

Challenges and perspectives of total hip arthroplasty in young adults: A study of 74 patients

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Abstract

Total hip arthroplasty (THA) proves to be a viable option for younger patients. The short- and medium-term outcomes were generally satisfactory, with a relatively average complication rate. This study favored uncemented implants and ceramic-ceramic coupling. Proper selection of indications and equipment is crucial to achieving good long-term results and minimizing complications. Our study underscores the significance of THA in young patients, especially for specific conditions that benefit from this intervention. Despite promising functional outcomes, potential complications such as loosening and recurrent fractures must be considered. Careful patient assessment and regular postoperative follow-up are vital for optimal results. Further research is necessary to deepen our understanding of this procedure in the younger population.

Keywords: Total hip arthroplasty; Functional outcomes; Young patients

1. Introduction

Total hip arthroplasty (THA) is a commonly performed surgical procedure to treat coxarthrosis, yielding favorable outcomes in older patients (1). However, its use in younger patients raises questions about its appropriateness, the optimal surgical technique, and the selection of friction couples (2). In this article, we examine the role of THA in young patients. Despite often being underrepresented in clinical studies, understanding the outcomes and complications in this demographic is crucial for improving patient care (3).

In a retrospective study of 74 patients, we analyzed the short- and medium-term results of THA in young individuals. The average age was 39 years, with a predominance of males. The most frequent etiologies were osteonecrosis of the femoral head and post-traumatic coxarthrosis. The most commonly used friction couples were metal/polyethylene and ceramic/ceramic.

We also discuss the complications associated with this intervention, including loosening and recurrent fractures, as well as the functional outcomes achieved. Additionally, technical choices such as the use of autologous bone grafts and the implantation of a Kerboull ring will be examined (4).

Ultimately, this study seeks to assess the effectiveness of THA in younger individuals, emphasizing short- and medium-term outcomes and the complications encountered. The results of this analysis will enhance understanding of the procedure's application in this demographic, facilitating better management and informed decisions for patients requiring subsequent revision hip joint arthroplasty.

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2. Patients and methods

A retrospective study was conducted involving 74 patients who underwent total hip arthroplasty between January 2011 and December 2020. The study included patients under 50 years old with specific indications for the procedure. Demographic data, including age and gender, along with clinical characteristics, were collected.

Patients were followed up for an average of 60 months with regular assessments using the PMA score (Postel and Merle d'Aubigné) to evaluate functional outcomes. Data also encompassed the etiology of hip pathology, disease progression duration, and postoperative complications.

Etiologies of hip pathology such as osteoarthritis of the femoral head, post-traumatic coxarthrosis, dysplasia, and tuberculous infectious coxitis were categorized by percentage. Additional imaging like CT and MRI provided further insights, particularly in cases of bilateral osteonecrosis.

Surgical techniques predominantly involved the Moore approach in the lateral decubitus position, with some patients receiving autologous bone grafts and others having a Kerboull ring implanted.

Descriptive analysis of collected data utilized basic statistics such as means and percentages to depict patient characteristics and outcomes. The study adhered to ethical principles and regulations, approved by the institutional ethics committee, ensuring confidentiality and anonymity of all patient information.

3. Results

The retrospective study included a total of 74 patients who underwent total hip arthroplasty between January 2011 and December 2019. The average follow-up was 60 months. The results were analyzed taking into account the PMA score, age, sex, etiology, duration of disease progression and associated complications (Table 1).

The average age of the patients was 39 years, with a distribution of 2 men to 1 woman. Fourteen patients underwent bilateral total hip arthroplasty, with a mean interval of 8 months between the two procedures. The etiologies of the hip pathologies were as follows (Figure 1): osteonecrosis of the femoral head is 66% - post-traumatic coxarthrosis is 15% - LCH 9% - acetabular dysplasia 3% and infectious tuberculous coxitis is 7 %.

