

Mycobacterium Chelonae Infections Associated With Bee Venom Acupuncture

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We report 3 cases of *Mycobacterium chelonae* infections after bee venom acupuncture. All were treated with antibiotics and surgery. *Mycobacterium chelonae* infections should be included in the differential diagnosis of chronic skin and soft tissue infections following bee venom acupuncture.

Keywords. *Mycobacterium chelonae*; bee venom; acupuncture.

Skin and soft tissue infections caused by nontuberculous mycobacteria (NTM) have been reported to be associated with trauma and surgical or other procedures, including liposuction, subcutaneous injection, and breast implantation [1, 2]. Especially in Asia, which has a high prevalence of alternative medicine, NTM infections associated with oriental medical procedures, such as acupuncture, are not uncommon [3, 4].

Bee venom therapy is a type of oriental medicine treatment using either diluted bee venom or an actual bee sting. Although this procedure has been widely used along with acupuncture, NTM infection after bee venom acupuncture has not been reported. We experienced 3 patients with NTM infections following bee venom acupuncture, and in all patients, *Mycobacterium chelonae* was identified.

MICROBIOLOGICAL IDENTIFICATION

Specimens for culture were obtained by needle aspiration of the abscesses and surgical drainage. Bacteriologic diagnosis was

established by acid-fast staining with Ziehl-Neelsen coloration and was confirmed by culture in 3% Ogawa media (Eiken, Tokyo, Japan) and BACTEC MGIT 960 system (Becton Dickinson, Sparks, Maryland).

Species identification of the isolated NTM was performed using the polymerase chain reaction and restriction fragment length polymorphism method based on the *rpoB* gene (REBA Myco-ID; M&D Inc, Wonju, Korea) at the Department of Microbiology, Samsung Medical Center (1950-bed referral hospital in Seoul, Korea) according to the manufacturer's protocol [5]. Drug susceptibility testing was performed at the Korean Institute of Tuberculosis by using a broth microdilution method in the same manner as used for rapidly growing mycobacteria, according to the guidelines of the Clinical and Laboratory Standards Institute [6, 7].

CASE 1

In March 2010, a 46-year-old woman presented with multiple, tender, erythematous nodules on the right knee and the left ankle (Figure 1). She had been diagnosed with rheumatoid arthritis 10 years ago and had been taking methotrexate 15 mg weekly. She had received bee venom acupuncture several times, and 6 months prior she presented to a local clinic with subcutaneous nodules at the acupuncture points that had developed into ulcers with turbid discharge. Because no improvement was seen after antimicrobial treatment, she was admitted to our hospital and underwent an ultrasound scan of the left ankle that showed a 2.7 × 0.6 × 3-cm diameter, irregular hypoechoic fluid collection (Figure 1). Aspirated fluid showed 1+ acid-fast bacilli (AFB) on smear, but the culture did not grow any microorganisms. On hospital day 5, similar lesions on the left shoulder appeared and a biopsy was performed. The biopsy showed chronic active inflammation that was negative for AFB staining. Two weeks later, cultures from biopsy specimens grew NTM, identified as *M. chelonae*. The patient was treated with oral clarithromycin at a dose of 500 mg twice daily, intravenous ciprofloxacin at a dose of 200 mg twice daily, and intravenous tobramycin 500 mg daily before the susceptibility test was available.

In addition, surgical debridement of abscesses was performed. According to the susceptibility test results (Table 1), intravenous tobramycin and oral clarithromycin were continued. Because the patient complained of mild hearing loss after 1 month, the regimen was changed to oral clarithromycin and

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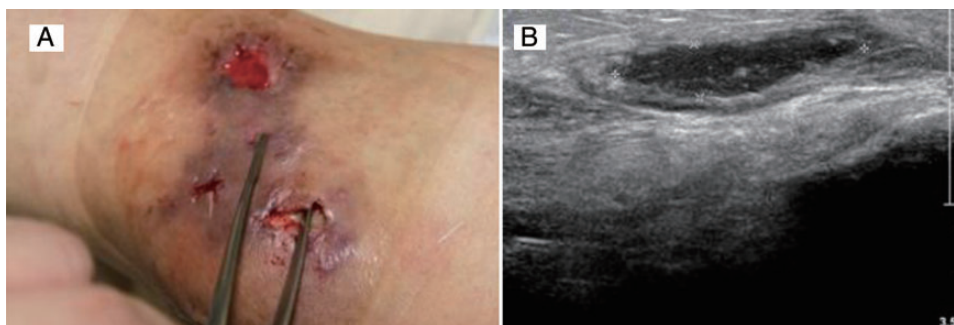


Figure 1. Case 1. A, Ulcerated abscess on the right knee. B, Ultrasound image of the left ankle showed a 2.7 × 0.6 × 3-cm diameter, irregular hypoechoic fluid collection.

moxifloxacin. The treatment was continued for 12 months, and her lesion resolved completely.

