Arthroplasty Practice in a Resource-Limited Setting: Indications, Nutritional Profile of Patients and Evolution in a Consecutive 2-Year Series

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Abstract

Background and objective: Total hip and knee arthroplasty is a common elective surgery that significantly improves patients' quality of life. The objective was to describe the clinical and evolutionary aspects of patients treated by arthroplasty in two hospitals in Kinshasa, DRC. *Methods*: Cross-sectional descriptive study (2018 to 2022). A total of 75 patients who underwent hip or knee arthroplasty were selected. Sociodemographic, clinical, therapeutic and evolutionary data were analyzed. *Results*: The mean age was 57.8 ± 13.7 years with a female predominance (sex-ratio F/M = 1.3). 42 patients were obese. Patients with coxarthrosis and gonarthrosis were more obese (p < 0.05). While aseptic necrosis of the femoral head was found more in the group of non-obese patients (p = 0.041). Anesthetic incidents (6) were noted in the obese including 3 cases of failure, 1 case of respiratory distress and 1 case of hypotension. Out of a total of 75 patients, we noted 32 cases of complications (42.7%) including one intraoperative complication (trochanteric fracture), two postoperative dislocations and two late postoperative deaths. *Conclusion*: The indications for arthroplasty in this study are dominated by non-traumatic pathologies of the knee and of the hip (osteoarthritis and aseptic necrosis). Most patients are overweight, including obesity. The evolution is favorable in the vast majority of cases.

Subject Areas

Orthopedics Surgery

1. Introduction

Osteoarthritis is a disabling degenerative joint condition characterized by pain, reduced mobility and a negative impact on quality of life. The pathogenesis of osteoarthritis is linked to both excessive joint loading and altered biomechanical patterns, as well as hormonal and cytokine dysregulation. Several risk factors have been identified for osteoarthritis, including age, obesity, gender, previous joint trauma, and occupational and athletic activity [1] [2].

Total hip and knee arthroplasty is a common elective surgery that significantly improves patients' quality of life [3]. However, it is a technique that is little used in the DRC for several reasons: expensive method despite self-financing of care by patients, lack of personnel trained in the technique, lack of means and adequate technical platform, etc. [4]. The objective was to describe the nutritional profile, the indications and the evolution of patients who underwent hip and knee arthroplasty in 2 hospitals in Kinshasa (DRC).

2. Materials and Methods

2.1. Nature and Period of the Study

This is a retrospective series of cases followed in two hospitals in Kinshasa/DRC: the "Centre Hospitalier Mère et Enfant Monkole (CHME Monkole)" and the "Centre Hospitalier Initiative Plus (CHIP)". It covered the period from August 13, 2018 to April 07, 2022.

2.2. Population and Sampling

We performed consecutive recruitment of all patients who underwent hip and knee arthroplasty at the two selected medical institutions.

2.3. Variables of Interest

Sociodemographic data: age, sex, profession, marital status.

Clinical data: major complaints, affected joints, BMI, shortening of the lower limbs, comorbidities, diagnosis.

Procedure data: type of anesthesia, duration of surgery, incident, transfusion, type of surgery, approach, intraoperative infection, heparin therapy.

Postoperative physiotherapy data: number of sessions, stockings worn, crutches.

Evolution data: intraoperative, early and late postoperative complications; patient satisfaction.

2.4. Ethical Considerations

Ethical and benevolent principles were observed. The data were treated anony-

mously and in strict confidence. The use of the results of the present study was limited to the strict exploitation related to the objective of the study. The protocol of our study was presented to the ethics committee of the Interdisciplinary Center for Research in Medical Imaging of Kinshasa and we obtained a favorable opinion.

2.5. Data Processing and Analysis

Data analysis was performed using Statistical Package for Social Sciences (SPSS 22.0) software. The descriptive analysis was carried out on the entire study population. The results are expressed as mean ± standard deviation for the quantitative variables, and/or as a percentage for the qualitative variables. Pearson's chi-square test or Fisher's exact test was used to compare percentages. The student test was used to compare the means. A p-value of less than 5% was considered the threshold of statistical significance.

3. Results

3.1. General Characteristics of the Study Population

As shown in Table 1, the mean age of patients was 57.8 ± 13.7 years, with an F/M sex ratio of 1.3. Most patients were retired (n = 36; 48%). The main complaint was hip pain (n = 45; 60%).

Table 1. Baseline.

Variables		n = 75	%
Age	Mean ± SD*	57.8 ± 13.7	-
	≤49 years old	20	17
	50 to 63 years old	23	30.7
	≥64 years old	32	34.7
Sex	Sex ratio F/M	1.3	-
	Male	33	44
	Women	42	56
Occupation	Retired	36	48
	Employee	26	34.7
	Unemployed	7	9.3
	Not determined	6	8
Marital status	In union	34	45.3
	Only	41	54.7
Major Complaints	painful hip	45	60
	Knee pain	37	16
	Knee deformity	1	1.3

*Standard deviation.

