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Original Article

Do patients lose weight after total hip arthroplasty? ☆,☆☆



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ABSTRACT

Objective: To investigate the effect of total hip arthroplasty (THA) on body mass index (BMI), from before to after the operation.

Methods: 100 patients who underwent THA were retrospectively analyzed. They were stratified according to BMI, as proposed by the World Health Organization (WHO).

Results: There were 48 male patients and 52 female patients. Their mean age was 63.8 ± 13.5 years. The mean follow-up was 24.6 ± 0.6 months. The men had a mean preoperative BMI of $28.4 \pm 3.6 \text{ kg/m}^2$ and the women, $27.5 \pm 5.0 \text{ kg/m}^2$. The mean postoperative BMI was $28.9 \pm 0.7 \text{ kg/m}^2$ for the men and $27.8 \pm 0.7 \text{ kg/m}^2$ for the women. There was a general mean increase in BMI of 0.4 kg/m^2 . The BMI increased both in patients with normal weight and in those who were overweight, but it decreased slightly in patients who were obese. BMI remained unchanged in the majority of the patients (73%).

Conclusion: The improvement in mobility achieved through THA did not promote any reduction in anthropometric measurements in the majority of the patients.

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Os pacientes emagrecem após artroplastia total do quadril?

RESUMO

Objetivo: Investigar o efeito da artroplastia total do quadril (ATQ) no índice de massa corporal em relação ao pré e ao pós-operatório.

Palavras-chave:

Perda de peso

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Índice de massa corporal
Artroplastia de quadril
Quadril/cirurgia

Métodos: Foram analisados retrospectivamente 100 pacientes submetidos à ATQ. Os pacientes foram estratificados pelo índice de massa corporal (IMC), conforme proposto pela Organização Mundial de Saúde (OMS).

Resultados: Foram observados 48 pacientes do sexo masculino e 52 do feminino. A média de idade foi de $63,8 \pm 13,5$ anos. O seguimento médio foi de $24,6 \pm 0,6$ meses. Os homens apresentaram IMC pré-operatório médio de $28,4 \pm 3,6 \text{ kg/m}^2$ e as mulheres, de $27,5 \pm 5,0 \text{ kg/m}^2$. O IMC médio pós-operatório foi $28,9 \pm 0,7 \text{ kg/m}^2$ para os homens e $27,8 \pm 0,7 \text{ kg/m}^2$ para as mulheres. Ocorreu uma média de aumento geral do IMC em $0,4 \text{ kg/m}^2$. O IMC aumentou em pacientes com peso normal e com sobrepeso, mas diminuiu levemente em pacientes com obesidade. A maioria dos pacientes (73%) permaneceu com o IMC inalterado.

Conclusão: A melhoria da mobilidade obtida com a ATQ não promoveu uma redução das medidas antropométricas na maioria dos pacientes.

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Introduction

The percentage of the obese population with osteoarthritis is growing within the worldwide population. The demand for total hip arthroplasty (THA) surgery has been continually increasing. There is evidence that the relative risk that an individual will need to undergo hip arthroplasty ranges from 1.92 among overweight individuals to 8.56 among those who are severely obese.¹ Quality of life seems to worsen in obese patients over the years following the procedure.²⁻⁴ Therefore, losing weight before THA surgery is important and greatly encouraged,⁵ given that a high body mass index (BMI) has been shown to be a risk factor for worsening of hip osteoarthritis.⁶ In addition, other objectives of weight reduction include diminishing the surgical risk and increasing the longevity of the implant.

Patients generally refer to coxarthrosis pain as the explanation for not losing weight during the period preceding the surgical procedure. Within this context, there is the idea that weight loss will take place naturally after surgery, since the patient will have less pain and functional limitation and will therefore be able to do physical exercise more easily. In this way, restoration of the patient's physical capacity is one of the aims of hip arthroplasty.⁷

The objective of the present study was to investigate the effect of hip arthroplasty surgery on body mass index, thus asking whether patients are able to lose weight after hip arthroplasty.

