183 - IMPACT OF THE BARIATRIC SURGERY ON THE MORFOLOGIC VARIABLES OF MORBID OBESE

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Introduction

The obesity is recognized as a problem of public health and is characterized by the excessive accumulation of body fat, in such extension that causes damages to the individual's health (Monteiro, 1995), as the favoring of cardiovascular illness, dislipidemies, type 2 diabetes mellitus and certain cancer types (Sichieri,1998). According to IBGE (2004) it is verified that 40,6% of the Brazilian population present weight excess, being 11,1% relative to obesity.

The morbid obesity is characterized by the Body Mass Index (BMI) above 40 or even lower, but together with co-morbosities (Julia, et al., 2004). This is one of the diseases with the largest mortality rates of the world. In Latin America, it is probable that 200.000 people die annually due to their associated co-morbosities. The mortality rate for morbid obese is 12 times larger among men with 25 to 40 years, compared to individuals of normal weight (Bray, 1998).

A recent longitudinal study showed that the largest increase of the prevalence of the obesity during the last decade occurred in the group of obesity degree III, or morbid obesity (Freedman, 2002). Usually, the clinical approach is ineffective in these cases, and the bariatric surgery is imposed as an important treatment option, causing the significant improvement of the co-morbosities (Coutinho *et al.*, 2003).

The modifications in the lifestyle and in the alimentary habits observed in the last decades contributed to an elevation in the prevalence of the obesity. There was an increase in the sedentarism and the adoption of a diet characterized by the high consumption of fats and calories, with the prevalence of the ingestion of processed foods (rich in sugar and salt), and the reduction in the consumption of natural sources of nutrients (fruits, vegetables and cereals; IBGE, 2004). This behavior takes to a deep unbalance in the diet, favoring, excessively, the increase of the obesity and of chronic diseases not transmissible (Monteiro et al., 1995).

The increase of the obesity could be verified in the richer social classes of the population and also in the least favored, once added to the sedentary lifestyle, the industrialization process reduced the cost and it turned more accessible the foods with little vitamins and minerals and with high content of energy and fat, especially the saturated ones (Cole et al., 2000; Monteiro et al., 2000; IBGE, 2004). With this, it is possible to verify the presence of the micronutrients deficiency, even if sub clinic, characterizing the "hidden hunger", together with the increase of obesity.

In spite of the maintenance of weight loss in excess in the long term, the countless metabolic changes originating from the surgical procedure cause nutritional disturbances, as the protein-caloric malnutrition. The deficiencies of macronutrients, are frequently associated to the ones of the micronutrients, causing, in a combination of factors, the occurrence of anemias, bone demineralization, several hypovitaminosis A and big modifications in the body composition (Alvarez-Leite, 2004) .

The objective of this study was to verify the impact of the bariatric surgery in the body composition of morbid obese, with assessments made 30, 90 and 180 days after the surgery.

Materials and Methods

Subjects: 30 patients with obesity III (OMS 98) BMI >40 kg/m^2 of both sexes were analyzed, without race distinction or social class in the pre and postoperative of Reductive Gastroplasty with Rebuilding in Y of Roux (National Institutes of Health, 1991). These patients were accompanied by the service of integrated nutrition of the multidisciplinary team of the Surgical Clinic Carlos Saboya. The sample was characterized by 23 women and 7 men, with average age among 38 ±14,1 years, average weight of 130,2 ±22,1 kg and average BMI of 46 ±5,3 kg/ m^2.

For the evaluation of the body composition, the anthropometric method was adopted according to the rules of the *International Society for Advancement in Kinanthropometry* (ISAK, Norton & Olds, 2000). The anthropometric evaluations were accomplished in the following times: in the preoperative (T0), in 30 days (T30), 90 days (T90) and 180 days (T180) after the surgery. The following parameters were obtained: *total body mass* (TBM, kg) obtained in platform type electronic scale with capacity of up to 300 kg (Filizola, 100g) being the patient with light clothes and barefoot; *body mass index* (BMI, kg/m^2) (Cuppari, 2002), relative body *fat* (%BF), *lean body mass* (LBM, kg) and body *fat mass* (BFM, kg). The height was obtained with the use of estadiometer label Lange, with the patient in orthostatic position, barefoot, (Cuparri, 2002). To measure the *abdominal perimeter* it was used a flexible and non-extensible elastic ribbon, with accuracy of 0,1 cm and it was obtained through the average of two abdominal measures taken in two different points, being the patient in orthostatic position and in the end of a normal expiration (Loghman, 1988):

Measure 1: sidelong in the medium line between the last rib and the iliac crest and previously in the medium line between the xifoid process and the umbilical scar.

