

Research Article

Clinical and epidemiological profile of patients undergoing total hip arthroplasty

Liz Araujo Wolfvitch^{1*}, Fernanda Rezende Campos Falcao¹, Bruno Anderson Gomes Dias¹, David Sadigursky², Gustavo Castro De Queiroz¹ and Magda Leao Pinheiro¹

¹Faculdade de Tecnologia e Ciência, Brasil

²Faculdade de Tecnologia e Ciência e Clínica de Ortopedia e Traumatologia, Brasil

Abstract

Objective: Describe the clinical and epidemiological profile of patients undergoing total hip arthroplasty by analyzing the correlations between gender and indication of surgery and postoperative complications.

Methods: Cross-sectional study in retrospective approach of the medical records of patients undergoing total hip arthroplasty in a private Hospital in Salvador, Bahia in 2013 and 2014.

Results: 66, 3% of patients are women, aged between 71 and 80 years (31, 2%), systemic arterial hypertension patients (63, 9%), whose major indication occurred coxarthrosis (48, 2%) followed by hip fracture (39, 8%); mostly by falling from height (66, 7%). Among the complications, anemia prevailed (53%) and death occurred in only 2, 4%. By correlating sex with indication of arthroplasty, hip fracture was only statistically significant in women ($p=0.004$); in complications, anemia ($p=0.024$) and urinary tract infection ($p=0.025$) had statistically significance in women and in men genitourinary changes ($p<0.001$).

Conclusions: Patients undergoing hip arthroplasty are elderly, female, hypertensive, most of whose procedures ran from coxarthrosis or hip fracture. Among the complications prevailed anemia, genitourinary, cardiovascular and digestive changes. Hip fracture, anemia and urinary tract infection are significantly more prevalent in females, while the genitourinary changes are significant in males.

Levels of evidence: III.

Introduction

Total hip prosthesis surgery, or arthroplasty, is a hip joint replacement procedure aimed at restoring a function of the hip joint, relieving pain and improving functional capacity, thereby improving the quality of life of patients suffering from pathologies that involve them [1].

In the past, patients aged 60 yo. up to 75 yo. were considered the best candidates for a hip arthroplasty. But nowadays, this trend has been modified and older patients were included. Most of those patients now have a greater number of comorbidities, as well as younger patients, in whom the implants can be exposed to great stress during life-time. Many of the candidates, for total hip arthroplasty, are women, elderly, whom presents cardiopathy, nephropathies, diabetics, obstructive vascular disease, senile dementia, Parkinson's disease, pneumopathies (COPD), etc.

Its main indication is the presence of severe pain accompanied by functional limitation [2]. HTA (hip total arthroplasty) is the surgical procedure widely used for the treatment of conditions of the hip joint, that could be included degenerative, inflammatory or traumatic issues, but mostly for the treatment of hip osteoarthritis. The World Health Organization estimates that 10% of the world's population, over 60 years of age, with osteoarthritis, 80% of the population has movement restriction and 25% have functional limitations in day-to-day activities. This surgery may also be indicated in other situations, such as femoral fracture, common in the elderly, as well as in the treatment of rheumatoid arthritis and avascular necrosis [3].

It is worth mentioning that the prevalence of HTA complications has decreased over the years, with consequent increase in its longevity, due to advances in the design of implants, materials, surgical technique and anesthetic. This surgical procedure is subject to specific complications, as well as complications inherent of any surgery. Nerve injury, bleeding, and thromboembolism may occur soon after surgery. Loosening, failure of the components and osteolysis are complications that can occur years later after the initial procedure. Infections, dislocations and femoral fractures may occur at any time after the surgery [4].

It is known that total hip arthroplasty is a complex surgical procedure involving a multidisciplinary team. Knowing more about the common aspects of HTA will help orthopedists and the surgical team better understand the epidemiology of their patients, facilitating the adequacy of their ducts to prevent the occurrence or severity of complications.

