



Original article

**Early Complications of Total Hip Arthroplasty (THA) Using Primary Total Hip Prostheses (THP)
Performed via the Röttinger Anterolateral Approach**

Les complications précoces des arthroplasties totales de la hanche (ATH) par prothèses totales de hanches (PTH) primaires réalisées par voie d'abord antérolatérale de Röttinger

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Résumé

Introduction : L'arthroplastie totale de la hanche (ATH) par prothèse totale de hanche (PTH) est devenue une pratique chirurgicale courante à l'hôpital Paul VI de Ouagadougou depuis 2004 sous forme de mission. Elle est pratiquée les mois de février et décembre de chaque année par une équipe belge et allemande. L'objectif de cette étude était de décrire les complications précoces rencontrées après plus de quinze ans d'expérience.

Méthodologie : L'étude était prospective descriptive sur une période de deux ans (décembre 2021 - décembre 2023). Elle a concerné 147 hanches opérées pour arthroplastie totale de la hanche primaire par voie antérolatérale de Röttinger (133 unilatérales et 7 bilatérales). L'âge moyen était de 45 ans [18 - 65], le sexe-ratio était de 1,12. L'ostéonécrose de la tête fémorale (ONTF) était l'indication de l'arthroplastie totale de la hanche dans 95,2 % des cas. Les

arthroplasties étaient non cimentées dans 74 % des cas. Les patients ont été régulièrement suivis à J21, J45, J90, J180 et J360 pour un contrôle radio-clinique. Des complications précoces ont été analysées avec un recul moyen qui était de 19 mois [12-24].

Résultats : Des complications précoces ont été retrouvées dans 14 cas (9,5 %). Il s'agissait de complications peropératoires dont un cas (0,68 %) de fracture diaphysaire du fémur ; un cas (0,68 %) de syndrome de scellement du ciment osseux et sept cas (4,76 %) d'atteintes nerveuses dont six cas de neurapraxie du nerf fémoral et un cas d'atteinte nerveuse sévère. Des complications postopératoires dont un (1) cas (0,68 %) d'infection postopératoire précoce (0,68 %). Trois (3) cas de luxation prothétique précoce (2,04 %) et un (1) cas de descellement précoce de cupule non cimentée (0,68 %).

Conclusion : Les complications des arthroplasties totales de la hanche retrouvées dans notre pratique

étaient peu fréquentes et comparables à celles décrites dans la littérature.

Mots-clés : complications, arthroplastie totale de la hanche ; prothèse totale de hanche, voie antérolatérale de Röttinger.

Abstract

Introduction: Total hip arthroplasty (THA) using a total hip prosthesis (THP) has been a routine surgical procedure at Paul VI Hospital in Ouagadougou since 2004, performed as part of a medical mission. It is performed every year in February and December by a Belgian and German team. The objective of this study was to describe the early complications encountered after more than fifteen years of experience.

Methodology: This was a prospective descriptive study conducted over a two-year period (December 2021-December 2023). It included 147 hips that underwent primary total hip arthroplasty via the Röttinger anterolateral approach (133 unilateral and 7 bilateral). The mean age was 45 years [18-65], and the sex ratio was 1.12. Femoral head necrosis (FHN) was the indication for total hip arthroplasty in 95.2% of cases. The arthroplasties were cementless in 74% of cases. Patients were regularly followed up at 21, 45, 90, 180, and 360 days for radiographic and clinical evaluation. Early complications were analyzed with a mean follow-up of 19 months [12-24].

Results: Early complications were observed in 14 cases (9.5%). These were intraoperative complications, including one case (0.68%) of a diaphyseal fracture of the femur; one case (0.68%) of cement-bone sequestration syndrome, and seven cases (4.76%) of nerve damage, including six cases of femoral nerve neuropathy and one case of severe nerve damage. Postoperative complications included one (1) case (0.68%) of early postoperative infection (0.68%), three (3) cases of early prosthetic dislocation (2.04%), and one (1) case of early loosening of an uncemented cup (0.68%).

Conclusion: Complications of total hip arthroplasty observed in our practice were infrequent and comparable to those described in the literature.

Keywords: complications, total hip arthroplasty; total hip prosthesis, Röttinger's anterolateral approach.

Introduction

Total hip prosthesis is an internal joint device designed to replace the hip joint and allow near-normal function [1]. Although hip prosthetic surgery has advantages justifying its indication, it remains burdened with significant peri- and postoperative risks and early complications that can be disabling [2-4] or even fatal [5]. Total hip arthroplasty is a common practice worldwide and quite widespread in Burkina Faso. The objective of this study was to evaluate the early complications of patients treated for total hip arthroplasty using a total hip prosthesis during the study period. The aim of our study was to enrich the scientific literature with data on the early complications of THPs performed at Paul VI Hospital in Ouagadougou.

