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CASE REPORT

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Septic arthritis of the wrist caused by *Mycobacterium intracellulare*: a case report

Kenji Kawamura, Hiroshi Yajima, Shohei Omokawa, Naoki Maegawa, Takamasa Shimizu, Yasuaki Nakanishi, Tsutomu Kira, Tadanobu Onishi, Naoki Hayami and Yasuhito Tanaka

Department of Orthopaedic Surgery, Nara Medical University, Shijyo-cho, Kashihara, Japan

ABSTRACT

Septic arthritis of the wrist is rare entity, especially; atypical mycobacterial infection of the wrist is extremely rare. We report a case of septic arthritis of the wrist caused by *Mycobacterium intracellulare*, which was successfully treated by radical debridement followed by wrist arthrodesis using vascularised fibular grafting.

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KEYWORDS
Septic arthritis; wrist; atypical mycobacterium; vascularised fibula graft

Introduction

Septic arthritis of the wrist is rare entity. In a report of 156 joints with septic arthritis, there were only five with involvement of the wrist, and *Staphylococcus aureus* was the usual causative organism.[1] Mycobacterial infection has recently become a common pathogen causing sepsis in acquired immunodeficiency syndrome (AIDS) patients but exceptionally rare as a cause of primary musculoskeletal disease.[2] We report on an extremely rare case of septic arthritis of the wrist due to *Mycobacterium intracellulare*, which was successfully treated by radical debridement followed by wrist arthrodesis using vascularised fibular grafting.

Case report

A 60-year-old housewife with systemic lupus erythematosus (SLE) came to our hospital with a painful and swollen left wrist. She was diagnosed with SLE when she was 44 years old, since then she has taken 10 mg of oral corticosteroid every day. Her wrist pain and swelling appeared two years before our hospital visiting. Two years ago, she underwent first incisional drainage of her left wrist at another hospital, and was diagnosed with infected wrist arthritis due to *M. avium–intracellulare complex* (MAC) by mycobacterial culture of specimens of the synovial fluid. She has received standard anti-tuberculous chemotherapy including isoniazid and rifampicin, and underwent two additional incisional drainages of her left wrist. However, septic arthritis of her left wrist would not resolve, and therefore she was referred to our hospital.

Physical examination revealed marked diffuse swelling of her left wrist. She had full range of motion of the elbow and forearm equal to the opposite limb; however, wrist motion is markedly restricted (20° of flexion and 30° of extension). Radiographs demonstrated characteristic findings of tuberculous arthritis: particularly, osteopenia with marginal erosions and diffuse lytic lesions involving the carpal bones, base of the metacarpal bones, and distal ends of the radius and ulna (Figure 1). Our initial treatment included surgical radical debridement and multidrug chemotherapy including clarithromycin, rifampicin, and ethambutol. All necrotic bones of the wrist were excised through a dorsal approach (Figure 2). After the radical debridement, the wrist was stabilised with two crossed Kirchner wires, and bone cement block including streptomycin sulphate was put in the dead space (Figure 3). A short arm splint was applied until the second stage operation was performed. *M. intracellulare* was detected by polymerase chain reaction (PCR) from specimens of the necrotic bones while *Mycobacterium avium* was not detected by PCR. Eight weeks later, wrist arthrodesis using vascularised fibular

CONTACT Kenji Kawamura kkenji@naramed-u.ac.jp Department of Orthopaedic Surgery, Nara Medical University, 840 Shijyo-cho Kashihara, Nara, 634-8522, Japan

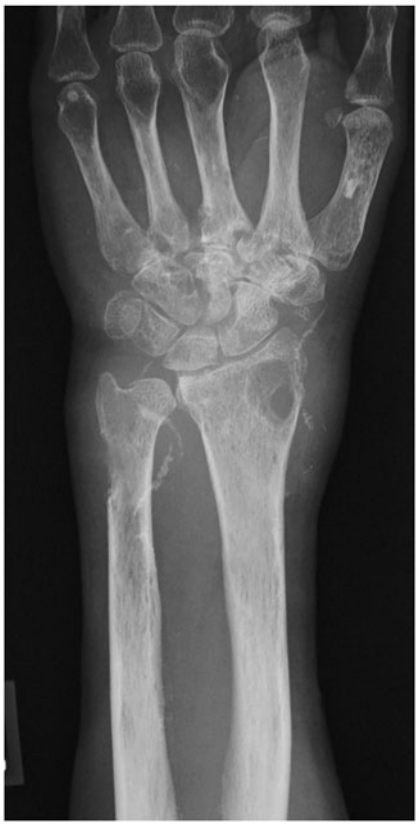

Figure 1. Preoperative radiograph showing an osteopenia with marginal erosions and diffuse lytic lesions in the carpal bones, base of the metacarpal bones, and distal ends of the radius and ulna.