The aim of this article is to describe the clinical and epidemiological profile of patients submitted to total hip arthroplasty, also analyzing

Correspondence to: Liz Araujo Wolfvitch, Faculdade de Tecnologia e Ciência, Doutor Rubem Chaves street, number 10, Jardim Apipema, Salvador-BA, Brasil, Zip code: 40155-330. Tel: +55(71) 982589899; E-mail: lica_wolf@hotmail.com

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the correlation between the sexes and an indication of the surgery, as well its complications.

Methods

The study is a cross-sectional study of patients submitted to total hip arthroplasty at a private hospital in Salvador, Bahia, from January 2013 to December 2014. The sample size was calculated with a 95% confidence level and error of 5%, resulting in 84 patients. Thus, through ICD-10, a list of all patients submitted to total hip arthroplasty was generated in that period. Patient block randomization was performed, and the 84 patients were divided for each surgical group; 42 patients for each group, totaling 84 patients involved.

Inclusion criteria included patients submitted to total hip prosthesis, aged over 18 years, from January 2013 to December 2014; The exclusion criteria were: patients submitted to total hip arthroplasty who had incomplete medical records.

The data collection was performed retrospectively, through an electronic data of patients submitted to total hip arthroplasty, from January 2013 to December 2014. The data were tabulated in the Microsoft Excel program; And the data analysis was obtained by the SPSS program.

The variables of interest collected were: sex; age; Pre-existing comorbidities; death; Indication of total hip arthropathy; Use of cement; Operated side and postoperative complications. Postoperative complications were grouped into large groups to facilitate understanding. Variables were analyzed using descriptive statistics. The absolute and relative frequencies were used for nominal variables; And the numerical variables, discrete or continuous, were analyzed according to the central tendency (median and fashion) and the dispersion (standard deviation and quartiles). To evaluate the correlation between two variables, the Fisher or Chi-Square test was used; Being considered statistically significant when $p < 0.05$.

There are no conflicts of interest in this study.

Results

Among the 84 patients in the sample, only 83 were eligible for analysis. One patient was transferred after the surgery, the medical record was incomplete for analysis and, therefore, it was excluded.

Of the 83 charts analyzed, 55 patients were female (66.3%) and 28 were male (33.7%), age ranged from 33 to 95 years, with a mean of 66.77 years and median of 69 years (standard deviation of 15.73). Patients were predominantly aged between 71 and 80 years (31.3%), being the lowest percentage presented by patients between 91 and 100 years (Table 1).

Table 2 shows the main comorbidities and pre-existing problems of patients submitted to total hip arthroplasty. Systemic arterial hypertension, dyslipidemia and diabetes were the most prevalent diseases, while smoking and alcoholism prevailed among living habits. In the surgical procedure 3 variables were analyzed: the side in which procedure was performed, cement use and indication of surgery. It was observed that total hip arthroplasty was performed on the right side in 50 patients (60.2%), and in 33 patients on the left side (39.8%), with cement being present in 31 patients (37.3% %). Coxarthrosis was the indication of the most prevalent total hip arthroplasty, followed by hip fracture (Table 3). It is noteworthy that, among the patients that presented fracture, as a cause of the indication of total hip arthroplasty, the majority was due to a fall from the self-height (66.7%).

Table 1. Sociodemographic characteristics of patients undergoing total hip arthroplasty

Variables	n=x	%
Gender		
Female	55	66,3
Male	28	33,7
Age		
31-40 years	6	7,2
41-50 years	8	9,6
51-60 years	14	16,9
61-70 years	15	18,1
71-80 years	26	31,3
81-90 years	12	14,5
91-100 years	2	2,4

Table 2. Pre-existing problems of patients undergoing total hip arthroplasty

Variables	n=x	%
Comorbidities		
Systemic Arterial Hypertension	53	63,9
Diabetes	24	28,9
Dyslipidemia	17	20,5
Obesity	6	7,2
Rheumatoid Arthritis	5	6
Hypothyroidism	6	7,2
Cardiopathy	14	16,9
Life Habits		
Alcoholism	8	9,6
Smoking	6	7,2
Use of illicit drugs	1	1,2

Table 3. Indications of total hip arthroplasty

Variables	n=x	%
Primary Arthroplasty		
Coxarthrosis	40	48,2
Hip Fracture	33	39,8
Aseptic Necrosis	6	7,2
Review of previous prosthesis		
Previous prosthesis release	6	7,2
Previous prosthesis infection	2	2,4
Previous prosthesis dislocation	4	4,8
Hip Fracture		
Fall from own height	22	66,7

Table 4 shows the frequency of postoperative complications in patients. The most common complications after total hip arthroplasty were grouped into several physiological systems to facilitate understanding. Thus, anemia, alterations of the genitourinary system, cardiovascular alterations, digestive tract and urinary tract infection were the most prevalent.

