internacional de Doenças 10 e a análise estatística feita através do programa STATA™ 9.2. ***Resultados*:** Ocorreram nove óbitos tardios, sendo cinco de mulheres. A média de idade dos pacientes que faleceram foi 48,3±8,4 anos e o índice de massa corporal pré-operatório foi 56,0±7,4 kg/m^2. As causas de óbito foram cirrose alcoólica (n=2), suicídios (n=2), causas infecciosas (n=2), insuficiência respiratória (n=1), agranulocitose (n=1) e causa desconhecida (n=1). Nenhum óbito teve relação direta com o procedimento cirúrgico e não houve influência das características pré-operatórias avaliadas na mortalidade. ***Conclusão*:** Não houve relação entre a mortalidade e as características pré-operatórias. A alta frequência de mortalidade por suicídio e por complicações do alcoolismo indica a necessidade de seguimento clínico mais rigoroso, envolvendo adequado apoio psicológico aos pacientes.

DESCRITORES - Mortalidade. Derivação gástrica. Cirurgia bariátrica.

INTRODUCTION

Brazil has experienced in recent decades the transition from the predominantly rural to urban and industrial society, and concomitantly with this transformation there was a change in the Brazilian pattern and anthropometric nutritional status: malnutrition has been replaced rapidly by progressive obesity, noting an increase in scale of its most serious grades[10].

Obesity as a chronic disease, causes a number of severe comorbidities; among them increased incidence of coronary heart disease, type 2 mellitus diabetes, hypertension and some cancers, especially in individuals with obesity grades II and III[11]. Clinical treatment of severe forms of obesity, based on proper diet, exercise and pharmacological treatment, has been shown not very efficient from the perspective of reversal of comorbidities. Therefore, the most valuable therapeutic option in these cases has been bariatric surgery[5].

Brazil occupies the 77th position in the WHO ranking of obesity[7]. According to a survey conducted by the Brazilian Institute of Geography and Statistics, men is more frequently affected than women, and there is increased prevalence of obesity even in advanced age[7]. However, given more alarming is the number of bariatric surgeries performed, with Brazil in second place, behind only from the United States. It is inferred, therefore, that there is a high prevalence of severe obesity in Brazil, since bariatric surgery is reserved only for such cases. The most frequent surgical technique performed in the country has been the Roux-in-Y gastric bypass. Results in short, medium and long term confirm that bariatric operations are very effective in reducing body weight and improvement of comorbidities that accompany severe obesity. There are also comparative studies of cohorts of patients operated and non-operated which demonstrated a reduction in mortality among those submitted to surgical treatment of obesity[1,2,5,17]. However, further studies are needed on late mortality, especially in the Brazilian population.

The above facts motivated this study which aimed to discriminate the causes of death and its association with preoperative findings, following Roux-in-Y gastric bypass patients in a cohort of medium and long term including surgical patients from morbid obesity center of the Brazilian Unified Health System

METHODS

This project was approved by the Ethics Committee of the Universidade Federal de Minas Gerais - ETIC 058/04.

The cohort comprised 248 patients followed between one and 12 years, undergoing Roux-in-Y gastric bypass by laparotomy at the Hospital de Clínicas of the Federal University of Minas Gerais, Belo Horizonte, MG, Brazil. Surgery was indicated for patients with BMI≥40 kg/m^2 or BMI≥35 kg/m^2 in combination with significant comorbidities. Patients dependent on alcohol, drug users and considered unfit after psychological evaluation were excluded.

The following variables were collected preoperatively from all patients: gender, age at surgery, body mass index (BMI), comorbidities (hypertension, dyslipidemia, diabetes mellitus) and smoking. For purposes of statistical analysis, age at surgery was categorized as less than or 40 years and preoperative BMI to a lesser or 50 kg/m^2. Mortality data were obtained from the Mortality Information System of the Department of Computer System Unified Health System. Data collection occurred through probabilistic linkage between the cohort of patients and official data, using the first and last name of the patient, mother's name and date of birth, from January 2001 until December 2010 .

For patients who died, the cause and place of death, time elapsed between the operation and death were marked. The causes of death were classified according to the International Classification of Diseases (ICD-10) present on death certificates and reviewed by two researchers independently (SMBK and MFHSD).

Preoperatively, hypertension was defined as systolic blood pressure ≥140 mmHg and/or diastolic blood pressure ≥90 mmHg and/or use of antihypertensive drugs[14]. Diabetes mellitus was defined as fasting glucose ≥126 mg/dl and/or random blood glucose 200 mg/dl, or blood glucose two hours after oral ingestion of 75 g of dextrose 200 mg/dl, and/or use of oral hypoglycemic medication or insulin[15]. Dyslipidemia was defined as plasma triglyceride levels greater than 150 mg/dl and/or total cholesterol above 200 mg/dl or HDL cholesterol below 40 mg/dl[16].

Statistical analysis was performed using STATA/SE 10™, using the chi-square test and Fisher exact test to verify the significance of association between dichotomous variables and the Mann-Whitney test for continuous variables. The Shapiro-Wilk test was used to test the normality of distribution of continuous variables.

RESULTS

The description of deaths causes and other data for patients who died are shown in Table 1. Important to note that one of the patients who developed hepatic cirrhosis denied drinking prior developing the habit after the procedure. Of the two patients whose cause of death was suicide, one died after

three years of surgery, not going to medical follow-up even in the first year after surgery. The mean follow-up of patients was 5.1±3.1 years (range 1-12, median 5y). The average age of the patients was 39.7±10.6 years (range 17-64y, median age 39y). The mean preoperative BMI was 53.0±8.9 kg/m^2 (range 35.3 to 78.4 kg/m^2, median 51.9 kg/m^2. Of the total, 75% (n=186) were female.

