Synovial infection with *Mycobacterium kansasii*

M. LEADER,*¹ P. REVELL,¹ AND G. CLARKE²

From the ¹Department of Morbid Anatomy, The London Hospital Medical College, and the ²Department of Rheumatology, Harold Wood Hospital, Harold Wood, Essex

SUMMARY Atypical mycobacteria have been recognised as saprophytic organisms for many years, but it was only with the development of better microbiological culture techniques that they became recognised as potentially pathogenic to man. Infections of tendon sheaths and joints by these organisms may present diagnostic problems, and we report here 3 cases in which *Mycobacterium kansasii* was responsible for disease at the hand and wrist.

Case reports

CASE 1

A 47-year-old male oil refinery worker presented in May 1975 with a 5-month history of tingling of the palmar aspect of the fingers of the right hand. He also complained of an associated feeling of heaviness and weakness of the hand. His past history was uneventful and he had no other relevant complaints. On examination he had marked wasting of the right thenar eminence with flattening of the hollow of the palm. A clinical diagnosis of the carpal tunnel syndrome was made and electromyography (EMG) supported this view. X-rays of the wrist were normal.

The wrist was explored surgically. The median nerve was noted to be under considerable compression in the carpal tunnel. Tissue was not sent for histopathological examination at this time. The patient made an uneventful recovery and was discharged from outpatient care.

One year later the same symptoms recurred. Clinical examination showed a fluctuant swelling over the palmar aspect of the wrist and some swelling of the hypothenar eminence and little finger. There was no local tenderness, but movements of the little finger were slightly reduced. X-rays of the wrist joint were again normal apart from soft tissue swelling. Fluid was aspirated from the palmar aspect of the wrist and sent for microbiological examination. Meanwhile the patient received local methylprednisolone injections.

The aspirated fluid contained no crystals but there were a considerable number of white cells, which

were predominantly lymphocytes. A Ziehl-Nielson stain failed to show micro-organisms. However, acid-fast bacilli were cultured from the same aspirate and were subsequently identified as *Myco. kansasii*. The organism was sensitive to ethambutol and rifampicin but highly resistant to para-amino salicylate, isoniazid, and streptomycin. Accordingly he was given rifampicin 450 mg and ethambutol 900 mg daily for 1 year.

On receiving the microbiology report the wrist was again surgically explored. The synovium was markedly thickened and covered with a thick exudate. Tissue sent for histology showed synovium containing numerous noncaseating granulomata with giant cells, epithelioid cells, and fibrosis (Fig. 1). Acid-fast bacilli were seen on Ziehl-Nielson staining.

The patient was seen regularly in the outpatient department, and 7 months after beginning anti-

Fig. 1 Case 1. Photomicrograph of synovium from the wrist, showing noncaseating tuberculoid granulomata with giant cells and fibrosis. (Haematoxylin-eosin, $\times 145$).

Accepted for publication 31 January 1983.

*Present address: Department of Histopathology, Westminster Medical School.

Correspondence to Dr P. Revell, Department of Morbid Anatomy, The London Hospital Medical College, Turner Street, London E1 2AD.

tuberculous therapy he had made a full recovery. He has had no further problems.

CASE 2

A 44-year-old housewife presented in February 1980 with a 2-month history of gradual swelling of the right index finger, associated with a variable degree of numbness, some pain, and poor grip. There were no provoking factors. She was otherwise well. In 1964 she had a transient and uncharacterised shadow on chest x-ray. She received no treatment then and had no further chest symptoms.

On examination there was mild diffuse swelling of the right index finger (sausage digit), with slight oedema of the hand (Fig. 2). X-rays were normal, as also were the full blood count and erythrocyte sedimentation rate (ESR). A clinical diagnosis of flexor tenosynovitis was made. Treatment was by local injections of triamcinolone hexacetonide to the tendon sheath and oral indomethacin, then later ketoprofen. There was initial improvement, but her symptoms recurred, and after 4 months excision biopsy of synovium was carried out. Repeat full

Fig. 2 Case 2. Right hand, showing diffuse swelling of index finger (sausage digit) and mild oedema of the hand.

blood count and ESR and x-rays of the hand and chest were all normal.

Histological section of the synovial membrane showed a large number of noncaseating tuberculous granulomata with a heavy accompanying chronic inflammatory cell infiltrate containing lymphocytes and plasma cells. Mycobacteria were detected with rhodamine staining, though none were seen by the less sensitive Ziehl-Nielsen method. A sample of synovium was sent for microbiological examination and *Myco. kansasii* was successfully cultured and characterised.

Treatment was begun with rifampicin (450 mg daily), ethambutol (600 mg daily), and isoniazid (300 mg daily). The organism proved insensitive to isoniazid, which was therefore withdrawn.

The wound broke down and discharged from 2 sinuses within 2 months of the operation owing to secondary infection. There was sloughing of the flexor tendon. However, the general swelling of the finger had subsided. The patient has now completed an 18-month course of antituberculous therapy. Reconstructive surgery will be considered with respect to the flexor tendon loss.

