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Causes of Primary Total Hip Arthroplasty Revision in Sub-Saharan Africa: A Single-Center Series from Idrissa Pouye General Hospital, Senegal

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Abstract

Introduction: Total hip arthroplasty (THA) is a highly effective procedure, but the increasing number of implants and patient life expectancy have led to a rise in revision surgeries. This study aims to identify and analyze the causes of THA revision within our orthopedic department in Dakar. **Materials and Methods:** This was a retrospective study conducted over an 11-year period. All patients who underwent revision THA were included. Fractures were assessed using the Vancouver classification and bone loss was evaluated using the SOFCOT and Paprosky classifications. **Results:** Thirty cases were analysed. Aseptic loosening was the leading cause of revision (46.67%), with an average onset of 10 ± 8 years post-implantation. These loosenings were predominantly bipolar (80%), characterised by significant bone loss and primarily classified as SOFCOT type 2 and Paprosky grade 2A. Prosthetic instability (dislocation) was the second most common cause of failure (26.67%). Periprosthetic fractures accounted for 13.33% of cases and were all classified as Vancouver type B2, indicating an unstable femoral stem. Other causes included material wear/breakage (6.67%) and septic loosening (3.33%). **Conclusion:** In our practice, aseptic loosening and instability are the primary drivers of THA revision. Improving long-term outcomes will require more rigorous primary surgical techniques, advanced implants such as dual-mobility cups for high-risk patients and thorough radiological follow-up to detect mechanical failures before significant bone loss occurs.

Keywords

Revision Total Hip Arthroplasty, Aseptic Loosening, Dislocation, Vancouver B2, Bone Loss

1. Introduction

Total hip arthroplasty (THA) has transformed orthopaedic surgery, enabling the restoration of joint architecture and biomechanics while preserving the integrity of the periarticular musculoskeletal structures. While it provides excellent long-term functional outcomes [1], the long-term survival of the implant is dependent on the absence of complications [2].

Surgical revision is therefore imperative in order to restore joint function and correct mechanical or biological failures. Currently, there is a constant increase in revision rates, driven by rising life expectancy and the implantation of prostheses in younger, more active patients [3]. The causes of these revisions are primarily dominated by aseptic loosening, bearing surface wear, instability and periprosthetic infection [4]. In West Africa, studies from Ghana [5] and systematic reviews across sub-Saharan Africa [6] have reported revision rates of 4% - 8%, with aseptic loosening, dislocation, and periprosthetic fractures as leading causes.

Against this backdrop, our study aimed to identify and analyze the causes of revision for primary THA in a single-center series at Idrissa Pouye General Hospital in Senegal, while discussing their relevance to the broader sub-Saharan African context.

2. Materials and Methods

- Study setting and design

We conducted a retrospective, descriptive and continuous study over an 11-year period (1 January 2009 to 31 December 2019) in the Orthopaedics and Traumatology Department at Idrissa Pouye General Hospital in Dakar.

- Data collection and inclusion criteria

Data were collected from operating room registries, hospitalisation records and outpatient consultation files. All patients who underwent a THA revision were included, regardless of gender. Patients with incomplete records (missing clinical notes or radiographic imaging documenting the complication) were excluded.

- Population characteristics

During the study period, 552 total hip replacements were performed in the department, and revision procedures accounted for only 5.43% of all total hip replacements performed. The revision rate for primary THAs implanted in our department during the study period was 3.40%.

The series included 30 revisions two of which were bilateral (28 patients). The mean age at the time of surgery was 56 ± 15 years. There was a male predominance of 60.70%, with a sex ratio of 1.5. The left side was involved in 60% of cases. Most

prostheses were implanted at Idrissa Pouye General Hospital (63.3%). Other hospitals in Senegal treated nearly a quarter of the cases (23.4%). A significant proportion (13.3%) were implanted abroad.

Baseline data regarding the revised hips (primary indication, type of fixation, surgical approach, and implant characteristics) could not be systematically collected, since a proportion of the patients had undergone their primary surgery in other institutions.

- Study parameters and classifications

The study focused specifically on the aetiologies of revision. For lesion analysis, the following reference tools were used (Table 1):

- loosening: classified according to the SOFCOT criteria and the Paprosky classification for assessing bone stock;
- periprosthetic fractures: Evaluated according to the Vancouver classification.

Table 1. Diagnostic criteria for THA complications.