Measure 2: sidelong, in the level of the iliac crest and previously the umbilical scar.

To set the relative body fat (%BF), the BFM and the LBM, the regression equations of Weltman (1987 & 1988) were used, starting from the abdominal perimeter (Frame 1).

To set the basal metabolic rate, the indirect method was used, measured in kcal during 24 hours, through the regression equation of Haris and Benedict (1919).

Frame 1: Weltman's equation

For men

%BF = 0,31457 x (AC) - 0,10969 x (WEIGHT) + 10,8336, r = 0,54, standard error = 2,88 % fat.
BFM = 0,22753 x (WEIGHT) + 0,31341 x (AC) - 22,608, r = 0,90, standard error = 2,86 kg
LBM = 0,77249 x (WEIGHT) - 0,31353 x (AC) + 22,620, r = 0,94, standard error = 2,86 kg

For women

% BF = 0,11077 x (AM) - 0,17666 x (HEIGHT) + 0,14354 x (WEIGHT) + 51,03301,
r = 0,76, standard deviation = ± 2,9
BFM = 0,62309 x (WEIGHT) - 0,17844 x (HEIGHT) + 0,09495 x (MA) + 5,88874,
r = 0,96, standard deviation = ± 2,9 kg.
LBM = 0,37939 x (WEIGHT) + 0,17898 x (HEIGHT) - 0,09494 x (MA) - 6,00423,
r = 0,89, standard deviation = ± 3,0 kg.

AC = average of the abdominal circumference; %BF =relative body fat ; BFM = body fat mass; LBM = lean body mass (Weltman,1987 & 1988).

The statistical analysis was accomplished in the statistical package SPSS for Windows 10.0. The comparison of the results of the moment zero (preoperative) and 30, 90 and 180 days after the surgery were made with the ANOVA *one way* for repeated measures.

Results

Statistically significant differences were obtained for all the observed variables and among all the considered times (Table 1).

Table 1: ANTHROPOMETRIC EVALUATION

Variables	T0	T30	T90	T180
TBM (kg)	131,4 ±22,4 *	117,5 ±20 *	104,7 ±18 *	90,9 ±25 *
%G (%)	49,7 ±6,6 *	47,5 ±5,8 *	44,9 ±5,4 *	42,6 ±8,1 *
LBM (kg)	67,5 ±18,5 *	62 ±15,8 *	57,5 ± 13,4 *	50,5 ±14,6 *
BFM (kg)	62,6 ±9,9 *	54,5 ± 8,8 *	46,6 ± 8,2 *	34,3 ±21,3 *
BMR (kcal)	2762,6 ±673, *1	2637,7 ±624,2 *	2567,5 ±608,7 *	2254 ± 789 *

*=significant difference for p=0,05; TBM=Total body mass; %BF=relative body fat; LBM=Lean body mass; BFM=Fat body mass; BMR=Basal metabolic rate.

Discussion

The bariatric surgery is the most effective treatment for patients with morbid obesity. In the present study, the analyzed individuals had significant decrease in the amount of body fat, in the absolute weight (TBM) and in the lean body mass, as well as in the basal metabolic rate. Evidences show that obesity can generate an increased risk of several chronic diseases not transmissible (Shils, 2003) In these cases, it is possible to highlight the risk factors for cardiovascular disease, as left ventricular hypertrophy or systemic arterial hypertension, dislipidemy, type 2 diabetes mellitus or glucose intolerance, hyperinsulinemy, hypercoagulability and hyperfibrinolysis, hyperuricemy with or without goute, that may lead to precocious atherotrombotic disease and coronary disease. Therefore, it's possible to say that the risk of coronary diseases decreases in patients submitted to bariatric surgery, especially due to the significant reduction of the fat deposits.