There were nine late deaths, in average time of postoperative 5.6±2.6 years; five were women. Among patients who died, age and preoperative BMI levels were, respectively, 42.4±6.7 years and 56.0±7.4 kg/m^2. The average age at death was 48.3±8.4 years (range 37-61y). Six deaths occurred in hospital.

After statistical analysis, it was found that there was no association between death and gender (p=0.17), age at surgery (p=0.32), preoperative BMI (p=1.0) and presence of preoperative comorbidities (hypertension, p=0.40; diabetes, p=0.99; dyslipidemia, p=0.10) and smoking (p=0.35) in late mortality.

TABLE 1 - Description of the causes of death and patient characteristics

	Gender	Age at death (years)	PO time to death (years)	Preoperative BMI (Kg/m2)	Comorbidities	Smoking	Cause of death (ICD-10)	Death place
1	M	37	3	47.7	DM, hypertension, D	Ex-smoker	X70.9	O
2	F	40	4	49.8	D	Not	D70	H
3	F	40	2	63.8	D	Yes	X95.9	H
4	M	45	5	63.8	SAH, D	Not	K70.3	H
5	F	48	7	60.8	SAH, D	Yes	K70.3	O
6	F	54	6	55.2	DM, D	Yes	I33	H
7	M	54	7	44.3	DM, hypertension	Ex-smoker	K35.0	H
8	F	56	11	55.6	D	Yes	I61.9	H
9	M	61	6	62.9	SAH, D	Ex-smoker	J96	H

DM=diabetes mellitus; D=dyslipidemia; F=female patients; M= male patients; PO= postoperative; H=hospital; O=another place.

DISCUSSION

The present study aimed to assess mortality after one year of completion of the Roux-en-Y gastric bypass, its main causes and preoperative factors involved. For this, was used as the official Mortality Information System of the Department of Computer System Unified Health System database, covering the entire national territory. It is used on a large scale and is configured as a secure source of research. This is a prospective study, in which the cohort was followed by a single multidisciplinary team, which allowed full access and control of variables.

After analyzing the results, it was found that the cohort consisted of young patients, with a mean age at death of 48.3±8.4 years. Another important feature of the study group is the high preoperative BMI, characterizing them as severely obese. International studies, such as those developed by Adams et al[1] and Sjöström et al[17], evaluated cohorts whose average preoperative BMI was lower than the BMI of the present study, suggesting more favorable conditions for the surgical procedure and possibly less morbidity postoperatively. However, preoperative BMI and comorbidities were not associated with increased mortality.

According to data from DATASUS[8] and Sangari Institute[9], the mortality rate from suicide in Brazil was 4.5 per 100 000 inhabitants in the period 2000-2008 and is rising. In the country occur about 3000 suicides per day, most of which (79.1%) in men. In this cohort, suicide was prevalent cause of mortality, accounting for 22.2% of total deaths. Obesity, like other chronic diseases, is associated with higher frequency of suicide, either by the worsening quality of life associated with comorbid conditions, either by higher prevalence of mental disorders present in severely obese individuals[12].

Large cohorts of Sweden[17] and in US[1,2] showed higher mortality from suicide and external causes in patients undergoing bariatric surgery compared to non-operated or the general population. It is intriguing that even with weight loss and improvement of comorbidities, previously severely obese individuals present suicide as an important cause of death after bariatric surgery. Body image issues and depression present preoperatively, in general, improve early in the postoperative period and can regain greater severity over time and contribute to increased risk of suicides[12,13]. Windover et al. evaluate 1020 candidates for bariatric surgery and reported attempts at self-annihilation in 115 (11.2%). In this study, younger individuals, females with higher BMI and lower education, had higher frequency of attempts at self-destruction[19]. Unrealistic expectations about the possible outcomes of surgery, repurchase weight, disappointment with the limitations in the diet and the various care required postoperatively, are possible factors related to suicide risk in postoperative time[12,13].

Cirrhosis represented, as well as suicide, leading cause of mortality accounting for 22.2% of total deaths. It is known that alcoholism is a possible and severe complication among patients undergoing bariatric surgery. A recent study by Chen JY et al.[3] shows the association between bariatric surgery and increased incidence of alcoholism, and found that the highest risk occurs in males, younger patients and those who, preoperatively, had regular consumption of alcohol, tobacco or illicit drug use. Heinberg et al.[4] indicate that there is increased vulnerability of patients undergoing bariatric surgery to alcoholism, as a result of changes in the pharmacokinetics and metabolism of alcohol after the procedure. These changes include reducing the

concentration of alcohol dehydrogenase and rapid gastric emptying, which culminate in accelerated absorption of the alcohol and extended time for metabolism and excretion of the substance.

The limitations of the study were based on the small number of individuals in the cohort and deaths, which limits the power to detect significant differences being the patients who died and the survivors. Furthermore, there is no control group of patients with similar clinical conditions, but not undergoing surgical treatment, for comparison of mortality rates between operated and non-operated.

At the hospital where the study was conducted, are established strict criteria for selection of patients eligible for surgery with preoperative multidisciplinary approaches on psychology, behavior and nutritional education for post-surgery, instructions on the surgical procedure and its possible results. Furthermore, it is proposed to follow-up patients postoperatively, including the late period of Roux-in-Y gastric bypass. It is extremely important to have clinical and psychological follow-up in patients undergoing bariatric surgery. This implies a greater number of consultations, increased attention from health professionals, concerns of patients and longer observation postoperatively, among other measures.

CONCLUSION

There was no relationship between mortality and preoperative characteristics. The high frequency of suicide mortality and complications of alcoholism indicates the need for more rigorous follow-up, involving appropriate psychological support to patients.

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