When analyzing the correlation between sex and the indication of arthroplasty (table 5), we found that only hip fracture was statistically significant in women ($p = 0.04$). On the correlation between sex and postoperative complications, we found that anemia and urinary

Table 4. Postoperative complications of patients undergoing total hip arthroplasty

Variables	n=x	%
Urinary tract infection	9	10,8
Anemia	44	53
Cardiovascular disorders	29	34,9
Respiratory system disorders	5	6
Digestive system disorders	23	27,7
Genito-urinary disorders	36	43,4
Nervous system disorders	7	8,4
Hematopoietic disorders	3	3,6
Infection	7	8,4
Hydroelectrolytic disorders	9	10,8
Insomnia	2	2,4
Skin alterations	6	7,2
Extremities edema	1	1,2
Pain	2	2,4
Mechanical alterations	6	7,2
Death	2	2,4

Table 5. Association between sex and indication of total hip arthroplasty

Variables	Gender				p-value
	Female		Male		
	n	%	n	%	
Coxarthrosis	23	57,5	17	42,5	0,103
Hip Fracture	28	84,8	5	15,2	0,004
Aseptic Necrosis	3	50	3	50	0,400
Prosthesis release	4	66,7	2	33,3	1,000
Previous prosthesis infection	1	50	1	50	1,000
Previous prosthesis dislocation	3	75	1	25	1,000

tract infection were significant in women, whereas alterations in the genitourinary tract were statistically significant in men, as shown in table 6.

Discussion

Goveia *et al.*, [5] in Minas Gerais, Brazil, demonstrated similar epidemiological data: 60% of the patients submitted to hip arthroplasty were women, 63% were patients between the ages of 70 and 90 years (mean age 73 years) presenting diagnosis of fracture of the femoral neck secondary to the fall from self-height. On the other hand, Yoo *et al.* [6] also reported male prevalence (55.8%), but younger: 46% were aged between 45-64 years and 24.1% between 65-74 years.

Among comorbidities, cardiovascular diseases were the most prevalent; Other studies confirm that cardiovascular disorders are the most prevalent, being present in 47% of patients; And that patients with heart failure are about 6 times more likely to develop a hip fracture [7]. This finding may be explained by the fact that there is an association between the risk factors of the third proximal fracture of the femur and cardiovascular disorders, with the advancing age; As well as by the diminution of the tolerance to the exercise; diabetes; arterial hypertension; Use of diuretics and reduction of vitamin D levels, in which these factors are directly related to the reduction of bone metabolism.

Among the pre-existing comorbidities, Lima and Barone [8] showed that 39.1% of patients had no relevant disease, 15.2% had rheumatoid arthritis, 10.8% had systemic arterial hypertension, 4.3%

had diabetes mellitus, and 13% had a history of previous local surgery. On the other side, Piano *et al.* [9] point out that among the patients submitted to HTA, 9.2% had diabetes, 45.9% were hypertensive, 9.2% were cardiopathic, 1% had osteoporosis and 12.3% were smokers. Memtsoudis *et al.* [10], disaccording, demonstrated in their systematic review congestive that heart failure, liver diseases, diabetes, cancer, neurological diseases and cardiac valvulopathies are the most prevalent comorbidities in patients undergoing arthroplasty.

