Case Report

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Early Aseptic Loosening following Uncemented Total Hip Arthroplasty Managed with Extended Trochanteric Osteotomy: A Case Report

Orthopaedics Section

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ABSTRACT

Early aseptic loosening following Total Hip Arthroplasty (THA) is an uncommon complication that may indicate implant-related, technical or biomechanical factors when it occurs within a short interval after primary arthroplasty. Early diagnosis along with timely revision surgery are important aspects in preserving bone stock while improving functional outcomes. Early aseptic loosening following THA is known as an uncommon but very significant cause of postoperative hip pain and functional limitation. The present case reports a 56-year-old male having progressive right hip pain, difficulty in ambulation two years following uncemented THA which was performed for avascular necrosis of femoral head. Clinical evaluation of patient showed no signs of infection and inflammatory markers were normal. Radiographs demonstrated progressive periprosthetic radiolucent lines around the femoral stem, suggestive of aseptic loosening. A diagnosis of aseptic implant loosening was established after excluding infective as well as other causes. The patient underwent revision THA during which acetabular component was found stable while the femoral stem was well fixed distally thus necessitating an Extended Trochanteric Osteotomy (ETO) for safe removal. A long uncemented revision stem was implanted showing satisfactory stability and osteotomy was fixed with cerclage wiring. Postoperative recovery was uneventful with good functional outcome. This case highlights the importance of early recognition of aseptic loosening and demonstrates the role of ETO in facilitating safe femoral stem removal and successful revision arthroplasty.

Keywords: Acetabulum, Femoral stem, Osteolysis

CASE REPORT

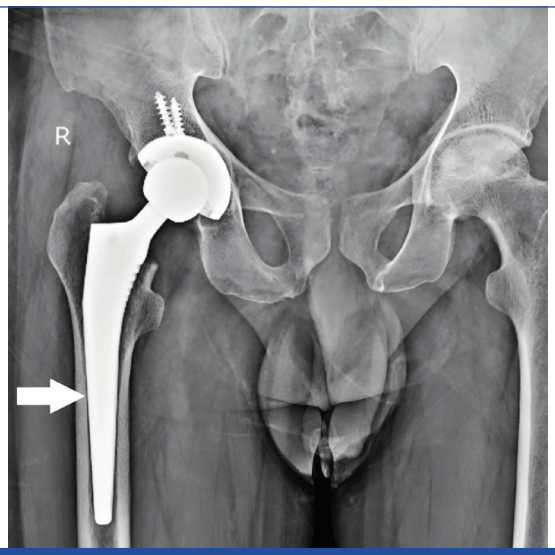
A 56-year-old male patient presented to the orthopaedic outpatient department having complaints of pain in right hip for past three months. The pain was gradual in onset, dull-aching in nature and initially moderate in intensity. It progressively worsened over time which was associated with difficulty in walking, performing daily activities. The pain radiated to right lower limb and was relieved by rest and lying down. There was no history of trauma, fever, seizures, loss of consciousness. The patient previously had undergone a right-sided total hip replacement approximately two years ago for avascular necrosis of femoral head. He had no significant medical co-morbidities such as diabetes mellitus, hypertension, asthma or tuberculosis and his recovery was uneventful postoperatively until the onset of the current symptoms. Operative details of the primary procedure confirmed an uncemented prosthesis with an uneventful immediate postoperative period. The patient remained asymptomatic until the onset of the current complaints. Prior to current presentation, the patient had been managed conservatively but experienced no significant relief.

On general examination, he was vitally stable and afebrile. Systemic examination showed no significant abnormalities. Local examination of right hip showed a healed surgical scar without any signs of infection such as sinus formation or discharge [Table/Fig-1]. There was tenderness over greater trochanter and anterior joint line. No obvious swelling or deformity was noted. Range of motion of hip could not be adequately assessed due to pain. Distal neurovascular status was intact along with palpable peripheral pulses, preserved motor and sensory function.

