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Mycobacterium asiaticum as the Probable Causative Agent in a Case of Olecranon Bursitis

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***Mycobacterium asiaticum* was isolated from fluid aspirated from an olecranon bursa that had become inflamed following a superficial injury. Other possible causes of the inflammation were excluded. No specific antimycobacterial therapy was given. The infection responded to drainage, regular dressing, and immobilization. Our experience suggests that *M. asiaticum* is a potential cause of infection of the joints and surrounding tissues.**

Mycobacterium asiaticum was first described following a study of isolates from the lymph nodes and viscera of healthy monkeys that had been imported from India and kept at a research institute in Hungary (2). Although the organism had been isolated in 1965, the species description was not published until 1971 (7). The first indication that *M. asiaticum* is a pathogen for humans came from Queensland, Australia, in 1983, when we reported the isolation of *M. asiaticum* from pulmonary secretions of five patients, two of whom were considered to have mycobacteriosis due to the organism (1). Subsequently, *M. asiaticum* was reported as the cause of pulmonary disease in a patient from Los Angeles, Calif. (5). Here, we describe a case of olecranon bursitis in which *M. asiaticum* was the probable causative agent.

Clinical summary. In October 1989, a 24-year-old male army officer based in Townsville, Queensland, Australia, presented to the local hospital with a low-grade olecranon bursitis of the left elbow, having incurred a laceration to the same elbow a year earlier while travelling in northern Queensland. The initial treatment was limited to rest and simple analgesia. In late November, when the inflammation had not resolved, straw-colored fluid was aspirated from the bursa, and methylprednisolone was injected. A firm bandage was applied, and the patient's activities were restricted. Two weeks later, when there had been no improvement, a further amount of fluid was aspirated and submitted for routine microbiological analysis. Microscopic examination of the fluid showed many polymorphonuclear leukocytes, but smears and bacterial cultures were negative. A week later, the bursa remained swollen and tender, and a course of flucloxacillin was given. During December, fluid was aspirated on two further occasions, and an aliquot of the aspirate was submitted for mycobacteriological examination. Routine microbiological tests were not repeated. A radiograph of the affected joint showed no bone involvement. A course of a nonsteroidal anti-inflammatory drug was given, but there was no improvement and a sinus had developed by mid-January 1990. The patient transferred to a different hospital (in Victoria, Australia) and received another course of flucloxacillin in February 1990. Again, no improvement was noted, and a new treatment schedule, involving dressings with povidone-iodine and hydrogen peroxide and immobilization in a cast, was commenced. This new approach brought significant improvement. Around this time, mycobacterial culture results indicating the presence of *M. asiaticum* became known. No specific antimycobacterial therapy was given. When examined in early March, the patient was well, with the affected elbow joint showing an area of induration without any evidence of fluctuance. Routine hematological and biochemical parameters were within normal limits. A radiograph of the joint and a nuclear bone scan showed no evidence of osteomyelitis. A swab of the healing wound was taken for mycobacteriological testing, but no mycobacteria were isolated. The wound subsequently healed, and the patient remains well.

Laboratory findings. Approximately 10 ml of cloudy, straw-colored fluid was aspirated from the bursa on 15 December 1989. The cell count showed 525 leukocytes per μl, 34 erythrocytes per μl, and a leukocyte content of 40% polymorphonuclear leukocytes and 60% lymphocytes. No crystals were seen under polarized microscopy. No organisms were seen in a Gram-stained smear, and all routine cultures for bacteria and fungi were negative. Histologic tests were not performed. The result of a test for rheumatoid factor (RA Test; Ortho Diagnostics) was <32 IU/ml. The result of a test for C-reactive protein (TDx System; Abbott Laboratories) was 0.02 mg/dl (normal range, ≤1.0 mg/dl).

Mycobacteriology. The centrifuged deposit of the aspirate collected on 24 December 1989 was used to prepare a smear for acid-fast microscopy (with Ziehl-Neelsen stain) and was cultured on eight Löwenstein-Jensen slopes (some with sodium pyruvate and ferric ammonium citrate supplements) at 36 or 32°C. No acid-fast organisms were seen in the smear. Cultures were examined weekly, and after 4 weeks an acid-fast organism was detected on four slopes (two at 36°C and two at 32°C). Growth did not appear to be enhanced by the supplements. The isolate was subjected to a panel of standard tests (1) and was identified as *M. asiaticum* by virtue of the following properties: slow, dysgonic growth at 25 and 36°C but no growth at 43°C; photochromogenicity (the isolate developed a pale yellow pigment on exposure to light); rapid hydrolysis of Tween 80; a negative nitrate reduction test; negative tests for urease, nicotinamidase, and pyrazinamidase; semiquantitative catalase (>45 mm of foam); a negative test for β-galactosidase activity; and negative tests for arylsulfatase activity. More recently, the

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isolate was further examined by determining the sequence of the hypervariable region of the 16S rRNA gene (3). The sequence obtained conformed with the type strain of *M. asiaticum.*

While the majority of recognized species of atypical mycobacteria, given favorable conditions, are potential pathogens, the ubiquity of such organisms in the nonliving environment means that their presence in clinical samples does not prove a role in a disease process. When individual cases are evaluated, supportive evidence can come from (i) the clinical background, (ii) repeated isolation of the same mycobacterium in the absence of other organisms, (iii) results of histologic tests, (iv) the specimen source, (v) the identity of the isolate, and (vi) the response to specific therapy.