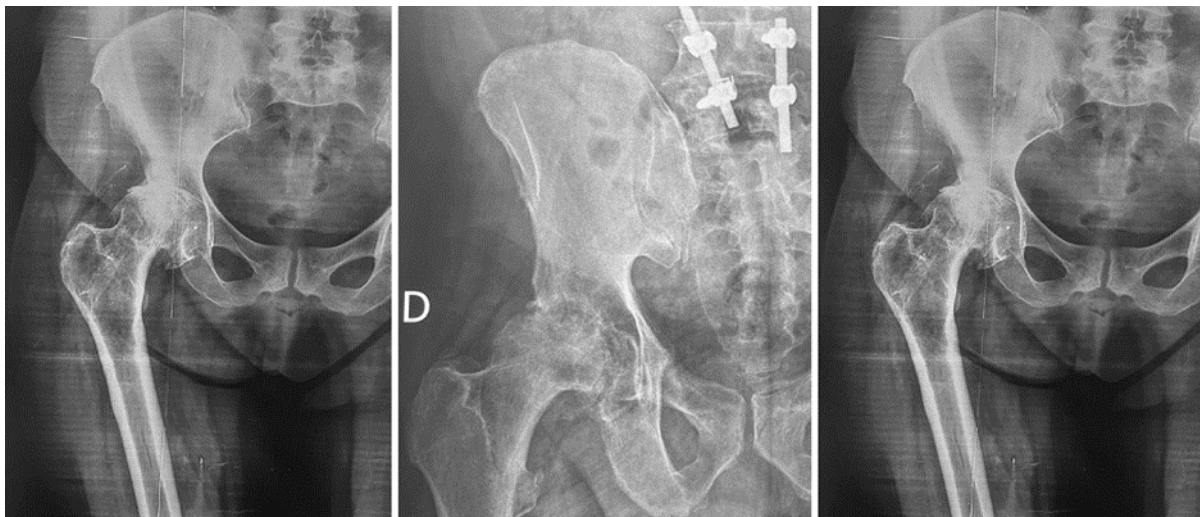


Figure 1 Osteonecrosis of the femoral head - Post-traumatic coxarthrosis - Hip dysplasia (*from left to right*)

Among the patients, 19 underwent computed tomography (CT) and 12 underwent magnetic resonance imaging (MRI) due to bilateral osteonecrosis. The Moore approach in lateral decubitus position was used in the majority of cases. Additionally, 10 patients underwent autologous bone grafting and 15 patients had a Kerboull ring implanted.

Functional results were evaluated using the Postel and Merle d'Aubigné score. The results showed that 30% of patients achieved an excellent result, 19% a very good result, 43% a good result, 3% a fair result, 3% a poor result and 2% a poor result.

Regarding complications, we noted 7 cases of aseptic loosening, 5 cases of septic loosening and 4 cases of late dislocation, 4 cases of polyethylene wear (all have a Metal/Polyethylene friction couple), 2 cases of fracture of the ceramic prosthesis (all have a Ceramic/Ceramic friction couple) and 3 cases of peri-prosthetic fractures (Figure 2).



Figure 2 Hip x-rays showing some complications (bipolar loosening – dislocation of the prosthesis)

Table 1 Summary of the results of the patient series

Features	Details
Middle age	39 years old (21 to 49 years old)
Sex	2 women for 1 man
Etiology	Osteonecrosis of the femoral head is 66% Post-traumatic coxarthrosis is 15% CHL 9% Acetabular dysplasia 3% Infectious tuberculous coxitis is 7%
Pre-Operative PMA Score	Poor: 20 patients - Poor: 42 patients - Fair : 12 patients
Autologous Bone Graft	10 patients
Kerboull's ring	15 patients
Friction Torque	Metal/Polyethylene: 40% Ceramic /Ceramics: 60%
Cemented Character	Cemented: 14 cases Uncemented: 60 cases
Type of acetabulum	Screwed cup: 51 cases Impacted acetabulum: 23 cases
Complications	7 cases of aseptic loosening 5 cases of septic loosening 4 cases of a late dislocation

	4 cases of polyethylene wear 2 cases of fracture of the ceramic prosthesis 3 cases of periprosthetic fractures
Post-Operative PMA Score (60 Months Follow-up)	Excellent: 30% - Very good: 19% - Good: 43% - Fair : 3% - Poor: 3% - Bad: 2%

4. Discussion

Total hip arthroplasty (THA) in younger patients presents unique complexities, including challenges related to implant durability and the active lifestyle typical of this age group. Our retrospective study of 74 young patients underscored critical aspects, focusing notably on etiology, implant selection, and postoperative complications.