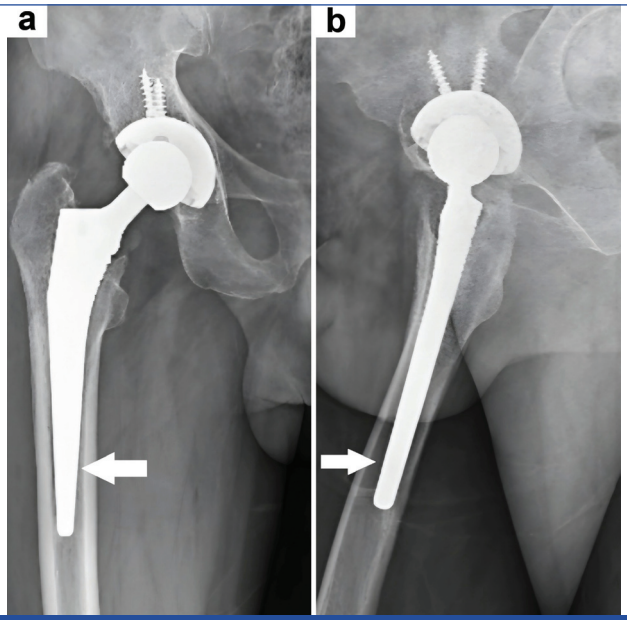
Radiological evaluation of pelvis with both hips showed a previously operated right hip having prosthesis in situ suggestive of implant-related pathology [Table/Fig-2]. Features suggestive of aseptic loosening such as progressive periprosthetic radiolucent lines were noted [Table/Fig-3]. Laboratory investigations such as serum Erythrocyte Sedimentation Rate (ESR) and C-reactive protein were within normal limits and microbiological culture of excised periprosthetic soft-tissue showed no growth thereby ruling out infective aetiology. Based on clinical, radiological, and laboratory findings, a diagnosis of aseptic implant loosening in a previously operated case of right total hip replacement was made. The relatively early onset of loosening within two years suggested possible biomechanical, micromotion, or implant-related causes.

[Table/Fig-1]: Clinical photograph showing healed surgical scar over right hip.

The patient was planned for revision THA. Under spinal and epidural anaesthesia, the procedure was performed using previous surgical approach. The acetabular component was assessed intraoperatively and found to be stable without any evidence of loosening. Intraoperatively, the femoral stem demonstrated loss of proximal fixation, while the diaphyseal portion remained well fixed



[Table/Fig-2]: Preoperative X-ray pelvis showing right hip prosthesis in situ.

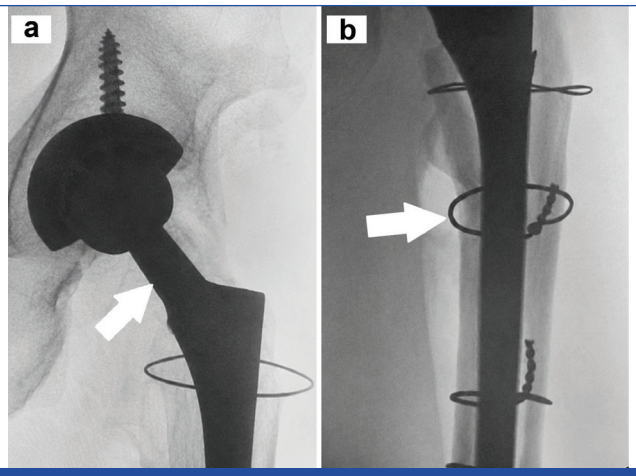


[Table/Fig-3]: X-ray pelvis showing progressive periprosthetic radiolucent lines, suggestive of aseptic loosening: a) Anteroposterior view; b) Lateral view.

distally, thereby necessitating an ETO for safe removal without cortical damage [Table/Fig-4]. The femoral canal was prepared, and revision diaphyseal stem uncemented prosthesis was implanted,

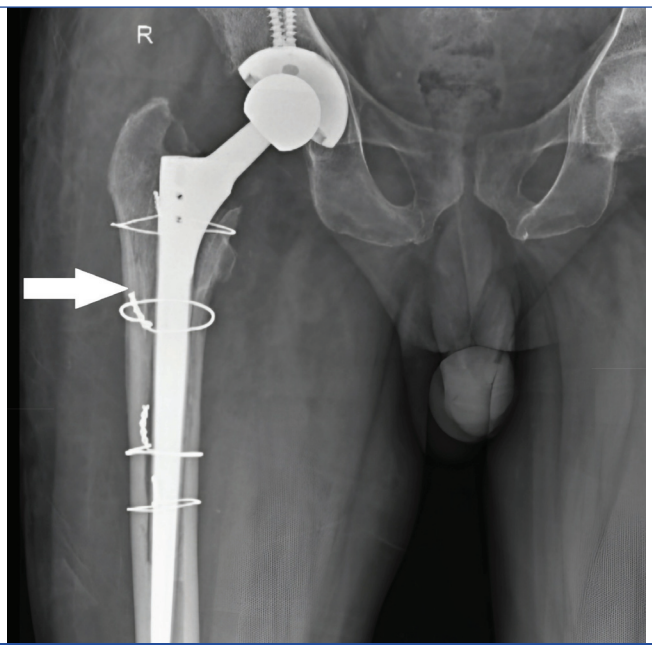
[Table/Fig-4]: Intraoperative image depicting Extended Trochanteric Osteotomy (ETO).

achieving satisfactory stability [Table/Fig-5]. The osteotomy site was stabilised using stainless steel wires. Postoperative recovery was uneventful and he was managed with analgesics, antibiotics, anticoagulants and physiotherapy.



[Table/Fig-5]: Intraoperative fluoroscopy image showing implantation of revision diaphyseal stem prosthesis: a) Fluoroscopy after THA with diaphyseal stem; b) Femoral stem fixation with multiple cerclage wires.