Regarding the indication of arthroplasties, Lima and Barone [8] likewise showed that the indications for arthroplasty were, in 50% of the cases, for hip osteoarthritis, 13% of rheumatoid arthritis, 15.2% aseptic necrosis of the femoral head, 10.8% of spondylitis ankylosing disease, 4.3% sequela of femur fracture, 2.1% sequela of hip pioarthritis, epifisiolites and bilateral ortopelvis. Another study, conducted in São Paulo, SP, Brazil, demonstrate that osteoarthritis prevailed in 92.4% of patients, followed by osteonecrosis and hip fracture, and osteoarthritis in 2%, and osteosynthesis failure1. Yoon *et al.*, [6] in Korea, show that 59% of primary hip arthroplasties occurred due to osteonecrosis and 28% due to osteoarthritis.

In addition, in the current study, about 66.7% of cases of hip fracture resulted from falls from the self-height. Studies carried out in 2007 [11] have shown that about 80% and 94% of patients with fracture had the main trauma mechanism to fall. Goveia and coworkers [5] affirm in the same way that the main cause of hip fracture was femoral neck fracture, caused by a fall in height, in 92% of the situations. Decreased functional capacity, decreased ability to perform activities independently, as well as the influence of environmental conditions predispose to the occurrence of this aggravation, which increases the risk with advancing age [11].

Abbas *et al.* [12] found that only 16.9% of the patients had complications, 2.5% presented surgical site infection, 2.5% were urinary infection (UTI), 1% dislocation, 2% pulmonary alterations, 0.5% thrombosis and 0.5% acute myocardial infarction (AMI). On the other hand, Dorman *et al.*, [13] in a study with patients over 75 years, reported that almost 75% of the patients presented complications, involving pneumonia, UTI, pulmonary embolism, AMI, confusion and constipation. Memtsoudis *et al.* [10], in their systematic review,

Table 6. Association between sex and the postoperative complications of patients submitted to total hip arthroplasty

Variables	Gender				p-value
	Female		Male		
	n	%	n	%	
Urinary tract infection	9	100	0	0	0,025
Anemia	34	77,3	10	22,7	0,024
Cardiovascular disorders	19	65,5	10	34,5	0,916
Respiratory system disorders	4	80	1	20	0,658
Digestive system disorders	16	69,6	7	30,4	0,694
Genito-urinary disorders	16	44,4	20	55,6	<0,001
Nervous system disorders	5	71,4	2	28,6	1,000
Infection	3	42,9	4	57,1	0,219
Hematopoietic disorders	1	33,3	2	66,7	0,262
Hydroelectrolytic disorders	8	88,9	1	11,1	0,261
Insomnia	1	50	1	50	1,000
Skin alterations	3	50	3	50	0,400
Extremities alterations	1	100	0	0	1,000
Pain	2	100	0	0	0,547
Mechanical alterations	5	83,3	1	16,7	0,658

reported cardiac, pulmonary, AMI and pneumonia complications, as more prevalent post-arthroplasty complications.

When analyzing the incidence of infection in the patients of this study, we noticed that 10.8% presented urinary infection and 8.4% had other types of infection. A retrospective cohort study demonstrated that the prevalence rate of infection in total hip arthroplasty was 2.8% of the cases, and that among all patients, who had infection, the majority were women, but without statistical significance, in the proportion between sex. Lima and Barone [8], in a study on total hip arthroplasty, found out a total frequency of 15.1% of hospital infections, 6.5% of superficial wound infection, 6.5% of deep infection and 2.1% of urinary tract infection. Pruzansky *et al.* [14] evaluated risk factors for infection, showing that the most common risks are obesity, anemia, malnutrition and diabetes, in addition to associating diabetes or obesity with all cases of orthopedic infection, with 89% of urinary infections and with 72% of cases of anemia after arthroplasty.

Analyzing the clinical outcome of the patients in this study, only 2.4% of the patients died. According to Goveia *et al* [5], hospital mortality accounted for about 7.2% of the patients. Hebert and Xavier [15] reported a mortality rate of 8% in the first 35 postoperative days and 20-30% in the first post-fracture year. The mortality rate is twice as high in men and 4 to 5 times higher in patients over 85 years old, when compared to those between 60 and 64 years old [15]. Memtsoudis and colleagues [10], in their systematic review, stated that most post-arthroplasty deaths occur within the first 4-6 days, with less than 5% occurring on the day of the procedure, and that advanced age, male gender, number of comorbidities, and the presence of complications are an independent risk factors for in-hospital mortality.