Patients and methods

The medical files of 100 patients who underwent THA between November 2008 and November 2011 were retrospectively analyzed. The inclusion criteria were that the patients needed to have had a diagnosis of hip osteoarthritis, $\text{BMI} \geq 20$ and minimum postoperative follow-up of 18 months. Those with incomplete records relating to demographic data or either of the two weight measurement times (before the operation and at a later postoperative stage) were excluded.

Weight and height were measured on conventional digital scales made by Urano, with a capacity of 180 kg and divisions of 100 g, which also had a measuring tape available. The

BMI was calculated using the formula w/h^2 , in which w is the patient's weight (kg) and h is his height (m). The patients were stratified at each time according to their BMI, as proposed by the World Health Organization (WHO),⁸ in the following manner: normal weight ($\text{BMI} < 25$), overweight (BMI between 25 and 30) and obesity ($\text{BMI} > 30$).

Descriptive statistics and frequency distributions were observed. The groups were correlated by means of the t or chi-square tests, according to the variable under analysis. $p < 0.05$ was considered to be statistically significant. 95% confidence intervals (CI) were used. The data analysis was done using the SPSS for Windows software, v.14.

Results

There were 48 male patients (48%) and 52 female patients (52%). Just before the operation, the mean age of the sampled population was 63.8 years (standard deviation: ± 13.5): 62.4 ± 14.3 years for the men and 65.1 ± 12.6 years for the women. The mean length of follow-up was 24.6 ± 0.6 months. The mean weight among the male patients was $84.5 \pm 11.5 \text{ kg}$ and among the female patients, $72.6 \pm 13.9 \text{ kg}$. The mean height among the men was $1.72 \pm 0.07 \text{ m}$ and among the women, $1.62 \pm 0.06 \text{ m}$.

The mean preoperative BMI was $28.0 \pm 0.6 \text{ kg/m}^2$. At the time of data gathering, 29 patients presented normal weight ($\text{BMI} < 25$), 42 were overweight (BMI 25–30) and 29 were obese ($\text{BMI} > 30$), as can be seen in greater detail in Table 1. The men's mean preoperative BMI was $28.4 \pm 3.6 \text{ kg/m}^2$ and the women's was $27.5 \pm 5.0 \text{ kg/m}^2$.

The postoperative analysis showed that there was a tendency toward weight decrease in 36 patients (36%); 15 did not present any weight change (15%), but 49 gained weight (49%). The mean postoperative BMI was 28.3 kg/m^2 : $28.9 \pm 0.7 \text{ kg/m}^2$ for the men and $27.8 \pm 0.7 \text{ kg/m}^2$ for the women. Overall, there was a mean increase in BMI of 0.4.

Table 1 also shows that the BMI tended to increase among patients with normal weight and among overweight patients, but presented a tendency to diminish among obese patients. However, the changes in weight that were observed did not present any statistically significant differences ($p > 0.05$).

Table 1 – BMI distribution among the patients evaluated.

BMI	N	Mean preoperative BMI	Mean postoperative BMI	Mean increase in BMI	p value
All the patients	100	27.95 ± 4.39	28.32 ± 4.88	-0.37	0.568
20–24.9 (normal)	28	23.36 ± 1.43	22.91 ± 1.40	0.45	0.245
25–29.9 (overweight)	42	27.28 ± 1.46	26.93 ± 1.38	0.35	0.275
> 30 (obese)	29	33.37 ± 3.27	33.36 ± 3.48	0.01	0.986
Men	48	28.44 ± 3.62	28.93 ± 4.59	-0.49	0.568
Women	52	27.49 ± 4.98	27.77 ± 5.11	-0.28	0.782

Table 2 presents the preoperative distribution of the patients according to BMI group and their migration after the operation, in a more specific manner per group. Increases in BMI were observed in nine patients in the group with normal BMI; 11 patients went from overweight to obese and three patients in the obese group showed reductions: one to normal BMI and two to overweight. However, 73 patients (73%) in the sample remained with unchanged BMI.

Table 3 shows the general number of patients according to pre and postoperative BMI. As also shown in Table 2, it was observed that there was a tendency for patients with lower BMI to migrate to higher BMI. Patients in the group with normal BMI migrated to the overweight group, while patients in this group migrated to the obese group after the operation. Overall, the patients' mean weight increased.