grafting was performed. The vascularised fibular graft was harvested from the right leg. Through a volar approach, the bone cement was removed and the fibula was interposed between the third metacarpus and the shaft of the radius. The fibula was fixed to the metacarpus and the radius using plates and screws. Intraoperatively, the target fused wrist position was 15° extension. The length of the fibula was 7 cm. The peroneal artery and concomitant veins of the fibula were anastomosed to the radial artery and concomitant veins respectively. A peroneal flap was transferred with the fibula for monitoring vascular circulation. Long arm cast immobilisation for four weeks followed by a short arm splint were applied until bone union was confirmed. Finger exercises were performed immediately after surgery. Active forearm rotation was permitted at four weeks after surgery. There were no circulation problems of the grafted fibula after surgery. Bone union was obtained at four months after surgery. Chemotherapy was continued for six months after surgery. She retained 70° pronation and 90° supination with full range of motion of the thumb and fingers. Grip strength on the affected side was 7 kg, which was 41% of the unaffected side. The patient felt no wrist

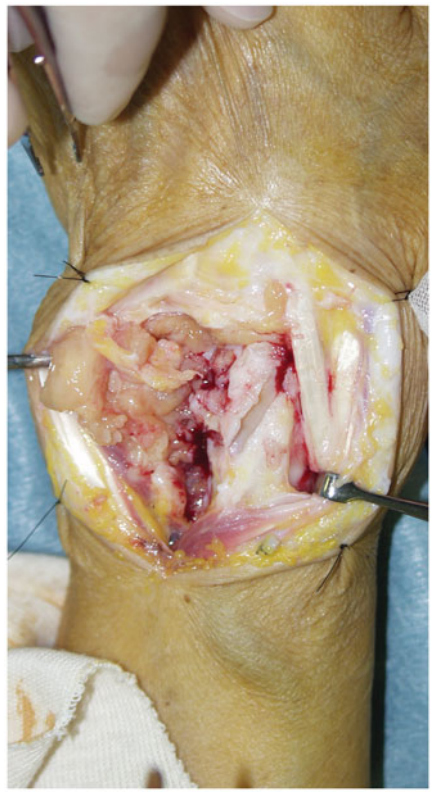

Figure 2. Intraoperative picture at the first debridement showing granuloma around the wrist joint.

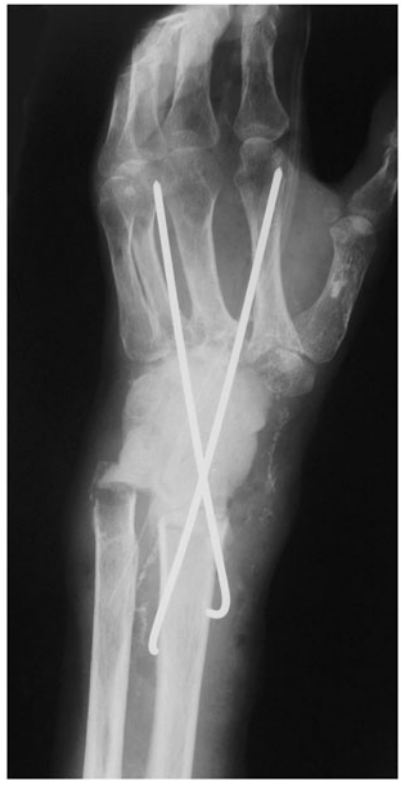

Figure 3. Radiograph after the radical debridement. The wrist was stabilised with two crossed Kirchner wires, and bone cement block including streptomycin sulphate was put in the dead space.