3.2. Radiological Diagnosis

Aseptic necrosis of the femoral head (n = 23; 30.7%) and knee arthrosis (n = 19; 25.3%) were the most common radiological diagnoses, as shown in Table 2. By comparing the groups divided according to BMI, patients with hip osteoarthritis and knee osteoarthritis were more obese (p < 0.05) compared to non-obese patients. On the other hand, aseptic necrosis of the femoral head was found more in the group of non-obese patients (p = 0.041) as shown in Table 2 bellow.

3.3. Data on the Course of the Intervention

All patients were operated with a technique of hypotensive anesthesia, of which spinal anesthesia was the most used with 77.3% of cases. Anesthetic incidents (n = 6; 7.9%) were mainly noted in obese patients, including 3 cases of failure, 1 case of respiratory distress and 1 case of hypotension. Compared to the means of knee prosthesis fixity, the cemented TKA was used in 21 patients and the hybrid TKA in 6 patients. At hip level, uncemented THA was the most used with 47 patients and cemented with 1 patient. This different information is provided in Table 3 bellow.

3.4. Complications Observed

Out of a total of 75 patients, we noted 32 cases of complications (42.7%) including one intraoperative complication (trochanteric fracture) and two immediate postoperative dislocations (n = 1; 3.1%) in the non-obese and early postoperative group (n = 1; 3.1%) in the obese group. We recorded two deaths (one from pulmonary embolism and the other from sepsis) late postoperatively. Lower than, Table 4 provides us with information on these various details.

4. Discussion

Obesity, joint trauma and muscle weakness are some of the risk factors for osteoarthritis. These factors increase all the mechanical stresses to which the articular cartilage is subjected. Gender, hormones, metabolic disorders and genetics also play a role. Elderly populations are more frequently and more severely affected by this disease than younger populations [1].

Table 2. Distribution of patients according to radiological diagnosis.

Variables	Entire group (n = 75)	BMI* < 30 (n = 33)	BMI* > 30 (n = 42)	p
Hip osteoarthritis *or* coxarthrosis	13 (17.3)	2 (6.1)	11 (26.2)	0.001
Femoral neck fracture	12 (21.3)	5 (15.2)	7 (16.7)	0.061
Knee osteoarthritis *or* gonarthrosis	19 (25.3)	6 (18.2)	13 (30.9)	0.003
Bilateral knee osteoarthritis	8 (10.7)	4 (12.1)	4 (9.5)	0.402
Aseptic necrosis of the femoral head	23 (30.7)	16 (48.5)	7 (16.7)	0.041

*Body Mass Index.

Table 3. Distribution of patients according to radiological diagnosis.

Variables		Entire group n = 75 (%)	BMI < 30 n = 33 (%)	BMI > 30 n = 42 (%)	p
Hypotensive anesthesia	AG + IOT*	9 (12)	2 (6.1)	7 (16.7)	>
	Epidural anesthesia	4 (5.3)	2 (6.1)	2 (4.8)	>
	Spinal anesthesia	58 (77.3)	25 (75.8)	33 (78.6)	>
	Spinal anesthesia + Sedation	4 (5.3)	2 (6.1)	2 (4.8)	>
	Failure of spinal anesthesia	4 (5.3)	1 (3.0)	3 (7.1)	>
Incidents	Respiratory distress	1 (1.3)	0	1 (2.4)	-
	Hypotension	1 (1.3)	0	1 (2.4)	-
Transfusion		16 (21.3)	5 (15.2)	11 (26.2)	>
Means of prosthesis fixity	cemented PTG	21 (28)	8 (24.2)	13 (39.0)	>
	Hybrid PTG	6 (8)	2 (6.1)	4 (9.5)	>
	Uncemented PTH	47 (62.7)	22 (66.7)	25 (59.5)	>
	Cemented PTH	1 (13)	1 (3.0)	0	-
Approach routes	Medial parapatellar knee	27 (36)	10 (30.3)	17 (40.5)	>
	Lateral hip	48 (64)	23 (69.7)	25 (59.5)	>
Duration of the operation (minutes)	(Mean ± SD)	127.6 ± 52.5	124.6 ± 42.5	129.6 ± 51.2	-
Antibiotic therapy (24 h)		62 (82.7)	20 (60.6)	42 (100)	>
Heparin therapy		71 (94.7)	29 (87.9)	42 (100)	>
Physiotherapy (weeks)	(Mean ± SD)	3.9 ± 1.7	3.7 ± 1.9	4.9 ± 1.5	>
Compression stocking		75 (100)	33 (100)	42 (100)	-

*General anesthesia and orotracheal intubation.

Table 4. Distribution of patients according to radiological diagnosis.