Discussion

BMI is frequently used as a tool for assessing patients' nutritional status and also as a means of evaluating obesity in epidemiological studies.⁹ WHO⁸ has suggested that the ideal BMI measurement should be between 20 and 25 kg/m².

Table 2 – Specific changes in BMI according to group, from before to after the operation.

Preoperative BMI	Postoperative BMI
Normal (20–24.9): 29 patients initially	Normal (unaltered): 21 patients ^a Overweight: 7 patients Obese: 1 patient
Overweight (25–29.9): 42 patients initially	Overweight (unaltered): 26 patients ^a Normal: 5 patients Obese: 11 patients
Obese (>30): 29 patients initially	Obese (unaltered): 26 patients ^a Normal: 1 patient Overweight: 2 patients

^a 73 patients continued to present the same weight, unaltered, within their BMI category.

Table 3 – Patient distribution according to BMI from before to after the operation.

BMI	20–24.9 (normal)	25–29.9 (overweight)	>30 (obese)
Before operation	29	42	29
After operation	27	35	38

In relation to higher BMI among patients who are candidates for hip arthroplasty, some studies have correlated hip osteoarthritis with obesity.^{10,11} It has been observed that the great majority of the patients who are candidates for THA are outside of this ideal weight range.

Some authors have shown that postoperative weight changes occur among patients undergoing various types of arthroplasty, including of the knee and hip.^{12–15} Aderinto et al.¹⁶ suggested that weight gains subsequent to THA were common, despite the functional improvement from the procedure, but that the weight gain would be greater among obese individuals. Middleton and Boardman¹⁵ reported that, independent of the preoperative BMI, weight reduction would not occur after arthroplasty. In the present study, we observed that the majority of the patients did not present postoperative changes in BMI. In a general manner, increases in BMI occurred among patients with normal BMI and overweight, but BMI decreased in patients who presented established obesity. It should be emphasized that the values obtained were trends and that they were not statistically significant ($p > 0.05$). It could also be seen that the tendency toward increased BMI occurred both in men and in women.

Dowsey and Liew¹³ analyzed weight changes among 529 patients who underwent THA, after 12 months of follow-up, and observed that weight reductions only occurred in 12.6% of the individuals. Abu-Rajab and Findlay¹⁴ reported that 30% of the patients presented weight decreases over a 12-month period. Jain et al.¹⁷ retrospectively reviewed 78 patients and observed their weight and height after THA. They found that the patients' BMI increased after the operation. In a general manner, the present study corroborates some of the findings of these authors.

Nonetheless, there is still some controversy in the current literature. Some studies have shown results that favor weight loss after THA.¹⁸ For example, Paans et al.¹⁸ evaluated postoperative weight and BMI after 1.0 and 4.5 years of follow-up and observed that there were significant reductions in these measurements. On the other hand, it has to be noted that these studies were conducted in several countries, with different ethnic groups with a variety of dietary and physical activity habits. In the present study, within Brazilian realities, only 8% of the patients reduced their weight, while 19% gained weight after the hip arthroplasty operation. Based on these results, it can be recommended that patients should decrease their weight before the operation and also diminish the risks relating to the transoperative and postoperative periods. Independent of weight and BMI prior to the procedure, the improvement in mobility achieved through THA in the present study generally did not promote reductions in anthropometric measurements in the majority of the patients, given

that most of them continued to present the same BMI as before the operation (73%).

We recognize that there are some limitations to the present study. Among these is the lack of observation of dietary habits, physical activity levels, ethnic profile, cultural origin, socioeconomic profile, schooling level, etc. However, this study indicates the importance of diminishing BMI before the operation, because there is a general tendency toward weight increases. The patients who underwent THA did not become responsive to the appeals to lose weight before the surgical procedure, which had been emphasized and extensively discussed with our team before the operation, and some patients even increased in weight.

Conclusion

THA surgery did not contribute toward diminishing the BMI of the patients operated.

Conflicts of interest

The authors declare no conflicts of interest.

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