Methodology

This was a prospective descriptive study covering a two-year period (December 2021-December 2023). Paul VI Hospital in Ouagadougou served as our study setting. All patients operated on during the study period for total hip arthroplasty via the Röttinger anterolateral approach were included in the study.

The Röttinger approach surgical technique consists of accessing the hip joint using a muscle-sparing technique between the tensor fascia lata and the gluteus medius muscles. An anterolateral skin incision between the anterosuperior iliac spine and the apex of the greater trochanter is performed. The fascia is incised in the direction of the skin incision. The plane between the tensor fascia lata muscle anteriorly and the gluteus medius muscle posteriorly is dissected with fingers. Dissection is continued and the reflected portion of the rectus femoris muscle is detached medially from the capsule. Retractors are inserted above and below the femoral neck to perform the capsulotomy [6] (Figure 1).

This anterolateral approach is an intermuscular route passing between the intermuscular space of the gluteus medius and the tensor fascia lata. It has the advantage of promoting rapid recovery with a low dislocation rate [7].

Total hip arthroplasty is performed as a medical mission every February and December of each year by a Belgian and German team at Paul VI Hospital since 2004. The implants used were cemented (26%) and cementless (74%) with a hard-on-soft friction couple. All our patients received analgesics, antibiotics, anticoagulants, and auto-rehabilitation after arthroplasty. Their hospital discharge was generally authorized on the 3rd postoperative day. Postoperative clinical follow-up (pain, mobility, and gait) as well as radiological follow-up was performed at 21, 45, 90 days, at 6 months, and finally at one year postoperatively to detect any early complications. This follow-up was conducted by two Burkinabe surgeons. For functional evaluation, they used the PMA (Perle Merle d'Aubigne) score [8].

We considered as early complications all complications occurring during the first year after arthroplasty.

The limitations of the study lie in the fact that it was monocentric, non-randomized, and the surgeons were visiting/missionary surgeons.

Our data were collected using Excel software and analyzed by STATA version 17 software.

In total, 140 patients including seven cases of bilateral arthroplasties, i.e., 147 total hip arthroplasties, met our inclusion criteria and constituted the study population. The mean age of patients was 45 years with extremes of 18 years and 65 years, and the sex ratio was 1.12 in favour of women. The right side was affected in 60.71% of cases. The indication for total hip arthroplasty was femoral head necrosis in 95.2% of cases (n=140).

Results

Early complications of total hip prostheses were infrequent in our study.

Intraoperative complications

We recorded one case (0.7%) of iatrogenic fracture of the femoral diaphysis. The fracture occurred on a cementless prosthesis. It was a 64-year-old patient with osteoporotic bone. We noted the fracture after placement of the prosthesis at the time of reduction.

One case (0.7%) of grade 3 bone cement sequestration syndrome (Donaldson) occurring in a patient during cement placement in the femoral shaft under pressure was reported. It required transfer of the patient to intensive care and despite resuscitation measures undertaken, the patient died on the 4th postoperative day.

In the present study, we recorded seven cases (4.76%) of nerve damage: six (6) cases of femoral nerve neuropathy with complete recovery at the 6-month postoperative follow-up, and one case of severe nerve damage with persistent paresis at 6 months postoperatively.

Postoperative complications

In our study, we noted one (1) case (0.7%) of early surgical site infection at the 21st postoperative day. It occurred in an immunocompromised patient with HIV whose viral load was 500 copies/ml of blood.

We recorded three cases (2%) of early prosthetic dislocations occurring between the 21st and 45th postoperative day. They occurred in male patients.

One case (0.7%) of early aseptic loosening of the cup on a cementless prosthesis at the 11th postoperative month was recorded in our study.

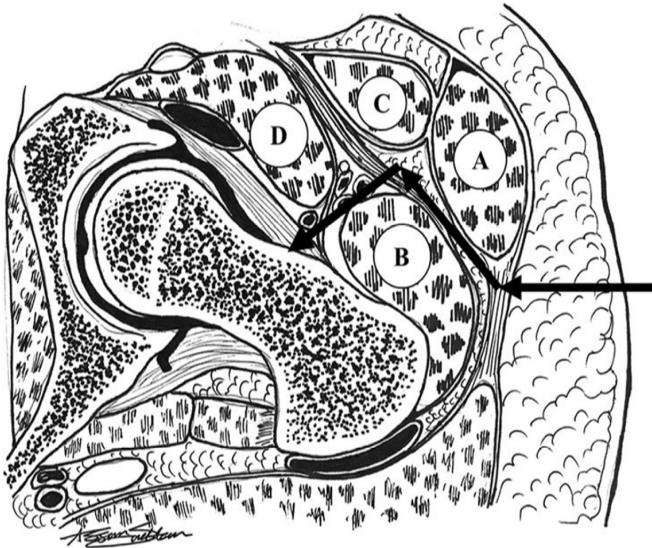


Figure 1: Image showing the dissection planes of the Röttinger approach (arrow). A, tensor fascia lata muscle; B, gluteus medius muscle; C, sartorius muscle; D, rectus femoris muscle.