CASE 2

In May 2010, a 44-year-old man was referred to our hospital with painful subcutaneous nodules on his left knee and neck that had lasted for 7 months (Figure 2). Eight months prior, he had received 7 sessions of bee venom acupuncture. Four weeks after the first session, he developed subcutaneous nodules at the acupuncture sites. Although he was treated with oral antibiotics after incision and drainage in the oriental medical clinic, his subcutaneous lesions did not improve. On admission, an ultrasound scan of the neck and computed tomography scan of the left knee were performed, which showed multiple subcutaneous abscess formations in the left posterior neck and medial and lateral aspects of the left knee (Figure 2). Aspiration of pus from his left neck was performed. The specimens showed 3+ AFB on smear and grew NTM, identified as *M. chelonae*. According to the susceptibility test results (Table 1), he received surgical debridement and 500 mg oral clarithromycin twice daily and 400 mg oral moxifloxacin once daily for 9 months, resulting in a slow but gradual resolution of the lesions.

CASE 3

In November 2012, a 29-year-old woman was referred to our hospital with a 4-month history of right ankle pain and swelling. One year prior, she had suffered from intermittent right ankle pain after a sprain. Since then, she had received bee venom acupuncture several times. On examination, there was localized heat with redness and tenderness at the lateral side of the right ankle. Aspiration of fluid from the right lateral malleolar bursa was performed. The specimens showed 4+ AFB on smear and grew *M. chelonae*. She underwent arthroscopy for debridement and was treated with 500 mg oral clarithromycin twice daily and 400 mg oral moxifloxacin once daily (Table 1). After 2 months, oral moxifloxacin was stopped due to nausea and oral clarithromycin was continued for another month. She showed clinical improvement and no relapse after the completion of treatment.

DISCUSSION

Mycobacterium chelonae was first identified in 1903, when Friedman isolated an acid-fast bacillus from the sea turtle *Chelonia corsicata* [8]. Interestingly, it was once used in an attempt

Table 1. In Vitro Antimicrobial Susceptibility of *Mycobacterium chelonae* Isolates From Case Patients

Patient	MIC (μg/mL) ^a							
	AMK	FOX	CIP	CLR	DOX	SMX	TOB	MOX ^b
Case 1	32 (I)	>256 (R)	4 (R)	≤0.5 (S)	>32 (R)	>128 (R)	4 (S)	2 (I)
Case 2	64 (R)	>256 (R)	16 (R)	≤0.5 (S)	>32 (R)	>128 (R)	8 (I)	4 (R)
Case 3	16 (S)	>256 (R)	8 (R)	≤0.5 (S)	>32 (R)	>128 (R)	2 (S)	4 (R)

Abbreviations: AMK, amikacin; CIP, ciprofloxacin; CLR, clarithromycin; DOX, doxycycline; FOX, cefoxitin; I, intermediate; MIC, minimum inhibitory concentration; MOX, moxifloxacin; R, resistant; S, susceptible; SMX, sulfamethoxazole; TOB, tobramycin.

^a MICs of all tested drugs were determined by the broth microdilution method and interpreted according to the Clinical and Laboratory Standards Institute (CLSI) document M24-A of 2003.

^b In the case of moxifloxacin, CLSI document M24-A2 of 2011 was used.