Complications	Clinical criteria	Paraclinical criteria (imaging/biology)
Aseptic loosening	Mechanical pain, functional limitation without infectious signs	Radiolucent lines > 2 mm, implant migration or subsidence on successive radiographs. Advanced imaging (CT).
Septic loosening	Pain, swelling, fever, fistula	Elevated ESR and CRP. Neutrophilic leukocytosis. Identification of pathogens (joint aspiration or intraoperative samples.
Dislocation	Acute pain, limb shortening, functional impairment	X-ray showing femoral head outside the acetabular cup. CT to assess malposition or impingement.
Periprosthetic fracture	Sudden pain, functional impairment, deformity after trauma	X-ray showing fracture around femoral stem or acetabular component.

3. Results

- Overall etiological analysis:

Aseptic loosening was the leading cause of revision in our series (46.67%), followed by prosthetic dislocation (26.67%). Periprosthetic fractures accounted for 13.3% of cases (see Table 2). Other causes included material wear or failure (6.67%), fracture-dislocation (3.33%), and septic loosening (3.33%).

- Loosening

Loosening was aseptic in 46.67% of cases and septic in 3.33%. The mean time to onset for aseptic loosening was 10 ± 8 years.

Loosening was predominantly bipolar, accounting for 80% of cases (Figure 1). It involved the acetabular cup in 51.85% of cases and the femoral stem in 48.15% of cases.

According to the SOFCOT classification (Table 3), Type 2 was the most frequent in both the femur (33.33%) and the acetabulum (20%). Regarding bone loss,

Paprosky grades 2A and 2B were the most prevalent on both sides (Table 4).

Table 2. Causes of revision.

Causes	Number	Percentage
Aseptic loosening	14	46.67
Prosthetic dislocations	8	26.67
Periprosthetic fractures	4	13.33
Material failure	2	6.67
Fracture-dislocation	1	3.33
Septic loosening	1	3.33
Total	30	100

Table 3. SOFCOT classification of loosening.

Type	Acetabulum	femur
1	2	2
2	6	10
3	1	2
4	5	

Table 4. Paprosky classification of loosening

Type	Acetabulum	femur
1	3	0
2A	5	7
2B	3	5
2C	1	0
3A	1	2
3B	1	

- Dislocations

Prosthetic instability was observed in eight cases (26.67%), including one bilateral case (Figure 1). Dislocation was the second most common cause in this study. All dislocations were classified as early (< 5 years), with a mean time to occurrence of 2.93 months (range: 2 days-1 year).

- Periprosthetic Fractures

Four patients (13.33%) underwent revision for a fracture involving a THA. According to the Vancouver classification, all of these fractures (100%) were Type B2, involving a bony break associated with an unstable femoral implant (Figure 2).

- Wear and Mechanical Incidents

Two cases of material wear and degradation were observed: an "explosion" of the polyethylene insert following trauma (Figure 3), and breakage of an acetabular

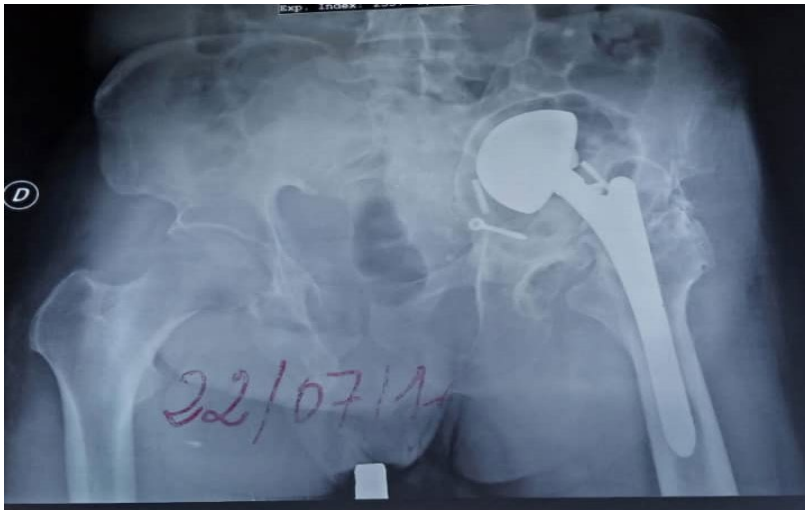

Figure 1. Septic prosthesis loosening with cup migration into the iliac wing.