4.1. Etiology and Demography

Our study revealed a predominance of osteonecrosis of the femoral head and post-traumatic coxarthrosis in young patients. These results are consistent with those of Kuijpers et al. (6), who also reported a high incidence of these conditions in youth undergoing THA. The average age of patients in our study was 39 years, almost similar to that reported in the study highlighting that THA is not exclusively a procedure for elderly patients.

4.2. Choice of Friction couples

The choice of friction torque is a determining factor in the long-term success of THA in young people. In our study, metal/polyethylene and ceramic/ceramic couples were commonly used. This preference is shared by Patel et al. (7), who found that these materials provide a good balance between durability and performance. However, as indicated by Sharma et al. (8), the metal/polyethylene couple can be associated with increased wear, a point also observed in our study.

4.3. Complications

Complications, such as periprosthetic loosening and fractures, are major concerns. Our study revealed a complication rate similar to that reported by Kuijpers et al. (6) with particular attention to osteoporotic patients. This similarity suggests that strategies to prevent complications should be a priority in this population.

4.4. Functional results

Functional outcomes, assessed by PMA score, showed significant improvement after THA, in agreement with the findings of Kuijpers et al. (6). This reinforces the idea that THA can provide excellent functional outcomes in young people, despite associated challenges.

When comparing our study results with recent literature, it becomes evident that total hip arthroplasty (THA) in young patients is a recommended intervention yielding promising outcomes. However, careful patient selection, appropriate choice of friction torque, and effective management of complications are crucial to optimize these results.

Nevertheless, our study has several limitations that should be acknowledged. Firstly, it is retrospective in nature, which restricts our ability to control for all potential confounding factors. Additionally, the relatively small sample size may limit the generalizability of our findings. Larger prospective studies are necessary to validate our observations and provide more robust data regarding the use of THA in young patients.

5. Conclusion

Total hip arthroplasty (THA) appears to be a viable option for the younger population. The short- and medium-term results were generally satisfactory, with a relatively average complication rate. In this study, uncemented implants and the ceramic-ceramic couple were preferred. Appropriate selection of indications and equipment is essential to achieve good long-term results and minimize complications.

In conclusion, our study highlighted the relevance of THA in young patients, particularly in addressing specific etiologies that can benefit from this intervention. Despite encouraging functional outcomes, it is important to consider potential complications such as loosening and recurrent fractures. Careful patient assessment and regular postoperative follow-

up are essential for optimal results. Future studies are needed to enhance our understanding of this procedure in the younger population.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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Appendix