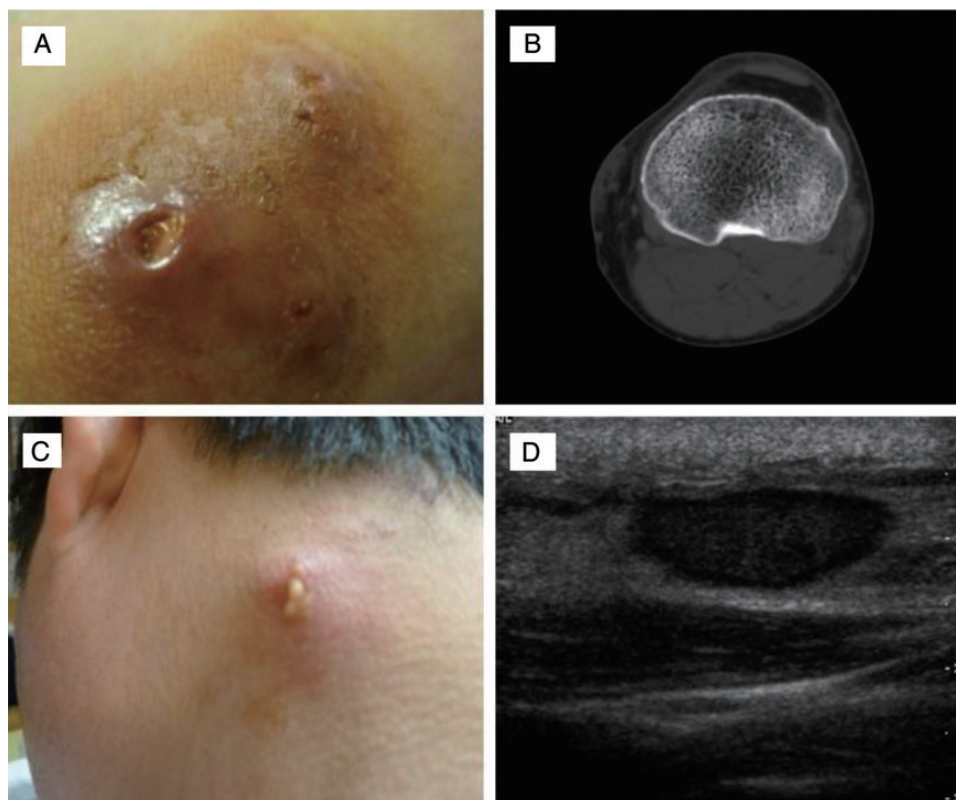


Figure 2. Case 2. A, Multiple subcutaneous nodules on the knee and computed tomography scan demonstrating small abscesses (B). C, Single abscess on the neck and ultrasound scan showing fluid collection (D).

to develop a vaccine as immunotherapy for *Mycobacterium tuberculosis* infections in the middle of the 20th century. However, over the past few decades, outbreaks and isolated cases of skin and soft tissue infections caused by *M. chelonae* have been described in association with cosmetic surgeries and tattooing [9, 10].

Bee venom acupuncture is growing in popularity, especially in Korea, and is used primarily for pain relief in many kinds of diseases as an alternative medical treatment [11]. Although severe allergic reaction and nonserious adverse events such as local swelling or itching following bee venom acupuncture have been documented, there are few data on infections associated with bee venom acupuncture. To our knowledge, this is the first reported case series of *M. chelonae* infection associated with bee venom acupuncture. In all cases, patients received bee venom therapy using needles, not natural bee sting.

In the previously reported cases of NTM infections, the contaminated source has not been established but, in general, non-sterile water used to dissolve the different substances has been suggested as the source of the organism. NTM is relatively chlorine-resistant and grows well and survives at relatively high concentrations in tap water and distilled water. Recently,

Rachel et al have documented the presence of pathogenic NTM in an Australian drinking water distribution system [12]. These findings show that the contaminated bee venom solutions or needles by tap water can be the source of infection in our cases. Although we were not able to test the local tap water of the premises where bee sting therapy was undertaken, it is possible that the concentration of disinfecting free chlorine was probably inadequate at the delivery taps supplying water to the operators' premises. In addition, lack of adherence to sterile injection techniques and infection control practices may have been the cause of the NTM infections in our cases.

Considering the increasing use of bee venom therapy and considerable morbidity of NTM infection, prevention efforts of infections are needed through strict adherence to infection control principles, including sterilization of venom extraction, purification process, injection equipment, and environment.

Given that the in vitro susceptibilities of *M. chelonae*, as well as many of the NTM, do not always correspond to the clinical response, careful consideration is needed to decide on the treatment regimen [13, 14]. Because there were no oral antibiotics except clarithromycin with in vitro susceptibility to *M. chelonae*, we used a combination regimen of clarithromycin and

moxifloxacin. All patients were successfully treated with this drug combination after surgical debridement.

Our findings should remind physicians to suspect NTM infections in patients with chronic nonhealing soft tissue infections following bee venom acupuncture. In addition, oriental medical practitioners should be aware of the risk of NTM infection following invasive procedures and make efforts to prevent infections.

Note

Potential conflicts of interest. All authors: No reported conflicts.

All authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Conflicts that the editors consider relevant to the content of the manuscript have been disclosed.

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