Septic Arthritis Caused by *Mycobacterium kansasii* in a Prosthetic Knee Joint

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**CASE REPORT**

An 82-year-old man was admitted to the hospital because of the gradual appearance of pain, erythema, and swelling in his right knee 6 years after total replacement of that knee. The patient first noticed the pain 6 months before admission. On admission, the patient was afebrile, and physical examination revealed monoarthritis of the right knee. Laboratory tests upon admission disclosed mild normocytic anemia (hemoglobin, 9.5 g%), a normal leukocyte count (7,500/mm³), mild thrombocytosis (732,000/mm³), an elevated sedimentation rate (105 mm/h), and hypoalbuminemia (3.1 g%). Results of other routine laboratory tests were within normal limits. A chest X-ray was normal. History and physical examination revealed no signs of overt or occult bleeding and no suspected malignancy. It was assumed that all laboratory abnormalities reflected chronic infection of the knee joint. During arthroscopy, implant loosening and wide necrosis of periprosthetic tissue were noted. Gram and acid-fast stains of synovial fluid were negative. Aerobic, anaerobic, and mycobacterial cultures were sterile. Histologic examination of a synovial biopsy specimen revealed chronic inflammation with granuloma formation. Acid-fast staining of synovial material revealed numerous acid-fast bacilli. At this point, empirical antituberculosis treatment was started. To confirm the nature of the pathogen, a 439-bp fragment encompassing the *hsp65* gene was amplified by PCR and subsequently digested with BstEII and HaeIII endonucleases, generating a restriction pattern typical of *Mycobacterium kansasii*. Empirical therapy was changed to ethambutol, rifampin, clarithromycin, and ciprofloxacin. The molecular identification was later confirmed by standard methods in a hospital laboratory.

*Mycobacterium kansasii* is a relatively common cause of nontuberculous mycobacterial pulmonary infection. Septic arthritis caused by *Mycobacterium kansasii*, on the other hand, is rare. Reported here for the first time is the case of an 82-year-old patient with an infection of a prosthetic knee joint with *Mycobacterium kansasii*.

*Mycobacterium kansasii* causes pulmonary infection in immunocompromised hosts, most commonly patients with AIDS (9), but can also occur in immunocompetent patients. *Mycobacterium kansasii* septic arthritis has been described but is rare. In a retrospective study and review of literature published by Bernard et al. in 1999, only 50 cases of *Mycobacterium kansasii* septic arthritis were described. None of them involved a prosthetic joint (2). Native joint infection caused by *Mycobacterium kansasii* is usually an indolent disease. Monoarthritis of the knees or wrists is the most common clinical manifestation, although systemic disease and polyarthritis occur in patients with underlying chronic disease (2). The disease is usually diagnosed by culturing a synovial biopsy specimen. Acid-fast staining and culture of synovial fluid are positive in less than 15% of cases described. The rarity of the disease and the frequently negative synovial fluid culture explain the delayed diagnosis in most cases—14 months on average (2).

Patients with *Mycobacterium kansasii* septic arthritis have been divided by Bernard et al. into two groups (2). The first group includes immunocompetent patients, the majority of whom either were treated with local injections of steroids or suffered local trauma. The second group includes patients with underlying systemic disease. The most common underlying disease described was human immunodeficiency virus infection. Systemic lupus erythematosus, rheumatoid arthritis, psoriatic arthritis, myelodysplasia, renal transplantation, polymyositis, and systemic sclerosis have also been described. Appropriate treatment cured the infection for most patients.

Prosthetic joint infection with *Mycobacterium tuberculosis* and *Mycobacterium fortuitum*, but not with *Mycobacterium kansasii*, has been described before. *Mycobacterium tuberculosis* septic arthritis results either from local reactivation in a pre-
viously infected joint or from hematogenous spread (8). In cases involving clinically infected or malfunctioning prostheses, antituberculosis chemotherapy alone is unsuccessful, and removal of the prosthetic joint is required. Medical treatment without implant removal has been described for *Mycobacterium tuberculosis* joint infection unexpectedly found during arthroplasty (7).

Fewer than 10 cases of *Mycobacterium fortuitum* prosthetic joint infection have been described (5). Cure required removal of the prosthesis in all these cases.

The source of mycobacterial infection in a prosthetic joint 6 years after implantation is unclear. Late bacterial infections of prosthetic joints are predominantly acquired by hematogenous seeding (10). Disseminated *Mycobacterium kansasii* involving joints has been described but is unlikely with involvement of only one joint and no other clinical manifestations (6). Known risk factors for *Mycobacterium kansasii* septic arthritis in immunocompetent hosts are local trauma and intra-articular injection of steroids, neither of which was reported by the patient. A local reactivation phenomenon is common in *Mycobacterium tuberculosis* prosthetic joint infection (7) but is less likely in this case, since disease caused by *Mycobacterium kansasii* usually represents chronic infection rather than reactivation (6).

We assume that the most likely pathogenesis of infection in this case is introduction of the organism either through minor trauma of the skin unnoticed by the patient or intraoperatively. *Mycobacterium kansasii*, an organism that has been cultured from tap water (1), was possibly introduced into the artificial joint during the implantation procedure. The slow-growing nature of the organism might explain the lag time between inoculation and clinical infection.

Diagnosis of mycobacterial arthritis is difficult due to the low yields of mycobacterial staining and culture of synovial fluid. In the case described here, the pathogen was rapidly identified using molecular methods, enabling the institution of appropriate medical therapy 35 days before *Mycobacterium kansasii* was detected in synovial tissue culture. Due to the slow growth of mycobacteria, it is possible that routine use of rapid molecular identification would result in better clinical outcomes of mycobacterial septic arthritis in general.

Late bacterial infections developing more than 24 months after joint replacement are preferably treated with a two-stage replacement operation, with implantation of a new prosthesis 6 weeks after removal of the infected joint and initiation of antibiotic therapy (10). The case of mycobacterial prosthetic joint infections is different due to the chronic nature of infection. The clinical response to medical treatment is slow, and implantation of a new prosthetic joint is usually not feasible. Infection of a prosthetic joint with *Mycobacterium kansasii* resulted in loss of the prosthetic joint and severe long-term disability.

To the best of our knowledge, this is the first report of infection of a prosthetic joint with *Mycobacterium kansasii*.

REFERENCES