At discharge, the patient was haemodynamically stable along with a healthy surgical site [Table/Fig-6]. Distal circulation and neurological status were preserved and patient was advised to continue physiotherapy, avoid squatting and cross-legged sitting as well as follow-up regularly in the orthopaedic outpatient department. At the 2-month follow-up, the patient remained asymptomatic with satisfactory functional recovery and no implant-related complications.



[Table/Fig-6]: Postoperative X-ray pelvis showing well-aligned revision diaphyseal stem prosthesis in situ.

DISCUSSION

THA is a well-known and successful orthopaedic procedure for relieving pain and restoring function in patients with end-stage hip disorders [1]. Despite such excellent long-term outcomes, aseptic loosening is known as a leading cause of revision THA [1,2].Aseptic loosening is the failure of implant fixation in the absence of infection, which is commonly associated with particle-induced osteolysis, biomechanical stress, micromotion at the bone-implant interface along with failure of osseointegration in uncemented prostheses [2,3]. Aseptic loosening is usually considered as a long-term cause of arthroplasty failure; thus, loosening occurring within a few years after primary arthroplasty should prompt evaluation for implant-related, technical or patient-related factors [3]. Revision surgery

Author	Patient details	Clinical presentation	Radiological/Intraoperative findings	Management	Outcome
Koulischer S et al., [5]	64-year-old female having acromegaly along with growth hormone-secreting pituitary adenoma	Recurrent right hip pain since five years after uncemented THA	Peri-implant lucency with migration and loosening of acetabular component without any signs of infection; intraoperatively stable femoral stem	Revision THA along with isolated acetabular component replacement; retained femoral stem	Pain free, restored hip range of motion at 2-year follow-up.
Gutiérrez-Jiménez R et al., [6]	76-year-old female with prior THA for severe coxarthrosis	Persistent right hip and thigh pain along with reduced mobility one year following THA	Radiolucency at implant-cement, bone-cement interface suggestive of femoral loosening; stable acetabular component; negative infection signs	Revision THA along with Extended Trochanteric Osteotomy (ETO), removal of loosened femoral stem and cement mantle, uncemented revision stem implantation with cerclage cable fixation	Pain free ambulation without any support at three months as well as satisfactory osteotomy healing, stable implants.
Zhu H et al., [7]	Case series of 4 patients having aseptic loosening after THA	Hip pain, limping gait, reduced mobility	Osteolysis, radiolucent lines, femoral stem subsidence, pedestal sign, acetabular migration/loosening, screw breakage along with extensive osteolysis	Revision THA using wire cerclage fixation, porous acetabular components, larger cups, screw augmentation and bone grafting depending on defect severity	Improved pain, mobility as well as stable postoperative implant positioning.
Neelaksh et al.,	56-year-old male with prior uncemented THA for avascular necrosis of femoral head	Progressive right hip pain, difficulty in walking and daily activities two years after THA	Periprosthetic radiolucent lines suggestive of aseptic loosening; inflammatory markers and cultures were negative; intraoperatively stable acetabular component; femoral stem well-fixed distally	Revision THA using ETO for safe removal of femoral stem, implantation of long uncemented revision stem, stainless-steel wire fixation of osteotomy	Uneventful postoperative recovery along with stable implant positioning, preserved distal neurovascular status.

[Table/Fig-7]: Comparative summary of revision THA cases with aseptic loosening [5-7].

in such cases can be technically challenging particularly when the femoral component is well fixed distally [4]. ETO has emerged as a valuable technique in revision THA, providing excellent femoral exposure, facilitating safe removal of well-fixed stems, preserving surrounding bone stock, and enabling reliable osteotomy healing [4]. In present case, distal fixation of the femoral stem made conventional extraction difficult with risk of cortical injury. ETO enabled safe removal with preservation of bone stock and successful diaphyseal stem revision.

Koulischer S et al., reported a case of aseptic acetabular component loosening which occurred five years after uncemented THA in a patient having acromegaly, successfully managed using isolated acetabular revision arthroplasty [5]. Gutiérrez-Jiménez R et al., described femoral component aseptic loosening after one year of THA, managed successfully using revision arthroplasty with ETO as well as an uncemented revision stem [6]. Zhu H et al., reported a series of patients having symptomatic aseptic loosening after THA presenting with osteolysis and implant migration who underwent revision arthroplasty with satisfactory postoperative functional outcomes [7]. Comparative summary of revision THA cases with aseptic loosening is depicted in [Table/Fig-7] [5-7].

CONCLUSION(S)

The present case highlights early aseptic loosening as an uncommon but important cause of painful THA, even within a short postoperative interval following uncemented implantation. Careful clinical, radiological and laboratory evaluation is an essential aspect to exclude infection, other differential diagnoses. ETO proved to be an effective surgical technique for the management of a well-fixed distal femoral stem thereby allowing safe component removal, preservation of bone stock as well as successful revision with a long uncemented stem. Early recognition, timely revision are crucial for achieving favourable functional outcomes and implant stability.

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