

## CASE REPORT

# Late Prosthetic Hip Joint Infection with *Actinomyces israelii* in an Intravenous Drug User: Case Report and Literature Review

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**Late infections with *Actinomyces israelii* have been described for prosthetic hip joints but not in association with intravenous drug use. We present a case of a 43-year-old intravenous drug user who developed *A. israelii* infection in connection with a hip prosthesis 11 years after implantation, and we review four previously reported cases of *Actinomyces* prosthetic joint infections.**

### CASE REPORT

A 43-year-old female, an active intravenous drug user with avascular necrosis of the head of the femur as a consequence of steroid use for treatment of Guillain-Barré syndrome, was treated with a total right hip arthroplasty at the age of 30. She required revision of the procedure a year later for unclear reasons. Eleven years later, she developed gradual and progressive pain at the site of the arthroplasty. The patient sought medical attention 5 months later. The patient denied having a history of recent dental manipulation or intrauterine device use.

On physical examination, the following vital signs were noted: a temperature of 38.3°C, a heart rate of 101 beats per min, a respiratory rate of 20 breaths per min, and a blood pressure of 143/77 mm Hg. The patient's dental hygiene was good. Examination of the heart revealed no murmurs. The right lower extremity was painful and short by 5 in. and had limited range of motion.

The peripheral blood leukocyte count was 6,400/ml with a normal differential. The sedimentation rate was 120 mm/h. X rays of the hip showed cortical irregularity and lucency of the femur shaft. Analysis of the aspirated synovial fluid revealed a leukocyte count of 37,000/ml with 95% being neutrophils. A Gram stain showed a moderate number of polymorphonuclear leukocytes without organisms. Anaerobic cultures on pre-reduced sheep blood agar plates grew many opaque white colonies of gram-positive, irregular bacilli. The organism was identified as *Actinomyces israelii* with the RapID ANA II preformed enzyme detection panel (Remel Inc., Norcross, Ga.) and by the presence of moderate acetic acid and major succinic acid peaks on gas-liquid chromatography. Antibiotic susceptibility testing was done by Etest (AB Biodisk, Solna, Sweden) and revealed susceptibility to cefotaxime (MIC of 0.125 µg/ml), cefoxitin (MIC of 0.19 µg/ml), metronidazole (MIC of

2 µg/ml), penicillin (MIC of 0.125 µg/ml), and clindamycin (MIC of 0.094 µg/ml).

The patient refused surgery at the time and returned 2 months later with persistent symptoms. A repeat Gram stain of the synovial fluid revealed rare polymorphonuclear leukocytes without organisms, and cultures again grew *Actinomyces*. Following this result, the patient was admitted to the hospital. She underwent surgery, where loosening of the prosthesis and the presence of necrotic tissue were noted. The prosthesis was removed, and intra-articular vancomycin and tobramycin antibiotic beads were inserted. In addition, 3 g of ampicillin was administered every 6 h. After being in the hospital for 20 days, the patient left against medical advice and was lost to follow-up.

*A. israelii* is a gram-positive anaerobic bacterium that is frequently isolated from the gastrointestinal tract, bronchi, and female genital tract (6). It most commonly causes infections of the oral and cervicofacial area (which account for 55% of all *A. israelii* infections), with infections of the lungs (15%) and the abdomen (20%) being the next most common types of infection (2, 4, 10). Musculoskeletal disease is usually secondary to the spread of adjacent soft tissue infection (in 75% of cases), trauma (in 19% of cases), and hematogenous spread of infection (in 3% of cases) (5).

Late prosthetic joint infections with *Actinomyces* spp. have been previously described (3, 7, 8, 11, 12). The usual risk factors have been dental extraction (11) and intrauterine device use. Late infections (>1 year after the operation) are usually due to hematogenous spread from an extra-articular site (1). Primary infections may include pharyngitis, otitis media, pneumonia, urinary tract infections, cholecystitis, and dental caries.

The patient we reported had none of these infections prior to admission or at the onset of symptoms.

**Literature review.** A comprehensive review of the English language literature from 1966 to the present was done by using PubMed and Ovidweb. Four cases of *Actinomyces* prosthetic joint infections were identified (Table 1). No comorbid condi-

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TABLE 1. Cases of *Actinomyces* late prosthetic hip joint infections

Patient (reference)	Age	Sex <sup>a</sup>	No. of yr since orthopedic implant in hip	Treatment	Follow-up or outcome
1 (11)	61	F	10	Prosthesis removal and intravenous penicillin	Reimplantation 8 mo later, asymptomatic at 6-mo postoperative follow-up
2 (12)	77	F	7	Intravenous antibiotics	Complete recovery
3 (7)	74	F	1	Prosthesis removal and intravenous penicillin	Nonfunctioning joint due to secondary <i>Staphylococcus aureus</i> osteitis
4 (8)		M	2	Unknown	Unknown

<sup>a</sup> F, female; M, male.

tions, such as diabetes mellitus, malignancy, or steroid use, were included in the descriptions. Two patients had to have the prosthesis removed, and one patient improved with treatment with antibiotics alone (cefuroxime and rifampin). In all four cases, the hip joint was involved. None of the patients had intravenous drug use as a risk factor or evidence that they were intravenous drug users.

Diagnosis is confirmed by bacteriological identification of the organism from a sterile specimen. If the specimen is obtained from the oral cavity, genital tract, or bronchial washings, the demonstration of sulfur granules is required for the diagnosis. Some experts suggest that it is necessary to treat actinomycosis infections with high doses of antibiotics for a prolonged time (9). Eighteen to 20 million U of penicillin intravenously per day is required for 2 to 6 weeks, followed by oral amoxicillin, ampicillin, or penicillin V at 500 mg four times a day for 6 to 12 months. In patients with a penicillin allergy, tetracycline has been used with success. In pregnant patients, erythromycin can be used. A combination of medicinal and surgical therapy is often needed.

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