In the present case, *M. asiaticum*, a species that is rarely encountered in clinical material, was isolated in pure culture from a normally sterile site. Laboratory findings and the course of the disease were generally consistent with a bacterial infection, although the leukocyte count and the percentage of polymorphonuclear leukocytes were lower than would be expected in septic arthritis. Routine bacterial and fungal cultures of an aspirate collected before antimicrobial treatment was given yielded no growth. *M. asiaticum* grew in the only acute-phase sample examined for mycobacteria, with the negative microscopy result and 4-week incubation interval suggesting that only low numbers were present. Initially, intermittent therapy with a nonspecific antimicrobial agent brought no resolution, and because the likely involvement of *M. asiaticum* became known only at the time when conservative management was resulting in significant improvement, no antimycobacterial therapy was given. Thus, the results of the treatment are of no help in resolving any doubt as to the etiology. It is also possible that the mycobacterium isolated was not a primary pathogen but was introduced to the bursa during one of several injections and aspirations performed prior to the date of collection of the sample submitted for mycobacteriologic testing. However, the presenting condition followed an injury at the same site some 12 months previously; this indicates a chronic infective process typical of that caused by mycobacteria. We believe that the available information supports the diagnosis of olecranon bursitis due to *M. asiaticum* and that the infection was acquired from an earlier superficial injury.

In addition to the pulmonary isolates described in our initial report, we have occasionally isolated *M. asiaticum* from other Queensland patients, and we are also aware of an isolate from a porcine lymph node collected locally. While our observations might be interpreted as reflecting a comparatively high local prevalence of *M. asiaticum*, it is our view that the infrequency of reports from other localities is more an indication of the difficulty in identifying the species. (Primary isolation of *M. asiaticum* does not call for supplemented medium or special incubation conditions.) Cooperative numerical analyses carried out by the International Working Group on Mycobacterial Taxonomy (IWGMT) clarified the taxonomic status of *M. asiaticum* and drew attention to its biochemical similarity to other species, notably *M. gordonae* (6). We regard dysgonic growth, weak but definite photochromogenicity with development of a yellow pigment, and negative amidase reactions as important properties in reaching a presumptive identification as *M. asiaticum*. The validity of this approach was supported by the IWGMT study: several strains initially identified in the Mycobacterium Reference Laboratory (Brisbane, Queensland, Australia) as *M. asiaticum* clustered with the type strain (6). In the present case, the identity of the isolate was confirmed through molecular procedures.

Two courses of flucloxacillin, a drug that is useful in nonmycobacterial septic arthritis, failed to improve the patient's condition. However, experience with other slowly growing mycobacteria suggests that treatment of infection with *M. asiaticum* would require use of specific antimycobacterial agents. The few cases reported to date (1, 5) have shed little light on treatment and drug susceptibility of the species, although rifampin and ethambutol, with and without other compounds, seemed to contribute to clinical improvement. Since no antimycobacterial therapy was given in this case, no additional information has emerged. Using a radiometric procedure that has been proposed as a reference method for *M. avium* complex (4), we tested the isolate against five antituberculosis agents and obtained the following MICs: clarithromycin, 8.0 μg/ml; ciprofloxacin, 2.0 μg/ml; ethambutol, ≤2.0 μg/ml; isoniazid, 3.0 μg/ml; and rifampin, >8.0 μg/ml. By recommended criteria, these results suggest that ethambutol might have been useful in this case. We plan to test other *M. asiaticum* isolates in order to determine the uniformity or lack thereof in their susceptibilities.

As well as providing further evidence of the potential pathogenicity of *M. asiaticum*, this report confirms the potential value of routine mycobacteriologic testing for samples from suspected infective disease of the joints and surrounding tissues. The importance of *M. tuberculosis* complex in such sites is well documented, and the literature contains occasional reports dealing with other mycobacterial species such as *M. intracellulare*, *M. kansasii*, *M. marinum*, *M. szulgai*, and *M. haemophilum*. Our experience indicates that *M. asiaticum* also should be considered as a possible etiologic agent of disease of the joints and soft tissues.

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