Patient	Âge	Sexe	Étiologie	Couple de Friction	Caractère Cimenté	PMA Préopératoire	PMA Post-opératoire	Complications
51	34	Homme	Coxarthrose post-traumatique	Céramique/Céramique	Cimentée	Mauvais	Bon	Fracture de la prothèse en céramique
55	46	Femme	Coxarthrose post-traumatique	Céramique/Céramique	Non Cimentée	Mauvais	Bon	Aucune
23	47	Femme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Cimentée	Mauvais	Très bon	Aucune
44	48	Femme	Ostéonécrose de la tête fémorale	Métal/Polyéthylène	Cimentée	Mauvais	Bon	Aucune
29	38	Femme	Ostéonécrose de la tête fémorale	Métal/Polyéthylène	Non Cimentée	Mauvais	Très bon	Usure de polyéthylène
27	31	Homme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Non Cimentée	Mauvais	Très bon	Fracture de la prothèse en céramique
66	46	Femme	LCH	Céramique/Céramique	Non Cimentée	Passable	Bon	Aucune
52	54	Homme	Coxarthrose post-traumatique	Métal/Polyéthylène	Non Cimentée	Mauvais	Bon	Fractures périprothétiques
35	45	Femme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Cimentée	Mauvais	Très bon	Aucune
8	34	Femme	Ostéonécrose de la tête fémorale	Métal/Polyéthylène	Non Cimentée	Médiocre	Excellent	Descellement aseptique
4	44	Femme	Ostéonécrose de la tête fémorale	Métal/Polyéthylène	Non Cimentée	Mauvais	Excellent	Luxation tardive
57	29	Homme	Coxarthrose post-traumatique	Métal/Polyéthylène	Non Cimentée	Mauvais	Bon	Luxation tardive
41	28	Homme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Non Cimentée	Mauvais	Bon	Aucune
62	29	Femme	LCH	Métal/Polyéthylène	Non Cimentée	Mauvais	Bon	Luxation tardive
34	43	Femme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Non Cimentée	Mauvais	Très bon	Aucune
67	29	Homme	LCH	Céramique/Céramique	Non Cimentée	Passable	Bon	Fracture de la prothèse en céramique
28	50	Femme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Non Cimentée	Mauvais	Très bon	Aucune
49	25	Femme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Non Cimentée	Mauvais	Bon	Descellement aseptique
58	36	Homme	Coxarthrose post-traumatique	Métal/Polyéthylène	Non Cimentée	Mauvais	Bon	Fractures périprothétiques
54	40	Femme	Coxarthrose post-traumatique	Céramique/Céramique	Cimentée	Mauvais	Bon	Usure de polyéthylène
7	27	Femme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Non Cimentée	Médiocre	Excellent	Fracture de la prothèse en céramique
50	27	Femme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Non Cimentée	Mauvais	Bon	Descellement aseptique
70	48	Femme	Coxite infectieuse tuberculeuse	Métal/Polyéthylène	Cimentée	Passable	Passable	Usure de polyéthylène
5	28	Femme	Ostéonécrose de la tête fémorale	Métal/Polyéthylène	Non Cimentée	Médiocre	Excellent	Fracture de la prothèse en céramique
56	46	Homme	Coxarthrose post-traumatique	Céramique/Céramique	Non Cimentée	Mauvais	Bon	Luxation tardive
60	47	Femme	Coxarthrose post-traumatique	Céramique/Céramique	Non Cimentée	Mauvais	Bon	Aucune
3	47	Femme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Cimentée	Médiocre	Excellent	Fractures périprothétiques
74	37	Femme	Coxite infectieuse tuberculeuse	Céramique/Céramique	Non Cimentée	Passable	Mauvais	Aucune
46	44	Femme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Non Cimentée	Mauvais	Bon	Aucune
12	45	Femme	Ostéonécrose de la tête fémorale	Métal/Polyéthylène	Non Cimentée	Médiocre	Excellent	Descellement aseptique
31	36	Homme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Non Cimentée	Mauvais	Très bon	Aucune
4	30	Homme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Non Cimentée	Médiocre	Excellent	Aucune
61	54	Homme	Coxarthrose post-traumatique	Céramique/Céramique	Non Cimentée	Mauvais	Bon	Aucune
11	47	Homme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Non Cimentée	Médiocre	Excellent	Descellement aseptique
32	45	Homme	Ostéonécrose de la tête fémorale	Métal/Polyéthylène	Non Cimentée	Mauvais	Très bon	Aucune
63	23	Femme	LCH	Céramique/Céramique	Non Cimentée	Passable	Bon	Descellement aseptique
53	24	Femme	Coxarthrose post-traumatique	Métal/Polyéthylène	Non Cimentée	Mauvais	Bon	Usure de polyéthylène