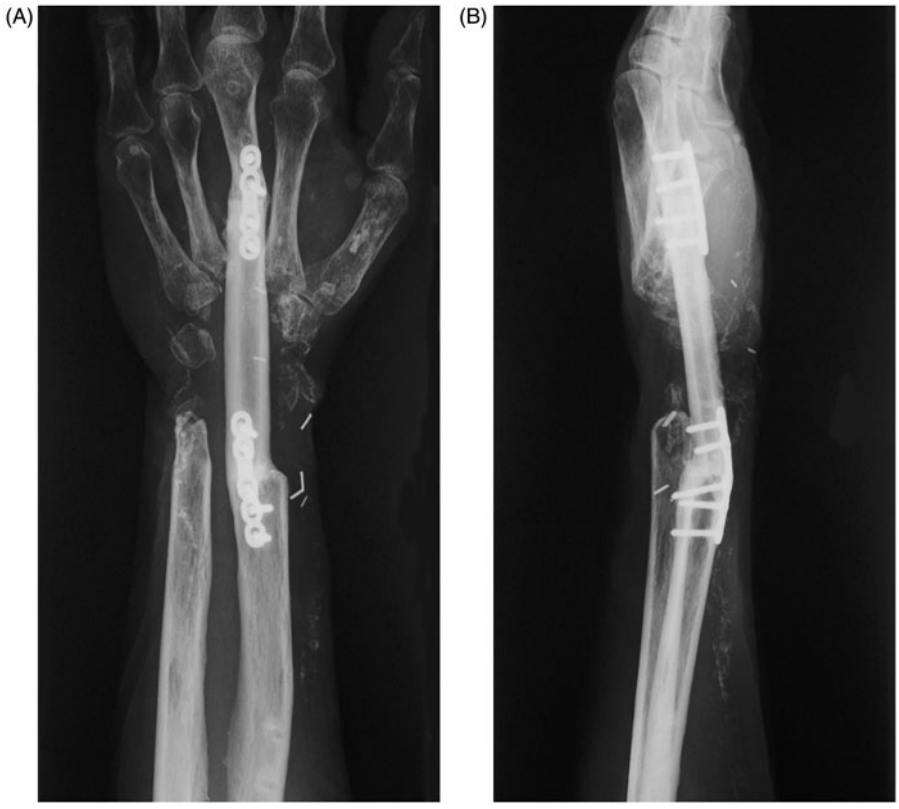

Figure 4. Radiographs 33 months after surgery showing complete union of both sides of the fibula: (A) posteroanterior view; (B) lateral view.

pain at the final follow-up, and there was no recurrence of infection between the follow-up periods of 33 months (Figure 4).

Discussion

Atypical or nontuberculous mycobacterial infection is a rare but serious hazard in immunocompromised patients including those undergoing maintenance haemodialysis and immunosuppressive therapy. The most common manifestations of atypical mycobacterial infection are pulmonary disease and lymphadenitis. Atypical mycobacterial infections of the musculoskeletal system are rare, especially; involving the hand and wrist is extremely rare.[2] There have been reports in recent years of tenosynovitis of the hand and wrist caused by atypical mycobacterial infections.[3] More than 50% of the reported cases of hand and wrist tenosynovial infections are due to *Mycobacterium marinum*, followed by *Mycobacterium kansasii*, and *M. avium–intracellulare complex*.[3] *M. avium* and *M. intracellulare* are closely related and difficult to distinguish from one another by conventional cultural and biochemical tests; therefore, they are often referred to as MAC. Recently, DNA probe technology was developed to identify the two MAC species, *M. avium* and *M. intracellulare*.[4] Many other atypical mycobacteria, including *Mycobacterium terrae*,[5] *Mycobacterium fortuitum*,[6] *Mycobacterium szulgai*,[7] and *Mycobacterium malmoense* [8] have been also reported to cause hand and wrist tenosynovitis.

In contrast to tenosynovitis, septic arthritis of the wrist caused by atypical mycobacteria has been rarely reported; despite the wrist is the most commonly infected upper extremity joint by *Mycobacterium tuberculosis*.[2] Most reported cases of atypical mycobacterial arthritis of the wrist are due to *M. marinum*.[9] *M. marinum* infections are associated with traumatic exposure to salt water or a fish tank in vocational or avocational activities. Like this, atypical mycobacterial infections are acquired by environmental sources, not by person-to-person transmission. This mode of transmission is in contradistinction to that of *M. tuberculosis*. On the other hand, *M. avium* and *M. intracellulare* are ubiquitous. Although MAC is the third most common infecting organism of atypical mycobacterial tenosynovitis of the hand and wrist,[3] to our best knowledge; there have been only five reported cases of septic arthritis of the wrist caused by MAC.[2] This might be because of misdiagnosis as *M. tuberculosis* infections. The clinical and radiological findings in atypical mycobacterial infection of musculoskeletal

system are very often indistinguishable from *M. tuberculosis*. The diagnosis depends on the results of tissue culture; however, it should be noted that cultures may not grow mycobacteria and MAC grows slowly on cultures and takes more than two month. Recently, the detection of mycobacteria by PCR to analyse nucleic acid sequence is recommended because it is rapid and accessible in most hospitals.[4] The current antibiotics recommended against MAC are a combination of clarithromycin, rifabutin, and ethambutol.[3] A combination of thorough surgical debridement and multidrug chemotherapy is recommended. With regard to surgical treatment of previously reported five cases, four cases were treated with only debridement and one case was treated with limited intercarpal fusion using iliac crest bone graft after debridement.[2] For septic arthritis with the destructed wrist like our case, radical debridement followed by total wrist arthrodesis using vascularised fibular grafting is recommended.[10]

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