Complications		Entire group n = 32 (%)	BMI < 30 n = 20 (%)	BMI > 30 n = 12 (%)	p
Intraoperative	*Trochanteric fracture*	1 (3.1)	0	1 (8.3)	-
Immediate postoperative	*Anemia*	2 (6.2)	2 (10)	0	-
	Dislocation	1 (3.1)	1 (5)	0	-
Early postoperative	*Anemia*	3 (9.4)	3 (15)	0	-
	Dislocation	1 (3.1)	0	1 (8.3)	-
Late postoperative	*Pain*	9 (281)	5 (25)	4 (33.3)	>
	knee swelling	2 (6.2)	2 (10)	0	-
	Urinary tract infection	10 (3.1)	5 (25)	5 (42.1)	>
	Pulmonary embolism	1 (31.2)	1 (5)	0	-
	Death	2 (6.2)	1 (5)	1 (8.3)	>

Worldwide, estimates show that 10% of men and 18% of women over the age of 60 suffer from symptomatic osteoarthritis, including moderate and severe

forms [5]. In the present study, we collected a total of 75 patients who underwent total hip or knee arthroplasty. The average age was 57.8 ± 13.7 years with extremes of 22 to 85 years with a female/male sex ratio of 1.3. Our results are in agreement with the majority of the published literature [1] [2] [3].

Obesity is closely linked to the onset and progression of osteoarthritis and is often considered a modifiable risk factor. In patients with a high body mass index (BMI), especially ≥40 kg/m^2, the surgeon suggests that it may be important to lower the BMI (by losing weight) before joint replacement surgery to avoid complications intra- and postoperatively and to make surgeries manageable [6]. In our series, patients with a BMI ≥ 40 were not listed because they were referred to the nutritionist for weight loss. Of a total of 75 patients, 17 (22.7%) were overweight and 42 (56%) obese. In arthroplasty, obesity has been associated with higher rates of impaired wound healing, infection, deep vein thrombosis, prolonged hospitalization, revision surgery, and surgical difficulty. Some of the most common strategies for mitigating the effects of obesity include preoperative weight loss and setting body mass index thresholds. The benefits of these recommendations continue to be debated as the ability of weight loss to improve postoperative outcomes remains uncertain. Since weight loss can be a difficult task for many patients, it is important that providers demonstrate tangible improvements to justify such weight loss and effectively motivate patients to lose weight [6]. The relationship between obesity and hip osteoarthritis is not as well defined. Jacob *et al.* [6] found that hip replacement surgery patients with a BMI ≥ 40 had longer operative times and higher blood loss than other BMI groups, but did not differ in functional recovery. According to the literature, the anterior approach has not been considered in obese patients. In our series, the lateral Hardinge approach was performed in all obese and non-obese patients, bleeding was controlled.

Arthroplasties surgery in the obese patient may be technically more difficult and carries a risk of additional complications. Substantial weight loss before undertaking total knee replacement surgery is advised because obesity increases operative time, length of stay, and hospital costs, as well as the risk of deep infection, revision, and poor positioning of the joints components [6] [7] [8] [9]. In our series, we noted an anesthetic incident, the patient presented with respiratory distress which was managed. Obesity can have an even greater impact on wound complications and deep infections. Obesity also increases the risk of hip dislocation, aseptic loosening and venous thromboembolism after hip arthroplasty [9].

Of the 75 patients reviewed 6.12 months after hip and knee prosthesis, 9 patients (obese and non-obese) complained of pain during the dry season. Our obese patients made good progress and resumed their daily activities. Of our 75 patients, 10 were not evaluated (13.33%), 38 were very satisfied (50.67%), 20 satisfied (26.67%), 5 not very satisfied (6.67%), 2 not satisfied (2.67%). In our study, we did not note any significant difference in the postoperative evolution of obese and non-obese patients. This correlates with most publications.

Conclusion

Obesity is potentially preventable and reversible, unlike osteoarthritis, and should, if possible, be treated before considering joint replacement. The indications for arthroplasty in this study are dominated by non-traumatic pathologies of the knee and of the hip (osteoarthritis and aseptic necrosis). Most patients are over-weight, including obesity. The evolution is favorable in the vast majority of cases.

Limitations of Study

We had a small sample size which was not very representative. We were also not able to include the satisfaction of patients after their therapeutic treatment.

Additional Information

Disclosures

Consent was obtained or waived by all participants in this study. All authors have confirmed that this study did not involve animal subjects or tissue.

Contribution of Authors

AME: work design, work writing and surgery actress. **JNK:** management and surgical operator. **GEN:** work proofreading. **TKM:** statistical analyses and work writing. **LMB:** proofreading of the work.

Conflicts of Interest

The authors declare no conflicts of interest.

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Principles Abbreviations

AG: *general anesthesia*
IOT: *orotracheal intubation*
THA: *Total Hip Arthroplasty*
TKA: *Total Knee Arthroplasty*
X ± SD: *Mean ± Standard deviation*