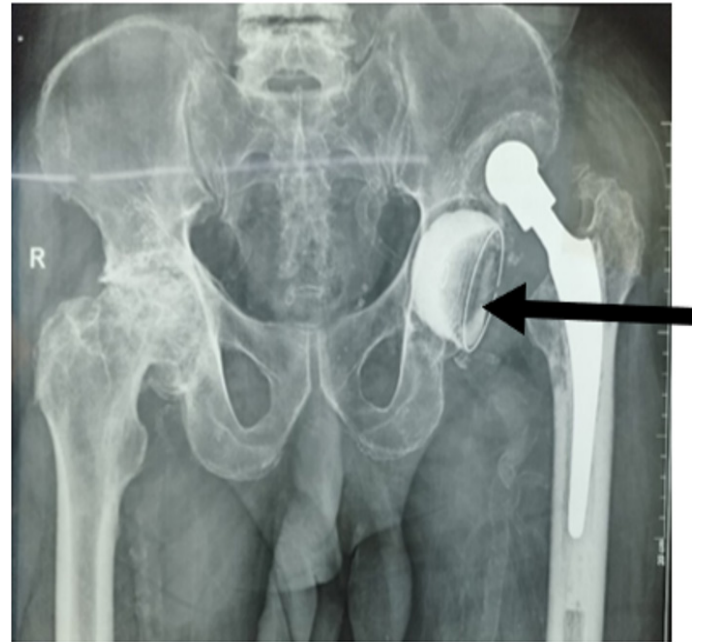


Figure 3: Radiograph of a patient showing loss of permanent relationship between the prosthetic head and the acetabulum, indicating prosthetic dislocation.



Figure 2: Control radiograph of a patient showing reduction + osteosynthesis with a hook plate associated with a diaphyseal plate + cerclage for an iatrogenic diaphyseal fracture of the femur.

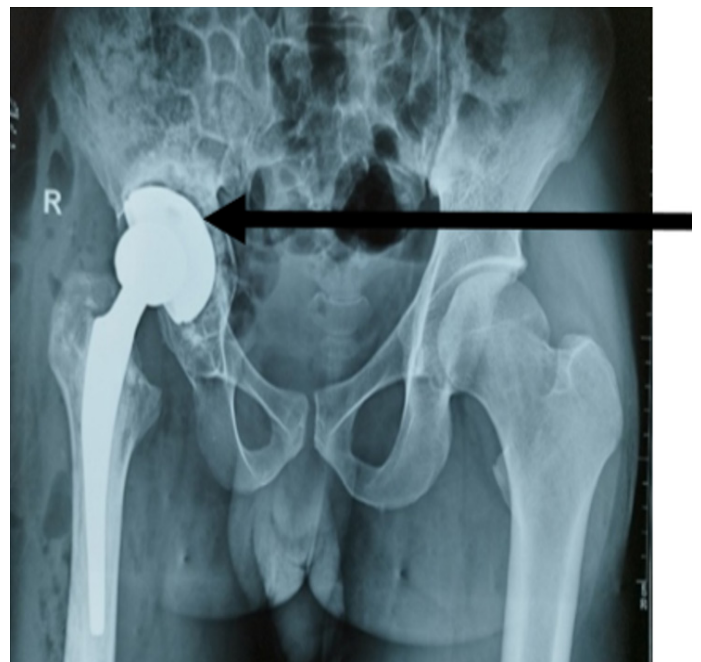


Figure 4: Radiograph of a patient showing a lucent line between the prosthetic acetabulum and the native acetabulum, indicating loosening of the cup.

Discussion

The rate of fractures during total hip arthroplasty varies between 0.1 and 1% in the literature [9]. These fractures are essentially represented by fractures of

the trochanteric mass or femoral diaphysis [10]. In our study, we noted 1 case (0.7%) of femoral diaphyseal fracture, which is consistent with the literature [9]. This is related to increased stress on the femur during reduction of the prosthesis on osteoporotic bone.