CASE 3

A 71-year-old man presented in August 1981 complaining of pain and swelling in the fingers and wrist of the right hand. The symptoms had begun in the right middle proximal interphalangeal (PIP joint 6 months before this in March 1981. Paraesthesiae were also present. There was some discomfort in the left hand and in the feet. He had had previous episodes of joint pain and swelling in the knees and feet 10 and 30 years before respectively, both episodes settling without further disability. Signs in the right hand were consistent with flexor tenosynovitis and PIP synovitis, especially of the right 3rd PIP joint. There were minimal signs of tenosynovitis in the left hand. Blood tests were normal including full blood count, ESR, serum urate, T4, and a latex test, which was negative. X-rays of the right hand showed only old degenerative changes in the 1st to 3rd metacarpophalangeal joints.

He was treated with local injection of triamcinolone hexacetonide in view of a past history of a duodenal ulcer in 1968, and the signs completely resolved. He returned with a recurrence in mid-December 1981, and this again resolved with local steroid treatment, but by February 1982 his problem had returned to a marked extent and the appearances suggested a septic arthritis. There were several areas of erythema, especially of the right wrist and third PIP joint, which was painful and swollen. The dorsum of the hand and fingers were grossly oedematous. Repeat full blood count, ESR, and

chest x-ray were normal. X-rays of his hands showed no change. Synovial fluid aspirated from the 3rd PIP joint contained no crystals and was sterile. A synovial biopsy was performed and sent for histological and microbiological examination. Organisms cultured from the synovium were identified as *Myco. kansasii*. Histological examination of the synovium showed noncaseating tuberculoid granulomata and acid-fast bacilli were identified in Ziehl-Nielsen stained sections.

The patient has slowly improved on ethambutol (600 mg daily) and rifampicin (450 mg daily) treatment. Initial additional isoniazid (300 mg daily) treatment has been withdrawn. There is still some swelling of the fingers and areas of fluctuation around the wrist and in the palm, but the pain and swelling have decreased considerably.

Discussion

Mycobacterium infections with atypical organisms occasionally occur in man. *Mycobacterium kansasii* may cause disease in many sites, including the musculoskeletal system. Kelly *et al.*¹ reported 12 cases of atypical acid-fast bacterial infections of tendon sheaths, joints, bursae, and soft tissues. The morphological characteristics of these organisms suggest that some at least were caused by *Myco. kansasii*. Subsequent cases of atypical mycobacterial infection have been reported and the organisms have been better characterised. The opportunistic pathogens in the mycobacterium group comprise *Myco. kansasii*, *Myco. marinum*, *Myco. simiae*, *Myco. szulgai*, *Myco. xenopi*, *Myco. ulcerans*, and the *Myco. avium-scrofulaceum* and *Myco. fortuitum* complexes. *Myco. kansasii* may occur as a saprophyte in man and has been recovered from gastric washings and sputum of healthy individuals.

We are aware of 15 previous cases of infection by *Myco. kansasii* affecting tendons and joints.²⁻⁸ Carpal tunnel syndrome was present in 5 of these cases^{3,4,6-8} and was due to a tenosynovitis causing compression of the median nerve by granulomatous inflammatory tissue at the wrist. A further 4 cases affected the wrist without causing carpal tunnel syndrome.⁸ Swelling of the finger with a granulomatous synovitis was present in 3 cases,^{5,6,8} and the remaining examples were of involvement at the knee (2 cases)^{2,7} and the elbow.³ The present 2 cases therefore fall within the previously described pattern of involvement. Other atypical mycobacteria^{1,3,8-12} have produced a similar clinical spectrum.

The present cases together with the majority of those described previously demonstrate the diagnostic problem that atypical mycobacterial infections may present. One year elapsed between the first carpal tunnel decompression and diagnosis of infection

in case 1, and in case 2 there was a delay of 6 months before biopsy and culture were performed. A review of previously reported cases shows that at least a year elapsed before the correct diagnosis was made in nearly all cases and that steroid or nonsteroid anti-inflammatory drugs had been prescribed without significant effect before there was recourse to biopsy. We therefore consider it is important that the diagnosis of atypical mycobacterial infection should be considered in cases of so-called 'sausage digit' and in the carpal tunnel syndrome. When biopsy is performed, it is mandatory that tissue be submitted for microbiological investigation as well as histology, since the organisms may be scarce or absent from tissue sections, and accurate identification is dependent on special characteristics of culture and biochemistry. The variability in resistance of *Myco. kansasii* and the other organisms makes it essential to know the drug sensitivities before starting treatment.

The source of the organism remains unknown, but it has been isolated from tap water and cow's milk. *Myco. kansasii* is found more commonly in urban than rural areas, and person-to-person transmission is thought to occur. The exact mode of infection is unknown, and although a history of minor trauma to the affected area has sometimes been noted^{1,8} this does not apply to the cases presented here.

We thank the Department of Microbiology, The London Hospital, and Dr C. H. Collins, Regional Reference Centre for Tuberculosis, Dulwich, for their skilled microbiological assistance.

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