Another reason for the success of the treatment against obesity is that it should considerate two stages: the first refers to ponderal reduction and the second one to the maintenance of the body weight after the weight loss (Donato Júnior *et al*., 2004). It is in the execution of this stage that the biggest difficulties arise (Ball *et al*.,1999). This way, many people can lose weight, but they don't get to maintain the new weight for a long time. This can be due to the fact of the reduction of the basal metabolism. According to Hill *et al* (1987), big weight reductions are usually accompanied by significant reduction of the metabolic rate in approximately hundreds of kcal. These findings correspond to the answers obtained in the present study. Such discovery can be explained by the significant reduction of the lean mass in the patients, causing an adaptation of the organism. A way to minimize this effect can be through the regular practice of physical exercises that help the maintenance and/or gain of muscular mass and constant changes in the energy intake to accompany the new reality.

Conclusion

The bariatric surgery has been proven efficient in relation to the loss of absolute weight and reduction in the body fat mass in all the moments, but the significant reduction in the lean body mass and basal metabolic rate can be a problem in the maintenance of the weight. The regular practice of physical activity associated to a set of dietary measures can contribute to the reduction of the impact of the surgery in the composition.

Bibliographical references:

1. FUNDAÇÃO INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA - IBGE. Tabulação avançada do censo demográfico 2000. Resultados preliminares da amostra. Rio de Janeiro: Fundação Instituto Brasileiro de Geografia e Estatística; 2002.
2. Mondini L, Monteiro CA. Mudanças no padrão de alimentação. In: Monteiro CA, organizador. Velhos e novos males da saúde do país. São Paulo: Editora Hucitec/Núcleo de Pesquisas Epidemiológicas em Nutrição e Saúde, Universidade de São Paulo; 2000. p. 79-89.
3. Monteiro, C.A. Velhos e Novos Males da Saúde no Brasil. A Evolução do País e de suas Doenças. 1ª Ed. São Paulo. Editora de Humanismo, Ciência e Tecnologia HUCITEC Ltda, 1995.
4. Cole T.J; Bellizzi M.C; Flegal K.M; Dietz W.H. Establishing a standard definition for child overweight and obesity worldwide: international survey. British Medical Journal. v. 320, n. 6, p. 1-6, 2000.
5. Scichieri, R. Epidemiologia da Obesidade. Rio de Janeiro. Editora UERJ, 1998.
6. Julia Fandiño; Alexander K. Benchimol; Walmir F. Coutinho; José C. Appolinário. Cirurgia bariátrica: aspectos clínico-cirúrgicos e psiquiátricos. *Rev. psiquiatr*. Rio Gd. Sul vol.26 no.1 Porto Alegre Jan./Apr. 2004.
7. WORLD HEALTH ORGANIZATION - WHO. Obesity: Preventing and Managing the Global Epidemic. Report of a WHO Consultation on Obesity. WHO: Geneva, 1998.
8. Bray, G.A. Contemporary diagnosis and management of obesity. Handbooks in Health Care Co. Newtown, Pennsylvania, USA, 1998.
9. Freedman, D.S.; Khan, L.K.; Serdula, M.K. et al. Trends and correlates of class 3 obesity in the United States from 1990 through 2000. *JAMA,* 2002; 288:1758-61
10. Coutinho, W.F.; Benchimol, A.K. Obesidade Mórbida e Afecções associadas. IN: Garrido, A.B. Cirurgia da Obesidade. São Paulo: Editora Atheneu, 2002. Cap. 3, p. 13 - 17.
11. Cuppari, L. Nutrição Clínica. São Paulo: Editora Atheneu, 2002. p. 53 - 55.
12. Alvarez-Leite JI. Nutrient deficiencies secondary to bariatric surgery. *Curr Opin Clin Nutr Metab Care*. 2004 Sep;7(5):569-75. Review.
13. National Institutes of Health Consensus Development Conference Statement March 25-27, 1991.
14. Norton K, Olds T. Antropometrica. Rosário - Argentina. Biosystem Servicio Educativo, 2000
15. Loghman, T.G.; Roche, A.F.; Martorell,R. Anthropometric standardization reference manual. Abridged edition, p.90, 1988.
16. Weltman A., Levine S., Seip R., Vu Tran Z. Practical Assesment of body composition in adults males. *Hum Biol*.1987:59(3):523-535.
17. Weltman A., Levine S., Seip R., Vu Tran Z. Accurate assessment of body composition in obese females. *Am J Clin Nutr.* 1988;48:1179-83
18. Harris JA, Benedict FG. A biometric study of basal metabolism in man. Boston: Carnegie Institution of Washington;

