**CASE REPORT**

Tuberculous arthritis of the knee with *Staphylococcus* superinfection

We describe a case of septic arthritis of the knee in which the diagnosis of tuberculosis was masked by an initial culture growth of *Staphylococcus aureus*. This led to a delay in diagnosis and an adverse outcome. In the appropriate clinical setting, we suggest that the index of suspicion for skeletal tuberculosis be raised in developed countries in order to avoid diagnostic delay, by requesting cultures for acid-fast bacilli and synovial biopsies at arthroscopy. Moreover, antituberculosis therapy should be started whilst awaiting the results of culture if the clinical history and biopsies are strongly suggestive of the diagnosis.

The development of antibiotics and advances in radiological diagnosis led to a decline in all forms of tuberculosis (TB) in developed countries during the 20th century. As a result, there has been a reduced index of suspicion of TB as the causative organism in most infective cases. However, in the past two decades an increase in migration, as well as the immunosuppressive effects of HIV infection, have led to a resurgence of this disease in developed countries.

Skeletal TB, occurs in 14% of cases of pulmonary TB in England and Wales. It is often associated with significant physical disability, emphasising the importance of early diagnosis and the immediate institution of appropriate therapy. The knee is the third most common site of skeletal TB, after the spine and hip. Although it is rare to have skeletal TB as a concomitant infection with another bacterial pathogen, the presence of two pathogens may influence the time to diagnosis and management of such cases.

We report a case of septic arthritis of the knee with concomitant *Staphylococcus aureus* and TB infection, in which the existence of two pathogens initially hindered the diagnosis.

**Case report**

A 23-year-old site worker presented with a four-week history of pain in the left knee, fever and swelling in the popliteal fossa. He had migrated from India to the United Kingdom a year earlier. At initial presentation, he was noted to have a warm knee, no effusion and flexion from 0° to 100°. A presumed diagnosis of a ‘superficial abscess’ was made and he underwent emergency incision and drainage of the popliteal swelling. The wound was dressed with an absorbent dressing and he was discharged with a follow-up appointment one week later. No drain was inserted.

*Staph. aureus* was cultured from the sample aspirated during incision and drainage, and the patient was given a two-week course of oral flucloxacillin 500 mg to be taken four times a day.

He presented to the orthopaedic department ten days later with recurrence of the popliteal swelling; he had a tachycardia of 120 beats per minute; with a temperature of 37.4°C. The affected knee was hot and swollen with generalised tenderness. Flexion was limited to 10°, with severe discomfort. The inflammatory markers were raised (erythrocyte sedimentation rate (ESR) 62 mm/hr and C-reactive protein (CRP) 127 mg/l). Radiography showed a generalised reduction in joint space and soft-tissue swelling (Fig. 1).

Microscopy of the initial knee aspirate demonstrated Gram-positive cocci. *Staph. aureus*, sensitive to flucloxacillin, was subsequently cultured. Microscopy for acid-fast bacilli was negative and a diagnosis of *Staph. aureus*-related septic arthritis made. He underwent arthroscopic lavage and frank pus was drained. His condition improved after two weeks of splintage and intravenous flucloxacillin 1 g four times a day and fusidic acid 500 mg three times a day. He was discharged home with oral flucloxacillin 500 mg four times a day for six weeks.

He presented again five days after discharge with worsening pain, swelling, and stiffness of
his left knee. He underwent further arthroscopic lavage, and was recommenced on intravenous fusidic acid 500 mg three times a day. At repeat arthroscopy there was severe articular surface destruction and generalised synovitis. Synovial biopsy (Fig. 2), performed at second arthroscopy, showed necrotising granulomatous inflammation, highly indicative of TB. A presumptive diagnosis of tuberculous arthritis was made and he began a course of antituberculous quadruple therapy consisting of isoniazide, rifampicin, pyrazinamide and ethambutol. His chest radiograph was unremarkable, and tests for human immunodeficiency virus were negative. The knee was placed in skin traction for four weeks, followed by functional knee bracing. The lavage fluid from the initial arthroscopy confirmed growth of *Mycobacterium tuberculosis*, sensitive to rifampicin, after six weeks of culture. He underwent quadruple therapy for two months, followed by ten months of rifampicin and isoniazide and pyridoxine. Because of the delayed diagnosis and the severity of bony involvement, treatment was prolonged.

At 14 months follow-up, he had flexion limited to 0° to 90°, and subsequent further arthroscopy showed persistent destructive changes in the joint.

**Discussion**

The diagnosis of TB should be sought in all cases of septic arthritis in view of the resurgence of the disease in England and Wales. In TB arthritis, the radiological appearance of the joint at presentation is a predictor of outcome. Thus, early diagnosis of skeletal TB and early treatment with antituberculous therapy affects the outcome.

The difficulty of diagnosing skeletal TB is well documented. The average delay in the diagnosis is for between 16 and 19 months. Culturally and histologically, synovial biopsy has remained the standard for diagnosis, providing positive results in over 90% of proven cases. The rate of positive results drops to 80% from synovial fluid cultures and to 20% from synovial fluid smears for acid-fast bacilli.

In this case, we speculate that the initial ‘superficial abscess’ was a caseating popliteal lymph node which was incised. An abscess in the popliteal fossa is unusual, and should raise the index of suspicion for underlying knee infection.

At the second presentation, microscopy for acid-fast bacilli was initially negative and therefore consistent with a low prediction rate of 20%. The diagnosis of TB was made after histological analysis, followed by positive culture after six weeks. However, synovial biopsy was only performed at the second arthroscopy, and at no stage did the patient undergo a Heaf test. A higher index of suspicion would have led to these tests being performed earlier, resulting in earlier diagnosis.

One further cause for diagnostic delay was that the initial diagnosis of *Staph. aureus* septic arthritis confounded the diagnosis of TB arthritis. The failure to achieve an adequate response to appropriate treatment for *Staph. aureus* led to the search for other pathogens. To the best of our knowledge, there is only one other case of knee sepsis with coexistent *Staph. aureus* and TB, with one further case of simultaneous pneumococcal arthritis and osteoarticular tuberculosis of the knee.

The risk factors for the development of TB include recent TB contact, previous pulmonary TB, low socioeconomic class, ethnic origin, heavy alcohol consumption, homelessness, trauma and previous steroid therapy, and immunodeficiency. Our patient was an immigrant from a TB-
endemic area and of low socioeconomic class, but had no previous personal history of TB. Initially, he presented with chronic knee pain and a popliteal abscess, which could have been a cold abscess. These factors should have prompted suspicion for TB. The primary focus of infection in these patients is a matter of debate. One possibility is that the patient was primarily infected in his country of origin (e.g. lung infection) and that this infection was subclinical since he had no previous history of TB, and had a normal chest radiograph. For reasons that are unclear, it is suggested that the infection is reactivated when the patient migrates to another country, and manifests in a different organ.

This case highlights the necessity for constant vigilance and a methodical approach by all clinicians in order to facilitate early diagnosis of TB arthritis. For all cases of septic arthritis, a high index of suspicion for TB should be maintained, especially when there are risk factors at presentation. Investigations should include a chest radiograph, tuberculin test, microscopy for acid-fast bacilli, and culture for *Mycobacterium tuberculosis*. We also suggest that a synovial biopsy should be taken at the initial arthroscopic washout, and that histology should be requested early to minimise any delay in diagnosis. Moreover, in the right clinical setting, histological characteristics consistent with TB would justify the initiation of presumptive antituberculous chemotherapy while a culture result is awaited.

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

References

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