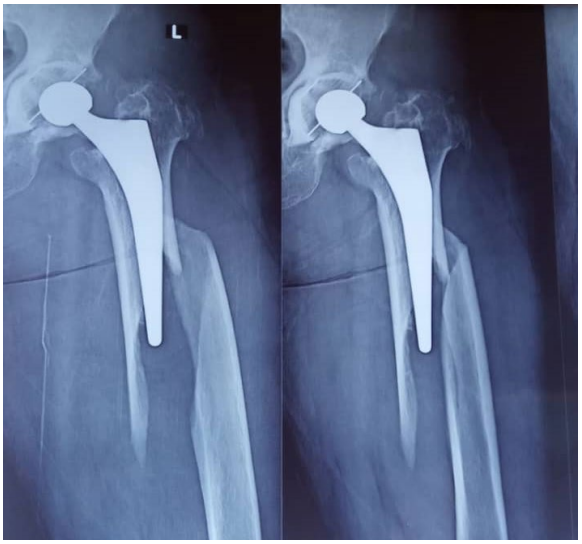

Figure 2. Periprothetic fractures Vancouver type B2.

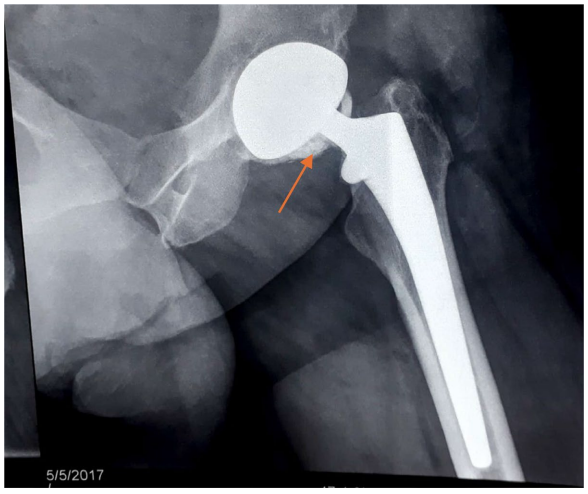

Figure 3. Shattered prosthesis liner (arrow).

fixation screw.

4. Discussion

Aseptic loosening was the primary cause of revision in our series (46.67%). This predominance is widely documented in the international literature. In the United States, Bozic *et al.* [7] reported a rate of 51.70%, while French series such as those by Gasteau *et al.* [8] (63.20%) and Lebeau *et al.* [9] (65.90%) confirm this trend. Our results are also similar to those of Oltean-Dan *et al.* [10], who, in their study of a regional orthopedic center, identified aseptic loosening as the major cause of revision (44.18%). This complication occurs preferentially in young, highly active subjects due to mechanical stress, or in elderly subjects whose osteoporosis weakens the bone-prosthesis interface.

The mean time to onset in our study was 10 ± 8 years. This result is consistent with data from Fen *et al.* [11] (10 years) and falls within the average observed by Oltean-Dan *et al.* [10] (8.4 years). The longevity of a THA remains closely linked to the precision of the surgical technique, the quality of the bone stock, and patient compliance.

The relatively young profile of our population (mean age of 56 years) leads us to compare our results with the work of Kahlenberg *et al.* [12], who emphasize that in active patients, instability and early wear are predominant causes of revision. Similar to the Idrissa Pouye General Hospital, the study by Oltean-Dan *et al.* [10] conducted in a regional center shows that these referral facilities attract a high volume of severe mechanical pathologies, where the management of primary prosthesis failure becomes a major surgical activity.

Dislocation accounted for 26.67% of our failures. This rate is higher than the 22.5% reported by Bozic *et al.* [7] and the 13.9% observed by Oltean-Dan *et al.* [10] In our context, this instability may be linked to anatomical factors (abductor insufficiency), technical factors (implant malposition), or non-compliance with postoperative precautions by young patients eager to quickly return to normal activities.

A notable feature of our series is that 100% of the periprosthetic fractures (13.33% of cases) were Vancouver Type B2. This figure is significantly higher than the 5.80% fracture rate reported by Bozic *et al.* [7]. The systematic occurrence of Type B2 (unstable implant) suggests either high-energy trauma or the existence of chronic, unrecognized loosening that weakened the femur.

This severity is also reflected in the analysis of loosening, where SOFCOT Type 2 and Paprosky Grade 2A predominated, matching the observations of Lebeau *et al.* [9]. These significant bone losses are often the result of delayed diagnosis. As noted by Oltean-Dan *et al.* [10], prolonged consultation delays in regional centers explain why bone destruction is often advanced at the time of management, making revision surgery technically complex.

