Case report

Mycobacterium chubuense hand infection

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Introduction
Mycobacterium chubuense is a species of the phylum actinobacteria, belonging to the genus mycobacterium. Mycobacterium chubuense was isolated for the first time in the garden soil of Hospital Chubu, Japan [1] and its presence has been reported in surface water and drinking water [2]. There is only one previous case report of a Mycobacterium chubuense infection involving the knee [3].

Case report
A 53-year-old previously healthy man (Aquatic merchant) had noted pain and swelling in right palm for 1 month. He presented to a community doctor in Beilun District (NingBo city of Zhejiang province) with pain and swelling of the dorsum aspect of the right hand. He could not recall any history of trauma. The local practitioner apparently had no clear diagnosis, but a course of empirical cephalosporin antimicrobials (Specific drugs were unknown) and traditional Chinese medicine were prescribed, which proved ineffective. There was no history of steroid injections. His condition continued to deteriorate over the next 3 weeks until he was referred to our hospital.

On physical examination, the patient was unable to make a tight fist, because of swelling and erythema over the dorsum aspect of the right hand. There was a painful, firm mass on the distal ulnar side of dorsum of hand, the mass which was approximately 3.5 cm long and 2 cm wide. Another mass was located on the area of dorsum of 3rd metacarpal, approximately 3 cm × 2.5 cm. Plain radiographs show no obvious pathology. Blood tests were all within normal limits except a slight increase in blood sugar. One day after initial presentation to our service, the patient was taken to the operating room for debridement and drainage. Alarge amount of tawny inflammatory granuloma and diffuse synovitis under the skin and along the extensor tendon (Fig. 1A–D). All infected synovial tissue was excised. The infected wound was thoroughly irrigated and closed loosely. Tissue samples were sent for routine bacterial and mycobacteria cultures as well as pathology.

A course of azithromycin (0.5 g iv per day) therapy was initiated after surgery, however, there was no significant reduction in wound swelling, iv levofloxacin lactate 0.5 g was added 3 days later. Pain and swelling were improved gradually after surgery. Three days later, drain was removed.

The granuloma tissue were grinded and cultured in Lowenstein-Jensen culture medium. Five days later, culture was positive by with orange colored colonies. Histological specimen from the surgically excised tissue demonstrated necrotizing granulomatous inflammation (Fig. 1H). The bacterial colony were sent to KingMed Diagnostics for targeted sequencing (Hsp65). The sequence of the sample submitted for examination had the highest similarity with Mycobacterium chubuense (99.28 %), and positive culture strain was then identified as the Mycobacterium chubuense. Scanning electron microscope showed the structural characteristics of Mycobacterium chubuense (Fig. 1G). The patient was discharged 6 days after surgery with an antimicrobial regimen of levofloxacin tablets 0.5 g orally once per day for 2 months and azithromycin 0.5 g orally once per day for 2 months.

The patient regained full function in the right hand without limitations by the last follow-up, a total of 10 months after initial presentation, and moreover, the patient had no signs or symptoms of recurrence (Fig. 1E,F).

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Fig. 1. A. Intraoperative hand appearance of an 53-year-old previously healthy man (Aquatic merchant), location of firm mass (black arrow) B. inflammatory granuloma on central proximal side of dorsal hand (black arrow) C. inflammatory granuloma on the distal ulnar side of dorsal hand (black arrow) D. All infected material was debrided E and F. postoperative hand appearance the patient regained full functionality in the right hand without limitations G. Scanning electron microscope of M. chabuense (Magnification ×10 K) H. Histological specimen from the surgically excised tissue demonstrating necrotizing granulomatous inflammation. (magnification ×10).
Discussion

*Mycobacterium chubuense* is a rapidly growing mycobacterium (RGM) which belongs to the Runyon IV group [4,5]. Skin and soft tissue infections by NTM, and particularly by rapidly growing mycobacteria, is associated with traumatic lesions, surgery and cosmetic procedures, such as tattooing, liposuction and mesotherapy injections [6,7]. Skin and lymph node localizations are the main forms of extrapulmonary NTM infections, while osteoarticular infections are the rarest forms [8]. In this case, considering that the patient’s occupation is an aquatic producer with frequent contact with sea water and fresh water in his daily work, along with the high risk of being stabbed by fish and shrimp, we believe that he belongs to the group at higher risk of NTM infection.

Due to the intrinsic mechanisms of resistance such as highly effective efflux pumps, targets with low affinity for these drugs and production of inactivating enzymes, the NTM are naturally resistant to the principal antituberculosis drugs [9]. Drug susceptibilities for this species are important for guiding effective therapy. There are no uniform guidelines for the treatment of disseminated RGM infection, and it is recommended that a multidrug combination including macrolides be included and the course of treatment extended [10]. Surgery for the rapid growing mycobacterium is generally indicated with extensive disease, abscess formation, or where drug therapy is difficult.

When suspecting an NTM infection, initial treatment should consist of azithromycin and clarithromycin (or other macrolide) while awaiting a sensitivity panel to guide antimicrobial therapy [10]. In our case, consider the extensive and persistent swelling on the palm of the patient and long-term nonstandard conservative treatment before admission, only drug therapy alone is difficult to cure, the surgical treatment was required. After the establishment of the etiologic diagnosis, the treatment regimen of azithromycin combined with levofloxacin was adopted, and the satisfactory treatment effect was also obtained. Therefore, this regimen can be used as a reference regimen for the treatment of *M. chubuense* infection.

Conclusion

Given that *M. chubuense* infection in the hand is rare and that the clinical presentation including laboratory variables may be obscure, it is important to keep that kind of infection in mind as a differential diagnosis and to take many samples for microbiological culture, when deeper infection is suspected, the operation is indicated.

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Ethical approval

The authors declare that the ethical approval was not required for this study.

Declaration of Competing Interest

None.

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