

## Case Report

# Diagnostic dilemma and management of peri-prosthetic joint infection presenting as recurrent dislocation following acetabular fracture fixation: a case report

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### ABSTRACT

Peri-prosthetic joint infection (PJI) can often mimic mechanical failure or present subtly following trauma. We present a 60-year-old male with a history of bilateral Total Hip Arthroplasty (THR) who presented with pain and inability to walk two months following a road traffic accident. The patient had previously undergone acetabular plating for a fracture-dislocation of the left hip, followed by a recurrent dislocation treated with closed reduction. On presentation, inflammatory markers were raised (ESR 54, CRP 40). Suspecting infection, we did Synovial fluid aspiration that revealed frank purulence with a WBC count  $>30,000/\text{mm}^3$  and 99% neutrophils. As per MSIS 2018 Criteria our case had  $>6$  score. The patient was diagnosed with PJI and underwent a first-stage revision arthroplasty involving implant removal, thorough debridement, and insertion of an antibiotic-loaded cement spacer with absorbable antibiotic beads. This case highlights the importance of ruling out infection in cases of recurrent dislocation and aseptic loosening, even when a clear history of trauma exists. Pre-operative aspiration remains the gold standard for diagnosis.

**Keywords:** Arthroplasty, Joint prosthesis, Implants, Infection, Peri prosthetic, Acetabular fracture

### INTRODUCTION

Total Hip Arthroplasty (THR) is a successful procedure, but complications such as aseptic loosening, dislocation, and Peri-prosthetic joint infection (PJI) remain significant challenges.<sup>1</sup>

Diagnosing PJI can be particularly difficult in patients with recent trauma or surgical intervention (such as fracture fixation), as inflammatory markers may be elevated due to tissue injury rather than infection.<sup>2</sup>

This case report discusses a diagnostic challenge where a patient presented with mechanical symptoms of dislocation and fracture, masking an underlying severe PJI.

### CASE REPORT

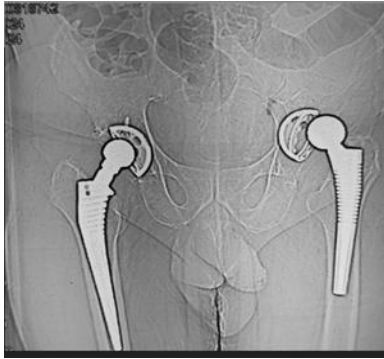
#### *Patient profile and history*

A 60-year-old male with a history of chronic alcohol consumption presented with complaints of pain in the left hip and inability to bear weight for two months.

#### *Past medical history*

The patient had undergone bilateral THR due to Avascular Necrosis (AVN). The right hip was operated on in 2016, and the left hip was operated on in 2018 using a metal-on-polyethylene implant elsewhere. In March 2024, the patient experienced a sudden jerk in the right hip and was treated with closed reduction, and in October 2024 (index

event), sustained a road traffic accident resulting in a left-sided acetabular fracture with dislocation of the left total hip replacement prosthesis (Figure 1).



**Figure 1: Initial trauma leading to peri-prosthetic acetabular fracture with dislocation of left THR prosthesis.**

#### **Course prior to current presentation**

On 19/10/2024, immediate management involved open reduction and internal fixation (ORIF) with acetabular plating and reduction of the prosthesis (Figure 2), performed elsewhere. On 25/10/2024 (one week postoperatively), the left hip dislocated again (Figure 3) and was treated with closed reduction, and the patient has now presented to us in August 2025.



**Figure 2: Initial management with open reduction internal fixation for acetabular peri-prosthetic fracture.**

#### **Clinical examination**

Two months post-trauma, the patient presented with the left limb in external rotation with varying shortening. There was tenderness over the lateral aspect of the left hip. Range of motion was painful and restricted. Notably, there was no local warmth, erythema, or discharging sinus.

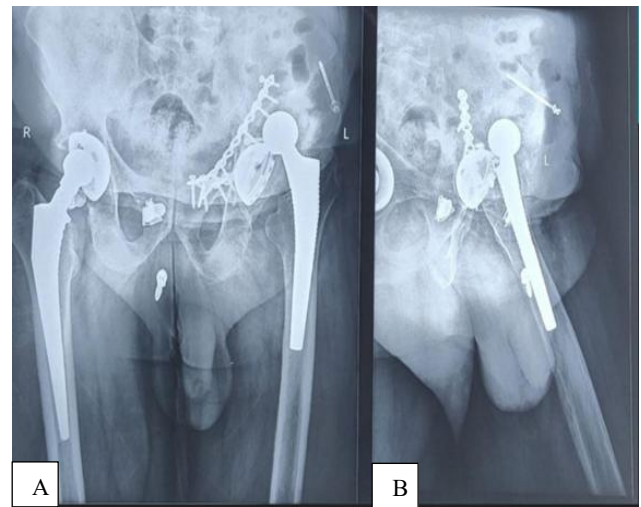
#### **Radiological investigations**

X-rays showed the left THR prosthesis in situ with evidence of the previous acetabular plating and signs

suggestive of loosening/dislocation. CT imaging confirmed the implant position and the status of the acetabular columns.



