Multifocal Infection of *Mycobacterium* Other Than Tuberculosis Mimicking a Soft Tissue Tumor of the Extremity

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**abstract**

*Mycobacterium* other than tuberculosis infections rarely develop in healthy individuals, but direct inoculation such as contaminated acupuncture can cause mycobacteriosis even in an immunocompetent host. A 56-year-old woman gradually developed pain on the anterior aspect of the left knee and the distal thigh after hiking without trauma. She received acupuncture for 3 consecutive days on the bilateral knees at the suprapatellar and infrapatellar areas. After acupuncture, mild localized heat and painful swelling developed around the knees bilaterally. Magnetic resonance imaging (MRI) demonstrated soft tissue masses with a lobulated contour at the prefemoral fat between the suprapatellar pouch and the distal femur and at the proximal tibia behind the knee joint capsule. Fibromatosis, pigmented villonodular synovitis, and soft tissue sarcoma were considered. On pathologic examination, multiple granulomas with lymphoplasmatic infiltration were evident, and acid-fast bacteria staining revealed acid-fast bacilli. A mycobacterial culture confirmed *Mycobacterium* other than tuberculosis infection, and a polymerase chain reaction-fragment length polymorphism assay identified the isolates as *Mycobacterium abscessus*. After treatment with appropriate antibiotics, the patient had no evidence of disease and reported no pain during activities of daily living.

Acupuncture is growing in prominence in Europe and the United States, and the number of reports on complications increases with its widespread use. Although the risk to an individual patient is difficult to determine, acupuncture may cause serious complications in patients with coagulopathy, heart valve disease, and immune deficiency. In addition, direct inoculation such as contaminated acupuncture can cause mycobacteriosis even in an immunocompetent host.

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**Mycobacterium** other than tuberculosis infections rarely develop in healthy individuals but are substantially more common in immunocompromised hosts. They may present with various clinical manifestations dependent on host immune status, such as disseminated disease, primary cutaneous infection, postoperative infection, pulmonary infection, keratitis, and cervical lymphadenitis. Proposed mechanisms of musculoskeletal involvement include hematogenous spread, contamination during surgical procedures, or injury in an immunocompromised host.

This article describes a case of *Mycobacterium* other than tuberculosis infection of the extremities that developed after acupuncture around the bilateral knee joints of an immunocompetent host that was confused with soft tissue tumor. The patient was informed that data concerning the case would be submitted for publication.

**CASE REPORT**

A 56-year-old woman developed pain gradually on the anterior aspect of the left knee and the distal thigh after hiking without trauma. She was treated with oral nonsteroidal anti-inflammatory drugs and physical therapy at a local clinic for 1 month, but her symptoms persisted. She opted for alternative medicine and received acupuncture for 3 consecutive days on the bilateral knees at the suprapatellar and infrapatellar areas. She did not report the history of acupuncture before we performed a biopsy. After those treatments, mild localized heat and painful swelling developed around the knees bilaterally, and she was admitted to another hospital for 15 days but reported no significant improvement. She was transferred to our institution for further evaluation and treatment.

She had no general illness that made her susceptible to infectious disease. Physical examination revealed mild heat around the knees bilaterally and small amounts of effusion in both knee joints. A conventional smear/culture and cytologic examination of knee joint aspirates did not suggest infection. Laboratory findings showed slightly elevated erythrocyte sedimentation rate and C-reactive protein. Magnetic resonance imaging (MRI) demonstrated soft tissue masses with a lobulated contour at the prefemoral fat between the suprapatellar pouch and the distal femur and at the proximal tibia behind the knee joint capsule. They also showed low-signal masses on T1-weighted images (Figures 1A, B), heterogenous intermediate signal on T2-weighted image (Figure 1C), and a well-enhanced mass on enhancing image (Figure 1D). Based on MRI findings, fibromatosis, pigmented villonodular synovitis, and soft tissue sarcoma were considered.

On incisional biopsy, a grossly turbid fluid was found, so the entire mass was excised under the impression that it was a kind of infection. On pathologic examination, multiple granulomas with lymphoplasmatic infiltration were evident (Figures 2A, B) and acid-fast bacteria staining revealed acid-fast bacilli (Figure 2C). A mycobacterial culture confirmed *Mycobacterium abscessus*. After confirmation of *M. abscessus*, intravenous amikacin and high-dose cefoxitin (8 g/day) were given for 4 weeks. Following intravenous injection therapy, antibiotics were switched to oral agents such as clarithromycin, ciprofloxacin, and doxycycline for 6 months.
Twelve months postoperatively, the patient showed no evidence of disease and reported no pain during activities of daily living.