1919
19. Shils, M.E.; Olson, J.A.; Shike, M.; Ross, A.C. Tratado de nutrição moderna na saúde e na doença. 9 ed. São Paulo: Manole, 2003. 2105 p.
20. Donato Júnior. J.,Pedrosas R. G., Tirapegui J. Aspectos atuais da regulação de peso corporal: ação da leptina no desequilíbrio energético. *Rev. Bras. Cienc. Farm.*2004:40(3):273-287
21. Ball , G. D.C., Gingras J. R., Fimrite, A., Villetard K., Kayman S., Mccargar L. J.Weight relapsers, maintainers and control: metabolic and behavioral differences. *Can J Appl Physiol.* 1999;24: 548-558.
22. Hill J. O., Sparling P. B., Shields, T. W., Heller P. A. Effects of exercise and food restriction and body composition and metabolic rate in obese women. *Am J Clin Nutr* .1987; 46: 622-630.
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IMPACT OF THE BARIATRIC SURGERY ON THE MORFOLOGIC VARIABLES OF MORBID OBESE

Abstract

The progress of the scientific knowledge on the increase of the morbimortality originating from the morbid obesity emphasizes the need of medical intervention in the treatment of this disease. In this aspect, the surgeries for control of the morbid obesity are justified as a current method that controls in effective way, in the medium and long term, the weight excess. Objective: To verify the impact of the bariatric surgery in the corporal composition of obese morbid in different moments after the surgical intervention. Methods: 30 patients submitted to the bariatric surgery were analyzed. The patients were appraised in the preoperative (T0) and 30 (T30), 90 (T90) and 180 (T180) days after the surgery. With the anthropometric method, the following parameters were obtained: total corporal mass, relative corporal fat (%), lean corporal mass (LCM), fat corporal mass (FCM) and basal metabolic rate (BMR). Results: there was significant difference (p=0,05) for all the variables analyzed in all of the considered times. Conclusions: the bariatric surgery has been efficient in relation to the loss of absolute weight and reduction of the corporal fat mass in all of the moments. However, it is important to note that the significant reduction in the lean corporal mass and basal metabolic rate can represent a problem in the maintenance of the patients weight during the post-surgery period. The regular practice of physical activity together with a set of dietary measures are recommended to help reducing the impact of the surgery in the corporal composition.

Keywords: obesity; corporal composition, bariatric surgery.

IMPACTÉ DE LA CHIRURGIE BARIATRIQUE SUR LES VARIABLES MORFOLOGIQUE DE OBÈSES MORBIDES

Résumé

Le progrès de la connaissance scientifique à propos de la croissance de morbimortalité survenante de l'obésité morbide suggère la necessité d'intervention médicale pour traiter cette maladie. Dans ce contexte, les chirurgies pour contrôler l'obésité morbide se justifient comme une méthode actuelle qui effectivement régule, à moyen et à long terme, l'excès de poids. But: Vérifier l'impact de la chirurgie bariatrique sur la composition corporelle d'obèses morbides à différents moments après l'intervention chirurgicale. Méthodes: 30 patients soumis à la chirurgie bariatrique. Les patients ont été evalués pendant la préparation préopératoire (T0) et 30 (T30), 90 (T90) et 180 (T180) jours après la chirurgie. En utilisant la technique anthropométrique, les paramètres suivants one été obtenus: masse corporelle totale, quantité relative de graisse coporelle (%G), masse corporelle maigre (MCM), masse corporelle grasse (MCG) e taux métabolique basal (TMB). Résultats: Une difference importante (p=0,05) a été trouvée dans toutes les variables evaluées et en toutes les temps considerés. Conclusions: La chirurgie bariatrique se démontre efficace en ce qui concerne la perte de masse corporelle et la réduction de masse graisse corporelle en touts moments. On avertit, pourtant, que la réduction significative de la masse corporelle maigre et du taux métabolique basal peuvent représenter des difficultés en mantenir le poids des patients pendant le postopératoire. L'activité physique régulière est recommandée, avec un régime alimentaire qui puisse contribuer à réduire l'impact de la chirurgie sur la composition corporelle.