**Figure 3: Dislocated left THR prosthesis with acetabular plate in situ.**



**Figure 4 (A and B): Current X ray presentation.**

#### **Laboratory investigations**

The patient had an elevated ESR of 54 mm/h and CRP of 40 mg/l, with a total leukocyte count of 11,000/mm<sup>3</sup>, and an HbA1c of 8.1%, indicating uncontrolled diabetes.



**Figure 5: Aspirated fluid from left hip joint.**

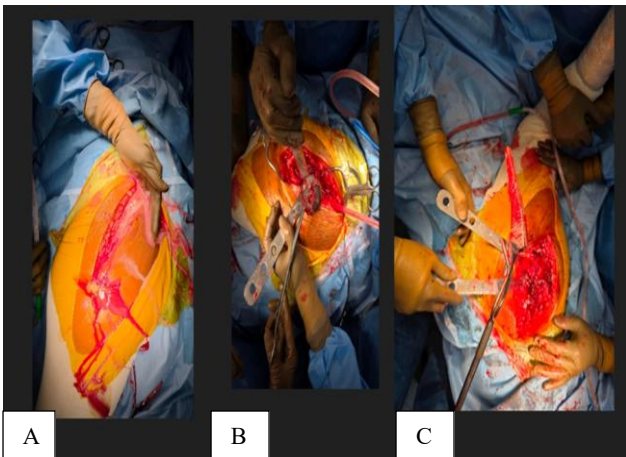
### Diagnostic workup and decision making

The case presented a diagnostic dilemma, as according to the Musculoskeletal Infection Society (MSIS) 2018 criteria it was initially inconclusive for infection, with raised ESR and CRP but no major criteria such as a sinus tract, and the recent trauma and surgery potentially explaining the elevated markers; therefore, to differentiate between mechanical failure and infection, a hip aspiration was performed, yielding 10 ml of thick purulent fluid (Figure 5).

**Fluid analysis:** The synovial fluid analysis showed a total white blood cell count of more than 30,000/mm<sup>3</sup> with 99% neutrophils, and a CRP level of 64. Based on these findings, a diagnosis of Periprosthetic Joint Infection (PJI) was confirmed. MSIS -8.<sup>1,2</sup>

### Surgical management

**Plan:** A two-stage revision protocol was selected.<sup>3</sup> Stage 1 involved explant removal, debridement, and spacer insertion, followed by Stage 2, which consisted of delayed re-implantation after infection control.



**Figure 6: (A) purulent fluid revealed on incision and (B and C) explanted prosthesis without instrumentation (loose).**



**Figure 7: Antibiotic cement spacer.**

### Intra-operative findings

Surgery revealed approximately 600 cc of thick purulent fluid in inter muscular as well as within the joint. The femoral implant was grossly loose and could be extracted without the use of instruments (Figure 6).

### Procedure

Thorough radical debridement was performed. An antibiotic-loaded cement spacer was inserted (Figure 7). Additionally, absorbable antibiotic beads (Stimulan) were used to increase local antibiotic delivery.

### DISCUSSION

This case illustrates the complexity of diagnosing PJI in the setting of recent trauma. The patient had no history of fever, and the clinical presentation was dominated by mechanical instability (dislocation). Reliance solely on serum markers (ESR/CRP) would have been insufficient given the recent trauma and repeated dislocation. Serum markers often lack specificity, as they can be significantly elevated secondary to recent tissue injury, fracture healing, and the physiological response. Coagulase-negative staphylococci and *Staphylococcus aureus* are the most common microorganisms in hip and knee.<sup>4</sup>

Studies have showed surgical debridement along with calcium sulphate bead insertion is effective in treating bone and joint infections without any side effects and complications.<sup>5</sup> The decision to aspirate was critical. The synovial fluid analysis provided the definitive diagnosis, shifting the surgical plan from a simple revision or fixation to a septic exchange. The intra-operative finding of a grossly loose implant further confirmed the chronicity of the infection, which likely contributed to the instability and failure of the previous reduction. For confirmed chronic PJI with grossly loose implants, procedures such as Debridement, Antibiotics, and Implant Retention (DAIR) are contraindicated.

A DAIR procedure is not recommended as a curative surgical strategy in patients with a loose prosthesis, more than 12 weeks after the index arthroplasty, symptoms lasting more than 3 weeks, compromised soft tissues where primary closure is not possible, and/or the presence of a sinus tract.

A two-stage revision arthroplasty remains the standard of care to ensure complete biofilm eradication before definitive re-implantation.<sup>3</sup> During the first stage, thorough radical debridement and complete ex-plantation were performed. We utilized an antibiotic-loaded cement spacer combined with absorbable antibiotic beads to deliver highly concentrated local antimicrobial therapy while preserving soft tissue tension and managing the surgical dead space. This approach optimizes the joint environment for a planned delayed definitive reconstruction, which will likely require a dual mobility cup with impaction bone

grafting and a revision femoral stem to appropriately address the compromised bone stock and mitigate the high risk of further dislocation.

## CONCLUSION

In cases of recurrent dislocation or implant failure following trauma, orthopaedic surgeons must maintain a high index of suspicion for underlying infection. Lab parameters should be interpreted with caution, and pre-operative joint aspiration is essential for guiding surgical planning. A missed diagnosis of infection leads to catastrophic failure of revision surgeries; therefore, a two-stage approach remains the standard of care for confirmed PJI.

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