

Infection of a total hip arthroplasty with *actinomyces israelii*: Report of a case

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Abstract

Context: Infection of following total hip arthroplasties can be classified based on the timing of infection. Late infections with *Actinomyces israelii* are extremely rare with only 3 previously reported cases in literature. We present another case of a late infection with *Actinomyces israelii* in a total hip arthroplasty 9 years following implantation. **Case Report:** A 71-year-old male with diabetes mellitus presented with right hip pain 9 years following a total hip arthroplasty. Physical examination revealed localised pain and biochemical investigations showed elevated inflammatory markers. X-rays were suspicious for infection and a collection around the prosthesis was confirmed by MRI scan. The patient underwent debridement and removal of prosthesis. Peri-operative specimen cultures isolated *Actinomyces israelii*. The patient responded to a combination of vancomycin followed by ciprofloxacin and linezolid therapy before undergoing a successful second-stage reimplantation surgery. **Conclusion:** This is the first reported case of late haematogenous infection by *Actinomyces israelii* in a total hip arthroplasty in a patient with diabetes mellitus as the only risk factor. The patient was successfully treated with antibiotic therapy and two-stage reimplantation arthroplasty.

Keywords: Total hip arthroplasty, late infection, actinomyces, diabetes mellitus.

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Introduction

Infection following total hip arthroplasties can be classified based on the timing of infection: early is defined as occurring within 1 month of prosthesis implantation, delayed occurring between 1 month and 1 year, and late infection occurring more than 1 year after implantation. With improvements in surgical technique and implant designs, survival rates of prosthesis have increased significantly [1]. Unfortunately, prosthetic infection continues to be a serious complication, with incidences in large series reported up to 1.7% for primary THAs [2]. Late infections by *Actinomyces israelii* has only been described in 3 cases in the English literature [3-5]. We

report a further case of *A. israelii* causing infection in a prosthetic hip joint 9 years following implantation.

Case Report

A 71-year-old man presented to outpatient clinic with right hip pain of 3 months duration. His past medical history included right and left total hip arthroplasties [THA] performed 9 and 10 years previously at another institution and Type 2 diabetes mellitus. Physical examination revealed clinical signs of localised pain in the right hip, with a reduced range of movement compared to the left. No further relevant symptoms were elicited. X-rays of the hip showed osteolysis of the femoral stem tip and were

suspicious for loosening of the acetabular component.

The patient was admitted for investigation of an infected THA. Laboratory studies demonstrated elevated inflammatory markers with erythrocyte sedimentation rate of 71 mm/h and c-reactive protein of 65 mg/l. White cell count and blood glucose level were in the normal range.

Joint aspiration revealed purulent synovial fluid. Microscopic analysis identified many leukocytes but no microorganisms. A MRI scan was performed which revealed the presence of a collection around the prosthetic joint. Presuming an infected right THA, the patient underwent revision surgery, where the prosthesis was found to be loose and purulent fluid surrounded the joint. The prosthesis was removed and an antibiotic-loaded bone cement spacer was implanted. Several biopsies of periprosthetic tissue were taken intra-operatively for microbiological investigation and subjected to culture. In all specimens *Actinomyces israelii* was isolated, sensitive to penicillin, teicoplanin, vancomycin, ciprofloxacin and linezolid.

Post-operatively the patient received intravenous teicoplanin, which was changed to vancomycin once antibiotic sensitivities were available. He received 6 weeks of intravenous antibiotics in total, before being discharged with ciprofloxacin and linezolid orally. He underwent the second-stage of the re-implantation arthroplasty 3 months following the first stage revision once inflammatory markers had normalised. Cultures and gram stains from the second-stage surgery was negative. The patient is now one-year post revision surgery. He is well with no clinical or laboratory evidence of infection.

Discussion

Infection after total joint arthroplasty is a serious complication. Early and delayed infections are mainly regarded as the result of bacterial seeding in the perioperative period, whereas late infections are predominantly caused by haematogenous seeding from endogenous sites [6]. Diabetes mellitus has been shown to increase the risk of infection in patients having primary arthroplasties [2, 7]. Other risk factors include post-traumatic osteoarthritis, previous surgery, chronic liver disease, corticoid therapy and intravenous drug abuse [8].

Actinomyces israelii is a filamentous gram-positive anaerobic bacterium of low pathogenicity that is frequently isolated from the gastrointestinal tract, bronchi, oral cavities and female genital tract [4, 5]. Pathogenesis most commonly involves dental caries or gingival disease, with infections of the lung or abdomen being the next most common. *A. israelii* infection in THA is extremely rare, with 3 reported cases in literature. In the first case, infection developed 1 year after joint replacement where the authors could not rule out bacterial implantation at the time of surgery [3]. In the second, infection developed 10

years after prosthesis implantation following dental work without antibiotic prophylaxis [4]. In the third, infection was associated with intravenous drug abuse [5]. In the present case, infection occurred 9 years after primary arthroplasty with diabetes mellitus the predominant risk factor.

Treatment of *A. israelii* infection in THA involves a combination of surgical and medicinal therapy. In all of the cases including the present study, the implant was removed surgically before the patient was commenced on high dose antibiotic therapy. In two cases, reimplantation surgery was possible once the microorganism was eradicated from the affected hip. One case was lost to follow-up and one case developed a fistulae which was later superinfected with *Staphylococcus aureus*.

Conclusion

This is the first reported case of late haematogenous infection by *Actinomyces israelii* in a total hip arthroplasty in a patient with diabetes mellitus as the only risk factor. The patient was successfully treated with antibiotic therapy and two-stage reimplantation arthroplasty.

References

1. Herberts PMH, Garellick G. Annual Report 2003 - Swedish National Hip Arthroplasty Register. Goteb: Department of Orthopedics Sahlgrenska University Hospital 2004.
2. Lai K, Bohm ER, Burnell C, Hedden DR. Presence of medical comorbidities in patients with infected primary hip or knee arthroplasties. *J Arthroplasty* 2007; 22(5): 651-656.
3. Petrini B, Welin-Berger T. Late infection with *Actinomyces israelii* after total hip replacement. *Scand J Infect Dis* 1978; 10(4): 313-314.
4. Strazzeri JC, Anzel S. Infected total hip arthroplasty due to *Actinomyces israelii* after dental extraction. A case report. *Clin Orthop Relat Res* 1986; 210: 128-131.
5. Zaman R, Abbas M, Burd E. Late prosthetic hip joint infection with *Actinomyces israelii* in an intravenous drug user: case report and literature review. *J Clin Microbiol* 2002; 40(11): 4391-4392.
6. Rieber H, Schwarz R, Krämer O, Cordier W, Frommelt L. *Actinomyces neuii* subsp. *neuii* Associated with periprosthetic infection in total hip arthroplasty as causative agent. *J Clin Microbiol* 2009; 47(12): 4183-4184.
7. Jain NB, Guller U, Pietrobon R, Bond TK, Higgins LD. Comorbidities increase complication rates in patients having arthroplasty. *Clin Orthop Relat Res* 2005; 435:232-238.
8. Cordero-Ampuero J, de Dios M. What are the risk factors for infection in hemiarthroplasties and total hip arthroplasties? *Clin Orthop Relat Res* 2010; 468 (12): 3268-32677.