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Tuberculous periprosthetic joint infection in a total knee arthroplasty: A rare case report

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Abstract
Periprosthetic joint infection (PJI) is a serious complication of total knee arthroplasty (TKA), commonly caused by bacterial pathogens. Tuberculosis (TB) as a cause of PJI is rare and presents diagnostic and therapeutic challenges. We present the case of a 50-year-old diabetic and hypertensive woman who developed TB PJI two years after TKA. Diagnosis was confirmed via histopathology and TruNAAT, and she was managed with implant removal, spacer insertion, and anti-tubercular therapy as per NTEP guidelines.

Keywords: Tuberculosis, periprosthetic joint infection, total knee arthroplasty, case report, mycobacterium tuberculosis

Introduction

Periprosthetic joint infection (PJI) remains one of the most challenging complications following total knee arthroplasty (TKA). While the majority of PJIs are bacterial, *Mycobacterium tuberculosis* accounts for fewer than 1% of cases. Delayed diagnosis can lead to significant morbidity. We describe a case of tuberculous PJI in a middle-aged woman from a TB-endemic region, with emphasis on keeping tubercular infection as a possibility in our differential diagnosis.

Case Report

A 55-year-old woman, known diabetic and hypertensive on regular medications, presented with a 3-year history of right knee pain and discharging sinus for the last 4 months. She had undergone a right total knee replacement on 23rd January 2023. Postoperatively, she remained symptomatically better for some time but later reported persistent discomfort, and eventually developed wound discharge over the past few months.

Fig 1: Wider view showing the knee joint with localized inflammation and sinus discharge suggestive of chronic infection. Image courtesy: ESI-PGIMSR, New Delhi

Fig 2: Close-up preoperative image showing discharging sinus over the anterior aspect of the right knee.
Image courtesy: ESI-PGIMSR, New Delhi

Fig 3: Preoperative plain x-ray radiograph of the right knee showing femoral and tibial component of TKA
Image courtesy: ESI-PGIMSR, New Delhi

X-ray of the right knee revealed well-fixed prosthesis with periprosthetic lucency. She underwent debridement with implant removal and antibiotic-loaded cement spacer insertion. Tissue samples sent intraoperatively revealed granulomatous inflammation on histopathology. TruNAAT testing confirmed *Mycobacterium tuberculosis* (4.5×10^{00} cFU/mL). ZN stain was negative for AFB. Based on these findings, a diagnosis of tuberculous periprosthetic joint infection was made.

Histopathological Assessment

Tissue samples sent intraoperatively revealed granulomatous inflammation on histopathology.

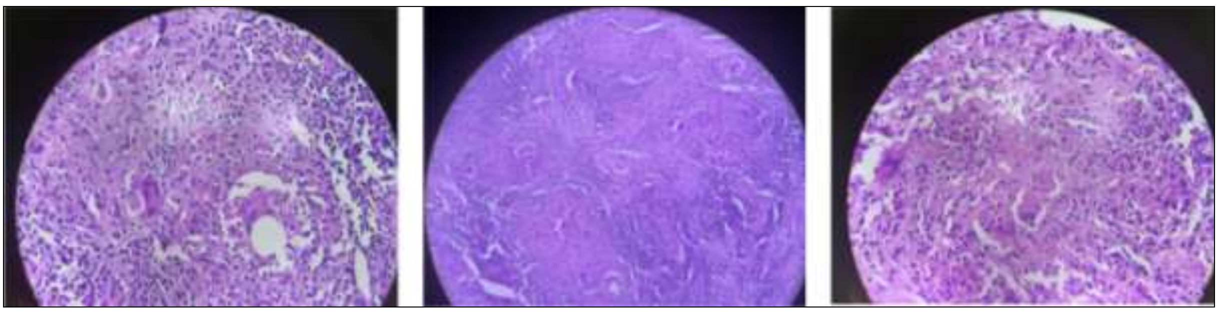

Fig 4: Image courtesy: ESI-PGIMSR, NEW DELHI

Management and Outcome

Following implant removal and spacer placement, the patient was initiated on anti-tubercular therapy (ATT) as per NTEP guidelines starting from March 2025. She is currently on a 5-drug fixed dose combination (HRZE) and is under regular follow-up. At her most recent visit, the surgical wound had healed well and there was no recurrence of discharge or systemic symptoms. Her inflammatory markers (ESR AND CRP) are trending downwards, and she is planned for reimplantation once infection is controlled.

Fig 5: Post op plain X- ray radiograph showing removed TKA implant with spacer insertion Image courtesy: ESI-PGIMSR, NEW DELHI

Discussion

Tuberculous PJI is a rare but increasingly recognized cause of chronic prosthetic joint infection, especially in TB-endemic areas. Delayed wound healing, persistent pain, and sterile cultures should raise suspicion. Diagnosis relies on histopathology and molecular testing such as TruNAAT or GeneXpert. In this case, the TruNAAT was positive despite a negative AFB stain, reinforcing its utility.

Treatment typically involves implant removal, spacer placement, and prolonged ATT. The current regimen under NTEP includes a 5-drug fixed dose combination for intensive phase. A staged approach to reimplantation after infection clearance is the preferred strategy.

Conclusion

Tuberculosis should be considered in the differential diagnosis of chronic or culture-negative PJIs, particularly in endemic regions. Early detection and a combined medical-surgical approach can result in good outcomes. Molecular tests such as TruNAAT play a key role in diagnosis, especially when conventional staining is negative.

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