Mots-clé: Obésité; composition corporelle, chirurgie bariatrique.

IMPACTO DE LA OPERACIÓN BARIÁTRICA SOBRE LAS VARIABLES MORFOLÓGICAS DE OBESOS MORBOSOS

Resumen

El progreso de los conocimientos científicos sobre el aumento dela morbimortalid occurrida por la obesidad morbosa enfatiza la necesidad de la intervención médica en el tratamiento de esta enfermedad. En este aspecto, las operaciones para el control de la obesidad morbosa son justificadas como un método corriente que controla, en la manera eficaz, a mediano y largo plazo, el exceso de peso. Objetivo: Verificar el impacto de la operación bariátrica en la composición corporal de obeso morboso en los momentos diferentes después de la intervención quirúrgica. Métodos: 30 pacientes que hicieron la operación bariátrica fueron analizados. Los pacientes fueron valorados en el preoperatorio (T0) y 30 (T30), 90 (T90) y 180 (T180) días después de la cirugía. Con el método antropométrico, los seguientes parámetros fueron obtenidos: masa corporal total, grasa corporal relativa (%), masa magra corporal (MMC), masa grasa corporal (MGC) y tasa metabólica basal (TMB). Resultados: Había diferencias importantes (p=0,05) para todas las variables analizadas en todas las épocas consideradas. Conclusiones: la operación bariátrica há sido eficiente em relación com la pérdida del peso total y la reducción de la masa grasa corporal em todos los momentos. Sin embargo, es importante notar que la reducción en la masa magra corporal y la tasa metabólica basal puede representar un problema en el mantenimiento del peso de los pacientes durante el período después de la cirugía. La práctica regular de la actividad física junto com las medidas alimenticias es recomendada para ayudar en la reducción del impacto de la cirugía en la composición corporal.

Palabras llave: obesidad, composición corporal, operación bariátrica

IMPACTO DA CIRURGIA BARIÁTRICA EM VARIÁVEIS MORFOLÓGICAS DE OBESOS MÓRBIDOS.

Resumo

O avanço do conhecimento científico sobre o aumento da morbimortalidade oriundos da obesidade mórbida, enfatiza a necessidade de intervenção médica no tratamento desta doença. Neste aspecto, as cirurgias para controle da obesidade mórbida se justificam como um método atual que controla de forma efetiva, a médio e longo prazo, o excesso de peso. Objetivo: Verificar o impacto da cirurgia bariátrica, na composição corporal de obesos mórbidos em diferentes momentos após a intervenção cirúrgica. Métodos: Foram analisados 30 pacientes submetidos à cirurgia bariátrica. Os pacientes foram avaliados no pré-operatório (T0) e 30 (T30), 90 (T90) e180 (T180) dias após a cirurgia. Com o método antropométrico, os seguintes parâmetros foram obtidos: massa corporal total, gordura corporal relativa (%G), massa corporal magra (MCM), massa corporal gorda (MCG) e taxa metabólica basal (TMB). Resultados: Houve diferença significativa (p=0,05) para todas as variáveis analisadas em todos os tempos considerados. Conclusões: A cirurgia bariátrica se mostra eficiente em relação à perda de peso absoluto e redução na massa gorda corporal em todos os momentos. Ressalta-se, contudo, que a redução significativa na massa corporal magra e taxa metabólica basal pode representar um problema na manutenção do peso dos pacientes no pós operatório. Recomenda-se a prática regular de atividade física associada a um conjunto de medidas dietéticas que poderão contribuir para a redução do impacto da cirurgia na composição corporal.

Palavras chave: Obesidade; composição corporal, cirurgia bariátrica.