The management of this fracture consisted of reduction plus osteosynthesis with a hook plate in the same operative session. The outcome was favourable with fracture consolidation after 3 months. In the literature, some authors explant the stem and use a revision prosthesis with a long locked stem [4]. We used plates because we do not have prostheses with long locked stems.

Bone cement implantation syndrome (BCIS) is a potentially fatal complication of orthopaedic surgery, occurring when cement is injected under pressure into bone, causing pulmonary embolism. BCIS is characterized by hypoxia and/or hypotension (with possible loss of consciousness) contemporaneous with bone cementing. The frequency of the severe form in the literature leading to cardiovascular collapse is 0.5 to 1.7%, and mortality is high [11]. In this study, we noted one (1) case (0.7%) with the patient's death despite transfer to an intensive care unit on the fourth postoperative day, which is consistent with the literature [11]. The patient's death could be explained by the absence of an intensive care unit at Paul VI Hospital, requiring several hours (5 hours) before finding a destination centre with an intensive care unit. Our patient's SC haemoglobinopathy may have contributed to his death. To prevent bone cement implantation syndrome, the surgeon must warn the anaesthetist before cement placement, wash and dry the femoral shaft, apply cement in a retrograde manner using a suction cannula and an intramedullary plug in the femoral shaft, and avoid applying excessive pressure. The anaesthetist must optimize haemodynamics in pre- and perioperative periods, aim for a systolic blood pressure within + 20% of the value before induction, prepare vasopressors to treat any potential cardiovascular collapse, and remain vigilant for cardiorespiratory failure [11].

Neurological complications depend on the approach

used. In the literature, we have encountered cases of femoral nerve damage manifesting as anaesthesia or paresis of the anterior aspect of the thigh and a deficit of leg extension via the anterolateral approach [12]. The frequency of femoral nerve damage in the literature varies between 1.5% and 6% [12]. We recorded in our study 7 cases (4.76%) of nerve damage. These lesions were probably due to nerve stretching during the intervention, which explains their complete recovery after physiotherapy sessions.

In the literature, surgical site infection rates after total hip arthroplasty are observed between 0.4 and 1.5% [3]. The occurrence of infection after THA is a very serious but also very difficult complication to manage. In the present study, we noted 1 case (0.7%) of early surgical site infection. The occurrence of this infection was probably due to our patient's immunocompromised status due to HIV. Clinically, we noted pain in the operated hip, serohaemorrhagic discharge, and local-regional inflammatory signs. On radiography, the prosthesis was in place. C-reactive protein was positive at 63 mg/L. Cytobacteriological study plus antibiogram were performed and allowed isolation of *Staphylococcus aureus*, which was sensitive to amoxicillin-clavulanic acid and ciprofloxacin. Treatment was medico-surgical with revision for debridement + sampling + lavage + drainage without prosthesis explantation. It was completed by antibiotic therapy for six weeks. The outcome was favourable with termination of suppuration, wound healing, and normalization of C-reactive protein after 6 weeks without recurrence. In the literature, other authors recommend prosthesis explantation [13].

Dislocation is a complication that may occur after total hip arthroplasty, one of the complications that could call into question the results of total hip arthroplasty. Its frequency according to published series varies between 0.11 and 9% [3, 9, 14]. In this study, we noted 3 cases (2.1%) of dislocations. Several predictive factors for early dislocation are: patient non-compliance adopting dislocating positions, muscle weakness increasing with age, and technical

error. Therapeutically, reduction was performed under general anaesthesia completed by traction for three weeks then rehabilitation in two of our patients. We noted one case of instability after reduction, and we indicated a bloody reduction with change to a longer head. A good outcome was noted in all our patients.

Early loosening of the acetabular component constitutes the most concerning problem of total hip arthroplasties. It leads to a difficult revision due to degradation of the supporting bone tissues. In the present study, we noted one case (0.7%) of early cup loosening. Studies in the literature have shown that acetabular loosening is responsible for 5.4% of total hip arthroplasty revisions [4]. This early loosening would be explained by a technical error. This low rate compared to the literature would be explained by the fact that our study was based on early complications, whereas loosening generally belongs to late complications. The indication for revision was given and consisted of cup change with reimplantation at its former cavity without reconstruction ring or bone graft. We noted a good outcome for the patient.

Conclusion

Early complications of total hip arthroplasty are very serious. They can call into question the effectiveness of total hip arthroplasty. Their management is often difficult and complicated. It requires a competent surgeon and good patient cooperation to obtain satisfactory results. The early complications of total hip arthroplasty observed in our practice were infrequent and comparable to those described in the literature. These complications can be further minimized by good surgical planning.

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