Finally, our septic loosening rate (3.33%) is remarkably low compared to the 14.80% reported by Bozic *et al.* [7] and the 23.20% reported by Oltean-Dan *et al.*

[10]. In the sub-Saharan African context, where infection control remains a challenge, this finding highlights the importance of rigorous perioperative protocols and suggests that regional centers may achieve outcomes approaching international standards. However, given the retrospective design and small sample size, the low rate of septic loosening should be interpreted descriptively rather than as definitive evidence of aseptic mastery.

5. Conclusions

This 11-year study confirms that aseptic loosening is the primary cause of THA revision at the Idrissa Pouye General Hospital (46.67%), with an average implant survival of 10 years.

However, two major challenges stand out: the high frequency of dislocations (26.67%), linked to the young and active profile of the patients, and the severity of periprosthetic fractures (100% Vancouver Type B2), underscoring the predominance of unstable implants and the technical challenges they pose during revision surgery. Conversely, the low rate of infectious complications (3.33%) highlights the quality of the initial management.

Improving outcomes will require increased precision during primary surgery and the establishment of rigorous radioclinical follow-up, which is essential for detecting mechanical failures before the onset of massive bone loss.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Malviya, A., Abdul, N. and Khanduja, V. (2017) Outcomes Following Total Hip Arthroplasty: A Review of the Registry Data. *Indian Journal of Orthopaedics*, **51**, 405-413. https://doi.org/10.4103/ortho.ijortho_177_17

[2] Puget, J. (2005) Les prothèses totales de la hanche. Les choix. Masson Elsevier, 498.

[3] Meira, E.P. and Zeni, J. (2014) Sports Participation Following Total Hip Arthroplasty. *International Journal of Sports Physical Therapy*, **9**, 839-850.

[4] Kelmer, G., Stone, A.H., Turcotte, J. and King, P.J. (2021) Reasons for Revision: Primary Total Hip Arthroplasty Mechanisms of Failure. *Journal of the American Academy of Orthopaedic Surgeons*, **29**, 78-87. https://doi.org/10.5435/jaaos-d-19-00860

[5] George, A. and Ofori-Atta, P. (2019) Joint Replacement Surgery in Ghana (West Africa)—An Observational Study. *International Orthopaedics*, **43**, 1041-1047. https://doi.org/10.1007/s00264-019-04286-1

[6] Davies, P.S., Graham, S.M., Maqungo, S. and Harrison, W.J. (2019) Total Joint Replacement in Sub-Saharan Africa: A Systematic Review. *Tropical Doctor*, **49**, 120-128. https://doi.org/10.1177/0049475518822239

[7] Bozic, K.J., Kurtz, S.M., Lau, E., Ong, K., Vail, T.P. and Berry, D.J. (2009) The Epidemiology of Revision Total Hip Arthroplasty in the United States. *The Journal of Bone and Joint Surgery-American Volume*, **91**, 128-133. https://doi.org/10.2106/jbjs.h.00155

[8] Gastaud, O., Cambas, P.M. and Tabutin, J. (2016) Reprises de PTH par tige de prem-

ière intention après échec de l'implant fémoral. *Revue de Chirurgie Orthopédique et Traumatologique*, **102**, 118-122. https://doi.org/10.1016/j.rcot.2016.01.013

[9] Lebeau, N., Bayle, M., Belhaouane, R., Chelli, M., Havet, E., Brunschweiler, B., *et al.* (2017) Reprises de PTH par implant acétabulaire double mobilité cimenté dans une armature métallique: Analyse d'une série de 62 cas à 5 ans de recul minimal. *Revue de Chirurgie Orthopédique et Traumatologique*, **103**, 477-483. https://doi.org/10.1016/j.rcot.2017.05.026

[10] Oltean-Dan, D., Apostu, D., Tomoaia, G., *et al.* (2017) Causes of Revision after Total Hip Arthroplasty in an Orthopedics and Traumatology Regional Center. *Clujul Medical*, **90**, 85-89. https://doi.org/10.15386/mpr-2136

[11] Fen, X., Gu, J. and Zhou, Y. (2022) Primary Total Hip Arthroplasty Failure: Aseptic Loosening Remains the Most Common Cause of Revision. *American Journal of Translational Research*, **14**, 7080-7089.

[12] Kahlenberg, C.A., Swarup, I., Krell, E.C., Heinz, N. and Figgie, M.P. (2019) Causes of Revision in Young Patients Undergoing Total Hip Arthroplasty. *The Journal of Arthroplasty*, **34**, 1435-1440. https://doi.org/10.1016/j.arth.2019.03.014