64	24	Homme	LCH	Céramique/Céramique	Non Cimentée	Passable	Bon	Fracture de la prothèse en céramique
33	46	Femme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Non Cimentée	Mauvais	Très bon	Descellement septique
15	31	Femme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Cimentée	Médiocre	Excellent	Luxation tardive
42	51	Femme	Ostéonécrose de la tête fémorale	Métal/Polyéthylène	Cimentée	Mauvais	Bon	Luxation tardive
20	25	Homme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Non Cimentée	Médiocre	Excellent	Luxation tardive
30	33	Femme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Non Cimentée	Mauvais	Très bon	Aucune
72	42	Homme	Coxite infectieuse tuberculeuse	Céramique/Céramique	Non Cimentée	Passable	Médiocre	Aucune
36	35	Femme	Ostéonécrose de la tête fémorale	Métal/Polyéthylène	Non Cimentée	Mauvais	Très bon	Aucune
19	53	Homme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Non Cimentée	Médiocre	Excellent	Fracture de la prothèse en céramique
1	44	Homme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Non Cimentée	Médiocre	Excellent	Aucune
73	30	Femme	Coxite infectieuse tuberculeuse	Céramique/Céramique	Non Cimentée	Passable	Médiocre	Fracture de la prothèse en céramique
16	46	Femme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Non Cimentée	Médiocre	Excellent	Fractures périprothétiques
6	51	Femme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Non Cimentée	Médiocre	Excellent	Aucune
17	48	Femme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Non Cimentée	Médiocre	Excellent	Aucune
21	35	Homme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Non Cimentée	Mauvais	Excellent	Descellement aseptique
69	34	Homme	Dysplasie ectyloïdienne	Métal/Polyéthylène	Cimentée	Passable	Bon	Descellement septique
9	36	Homme	Ostéonécrose de la tête fémorale	Métal/Polyéthylène	Cimentée	Médiocre	Excellent	Aucune
14	51	Femme	Ostéonécrose de la tête fémorale	Métal/Polyéthylène	Cimentée	Médiocre	Excellent	Aucune
26	42	Homme	Ostéonécrose de la tête fémorale	Métal/Polyéthylène	Non Cimentée	Mauvais	Très bon	Luxation tardive
38	37	Homme	Ostéonécrose de la tête fémorale	Métal/Polyéthylène	Non Cimentée	Mauvais	Bon	Usure de polyéthylène
18	35	Femme	Ostéonécrose de la tête fémorale	Métal/Polyéthylène	Non Cimentée	Médiocre	Excellent	Fracture de la prothèse en céramique
25	52	Femme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Non Cimentée	Mauvais	Très bon	Aucune
47	42	Femme	Ostéonécrose de la tête fémorale	Métal/Polyéthylène	Non Cimentée	Mauvais	Bon	Luxation tardive
24	41	Femme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Non Cimentée	Mauvais	Très bon	Aucune
40	46	Femme	Ostéonécrose de la tête fémorale	Métal/Polyéthylène	Non Cimentée	Mauvais	Bon	Descellement septique
39	25	Femme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Non Cimentée	Mauvais	Bon	Luxation tardive
2	40	Homme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Non Cimentée	Médiocre	Excellent	Aucune
59	49	Femme	Coxarthrose post-traumatique	Céramique/Céramique	Non Cimentée	Mauvais	Bon	Aucune
13	28	Femme	Ostéonécrose de la tête fémorale	Métal/Polyéthylène	Cimentée	Médiocre	Excellent	Luxation tardive
37	45	Femme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Non Cimentée	Mauvais	Bon	Luxation tardive
22	32	Femme	Ostéonécrose de la tête fémorale	Céramique/Céramique	Non Cimentée	Mauvais	Excellent	Descellement septique
10	44	Femme	Ostéonécrose de la tête fémorale	Métal/Polyéthylène	Non Cimentée	Médiocre	Excellent	Aucune
71	44	Femme	Coxite infectieuse tuberculeuse	Métal/Polyéthylène	Non Cimentée	Passable	Passable	Descellement septique
68	36	Femme	Dysplasie ectyloïdienne	Céramique/Céramique	Cimentée	Passable	Bon	Fractures périprothétiques
65	27	Femme	LCH	Métal/Polyéthylène	Non Cimentée	Passable	Bon	Aucune
48	30	Femme	Ostéonécrose de la tête fémorale	Métal/Polyéthylène	Non Cimentée	Mauvais	Bon	Usure de polyéthylène
45	45	Femme	Ostéonécrose de la tête fémorale	Métal/Polyéthylène	Non Cimentée	Mauvais	Bon	Descellement aseptique