**DISCUSSION**

*Mycobacterium* other than tuberculosis is a ubiquitous organism found in both water and soil. Although first observed soon after Koch’s discovery of the tubercle bacillus, *Mycobacterium* other than tuberculosis was not widely recognized as a human pathogen until the 1950s. The organisms are frequently isolated from soil, the sputum and saliva of healthy persons, and even from scrub sinks in operating rooms. Although their existence does not mean infection or disease, the majority of isolates from sources other than sputum are clinically significant and disease producing. Rapid-growing mycobacteria such as *M. fortuitum*, *M. chelonae*, and *M. abscessus* are the most common mycobacteria other than tuberculosis associated with nosocomial disease. Several authors have reported rapidly growing mycobacteria associated with nosocomial infections after augmentation mammoplasty, median sternotomy, laparotomy, percutaneous catheterization, and hip replacement arthroplasty. Maloney et al. reported an *M. abscessus* outbreak associated with endoscopy.

Musculoskeletal infection by *Mycobacterium* other than tuberculosis can lead to osteomyelitis, septic arthritis, tenosynovitis, and bursitis. The mechanisms of musculoskeletal alterations include hematogenous spread and contamination following injury or surgery. However, because of its scarcity, reports of musculoskeletal involvement of *Mycobacterium* other than tuberculosis are rare, and the treatment protocol of *Mycobacterium* other than tuberculosis infection of the musculoskeletal system is not established by subspecies. According to the American Thoracic Society, drug therapy or combined surgical and medical therapy is recommended for nonpulmonary *Mycobacterium* other than tuberculosis infection. For serious disease caused by *M. abscessus*, intravenous amikacin is given at a dose of 10 to 15 mg/kg in 2 divided doses to adult patients with normal renal function. The amikacin combined with high-dose cefoxitin (12 g/day given intravenously) is recommended for initial therapy (minimum 2 weeks) until clinical improvement is evident. If organisms are susceptible to oral agents, therapy can be switched to 1 of these agents. The oral agents available for *M. abscessus* are clofazimine and clarithromycin. For serious disease, a minimum of 4 months of therapy is necessary to provide a high likelihood of cure. For bone infection, 6 months of therapy is recommended. Surgery is generally indicated with extensive disease or abscess formation or where drug therapy is difficult.

In our case, initial knee joint aspirates did not suggest an infectious condition, and soft tissue masses were palpable. We considered the possibility of unusual multiple pigmented villonodular synovitis or soft tissue tumor rather than infection. Furthermore, it seemed that multifocal infections without direct inoculation were unlikely in an immunocompetent host. However, postoperative pathologic examination and a mycobacterial culture proved the presence of *Mycobacterium* other than tuberculosis infection. After the diagnosis was confirmed, a careful history taking revealed that the patient had undergone acupuncture procedures in the regions.

Acupuncture is growing in prominence in Europe and the United States. In a recent review, 1.1% of the population sought acupuncture care during the past 12 months. Four percent of the US population used acupuncture at some time in their lives. The National Institutes of Health consensus statement concluded that acupuncture is efficacious in the management of postoperative and chemotherapy-induced nausea and vomiting and dental pain. Meanwhile, the number of reports on complications increases with the widespread usage of acupuncture. Minor disturbances include pain during insertion or withdrawal of the needle, skin irritation, minor bleeding or hematoma, and orthostatic dysregulation. Serious adverse events include local and systemic bacterial infections, the transmission of viral disease, and stab injuries of the central nervous system and internal organs, es-

![Figure 2: Photomicrographs of the pathologic specimen. Histologic features of the mass show a focus of acute inflammation. (hematoxylin and eosin stain; original magnification ×200) (A). An ill-defined granulomatous reaction shows collections of histiocytes and lymphoplasmacytes (B). A few intracytoplasmic acid-fast bacillary organisms were observed (C).](e954)
icularly the lungs, resulting in a pneumothorax. Although the risk to an individual patient is difficult to determine, acupuncture may cause serious complications in patients with coagulopathy, heart valve disease, and immune deficiency.

Mycobacterial infection as a complication of acupuncture has been recently described in a few case reports. Kim et al. reported primary cutaneous tuberculosis after acupuncture. All 3 patients had no evidence of immunodeficiency. In a report by Woo et al., all but 1 patient with systemic lupus erythematosus showed no underlying disease associated with immunodeficiency. Although mycobacteriosis including Mycobacterium other than tuberculosis is probably related to infection of an immunocompromised host, direct inoculation such as contaminated acupuncture can cause mycobacteriosis even in an immunocompetent host.

REFERENCES