The fact that hip fractures occur, more commonly, in women, is already well known in the literature. According to Goveia *et al.*, [5] the great majority of patients submitted to hip arthroplasty had a femoral neck fracture, and in addition to being elderly, 60% were women. This fact can be explained by the higher prevalence of osteoporosis, common in menopausal women. Women are not only more likely to have osteoporosis, but they also present the disease more severely; However, women who take estrogen hormone therapy are 15% less likely to knee and hip arthroplasty than those who do not.

The literature presents conflicting data regarding the prevalence of anemia in the postoperative period of total hip arthroplasty, mainly due to the definitions of anemia and the conducts established in different services. It is known that bleeding, during total hip arthroplasty, can reach up to 1500 ml [16], and may be greater in the revision of arthroplasty; Which indicates that, following this type of procedure, is common to hemoglobin get lower levels. The prevalence of anemia after total hip arthroplasty ranges from 87% + - 10%. According to Spahn [17], pre-and postoperative anemia is associated with an increase in hospitalization time, incidence of urinary and respiratory infection, and increased mortality. Mahadevan *et al.*, [18] in turn, found that, among the patients undergoing revision of total hip arthroplasty, blood loss was significantly higher among men, older patients and which surgery was used cement; However, with no significant difference between the percentage of transfused and the number of transfusions, among sex. On the other hand, the need for transfusion is greater in patients who had less pre-operative hemoglobin concentration [18].

Urinary tract infections were also significantly more prevalent in females. Adult women are 50 times more likely to get UTIs than men, and 30% of women have symptomatic UTIs throughout their lives. Since the main route of urinary tract contamination occurs ascending,

this is attributed to the lower anatomical extension of the female urethra and the greater proximity between the vagina and the anus, characteristic of the female genitalia. On the other hand, the incidence of UTI increases among men over 50 years and is associated with urinary instrumentation, including bladder catheterization, and the occurrence of prostatic disease. Pinto *et al.* [10] showed a prevalence of infection in total hip arthroplasties of 2.8%, most of them women.

The alterations of the genitourinary apparatus involved, in the majority, bladder retention, which was decisive in the male sex. According to Bjerregaard *et al.*, [19] the incidence of post-arthroplasty urinary retention was 40%, and their risk was increased when using spinal anesthesia, without relevant influence with age, gender and type of arthroplasty. The application of spinal anesthesia is a risk factor for urinary retention, increasing the postoperative catheterization by about 50% when compared to general anesthesia [19]. On the other hand, Griesdale *et al.*, [20] in their cohort study on urinary retention after hip and knee arthroplasty, demonstrated the incidence of 43.3% of urinary retention in the first 24 hours postoperatively, assuming that being men that underwent hip arthroplasty and used morphine as associated risk factors; The risk of urinary retention among men was 60.4%, compared with 28.5% among women; And, compared to general anesthesia, men who perform spinal anesthesia with morphine have a 7.1 up to 12.2 times greater chance of urinary retention [20].

The relevance of the study is correlated with the greater knowledge about the clinical and epidemiological profile of patients submitted to total hip arthroplasty; It can rehearse the attention to the previous comorbidities and the associated risks and, consequently, seek adequacy to their behaviors to prevent the occurrence or severity of the complications. The major disadvantage of this study is its retrospective approach, which through an electronic medical record device may have made it possible to lose important patient data, the surgical and postoperative procedures. In addition, this was a study conducted in a private hospital, which greatly favors pathways of conduct and surgical attire, which makes it essential to others with other hospitals and medical routines from other countries.

Conclusion

Patients submitted to hip arthroplasty, in the present study, were elderly, female, with arterial hypertension, in whom, most of the procedures resulted from osteoarthritis or hip fracture. The most prevalent complications were anemia, alterations of the genitourinary system, cardiovascular alterations and alterations of the digestive apparatus. Regarding the indication of total hip arthroplasty, the prevalence of women in the occurrence of hip fracture was shown to be more significant; While complications such as anemia and urinary tract infection occurred more prevalently in women, as opposed to genitourinary changes that occurred more commonly in men.

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