Tuberculous osteomyelitis: chasing the elusive tubercle

S Busteed, NJ Beeching, FJ Nye, RN Thompson

INTRODUCTION

Tuberculosis remains a problem in the 21st century, but diagnosing skeletal tuberculosis can be difficult, even when there is a high index of suspicion. This article presents two cases of tuberculous osteomyelitis that illustrate the difficulties in diagnosing the disease. It also presents a review of the literature.

DISCUSSION

This article describes two cases of tuberculous osteomyelitis presenting to a rheumatology clinic. Tuberculosis continues to pose a significant public health problem in the UK. Figures from 1998 indicate an 11% rise in the incidence of the disease in England and Wales since 1993, with an annual rate of 10.93 cases per 100 000 population (Rose et al, 2001).

Bone and joint infection accounts for about 2% of all cases of tuberculosis worldwide (Watts and Lifeso, 1996) with the spine involved in half of these cases (Pott's disease). Tuberculous arthritis and extraspinal tuberculous osteomyelitis are less commonly seen. A study by Gonzalez-Gay et al (1999) in Spain found that unilateral sacroiliitis occurred in 19% of patients with osteoarticular tuberculosis. Bone and joint disease is caused by reactivation of blood-borne foci or spread from paravertebral lymph nodes. In industrialized countries, bony tuberculosis is usually associated with late reactivation of infection and occurs mainly in adults.

Extraspinal tuberculous osteomyelitis presents with local pain and develops insidiously as a rule. Tuberculous osteomyelitis can be difficult to diagnose definitively as there are no diagnostic features on plain radiographs and lytic bony lesions may be difficult to distinguish from malignancy (Adelman et al, 1991; Humphrey and Inman, 1995; Tsay et al, 1995). More than half of patients with skeletal tuberculosis have no evidence of active pulmonary disease on a chest radiograph (Vohra et al, 1997), although there may be evidence of previous infection. Computed tomography and magnetic resonance imaging may be of use in delineating soft tissue expansion. Biopsy and culture of

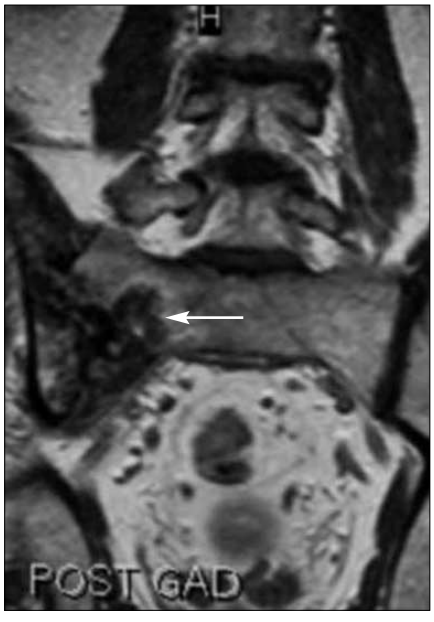
CASE REPORT 1

A 61-year-old man presented to the rheumatology clinic with a 2-year history of right-sided low back pain without radiation. There were no systemic features such as weight loss, pyrexia or sweats. He had been recently admitted with epididymo-orchitis. However, a chest X-ray was normal and acid and alcohol-fast bacilli (AAFB) were not demonstrated on microscopy of pus from a scrotal sinus. Clinical examination was unremarkable.

Initial investigations revealed a mild microcytic anaemia (haemoglobin 11.1g/dl and mean cell volume 79.9 fl) and normal inflammatory parameters (C-reactive protein 6 mg/litre and erythrocyte sedimentation rate (ESR) 20 mm/hr). A white cell count was 9.8 $x10^9$/litre and rheumatoid factor was negative. Total globulin was elevated at 36 g/litre but immunoglobulins and prostate specific antigen were normal. A repeat chest X-ray was normal. Lumbar spine X-rays showed obliteration of the right sacroiliac joint with adjacent sclerosis and suspicion of erosive change. Magnetic resonance scan of the area demonstrated destructive change in the right sacroiliac joint and a possible soft tissue mass anteriorly, suggestive of either a low-grade tumour of cartilage or an infective process (*Figure 1*). Subsequent computed tomography-guided biopsy of the soft tissue mass was unsuccessful.

The patient continued to experience increasing pain in the right lumbar area and underwent a right sacroiliac joint biopsy under image intensification at another centre. Histology of the biopsy specimen was consistent with low-grade active chronic osteomyelitis but no organism was isolated. Empirical treatment with flucloxacillin was started. Brucella serology was subsequently negative. A repeat magnetic resonance scan showed worsening of the right sacroiliac joint destruction with bone oedema and ring-enhancing lesions post-gadolinium. An open biopsy of the right sacroiliac joint was performed and histological examination of this specimen demonstrated AAFB on microscopy. *Mycobacterium tuberculosis* was eventually found on culture. Histology of the de-calcified specimen showed non-caseating granulomata and a Ziehl–Nielsen stain was negative. He was treated with antituberculous treatment for a total of 12 months. Repeat investigations on discontinuing therapy showed sclerosis of the affected joint on plain films with a normal haemoglobin level (15.0 g/dl) and ESR (8 mm/hr).

Figure 1. Magnetic resonance scan of sacroiliac joints showing bony destruction and oedema of the right sacroiliac joint.



Dr S Busteed is Specialist Registrar in Rheumatology, **Dr NJ Beeching** is Senior Lecturer and Clinical Lead in Infectious Diseases, and **Dr FJ Nye** is Consultant Physician in Infectious Diseases, Royal Liverpool University Hospital, Liverpool L7 8XP, and **Dr RN Thompson** is Consultant Rheumatologist, University Hospital Aintree, Liverpool

Correspondence to: Dr S Busteed

CASE REPORT 2

A 23-year-old male software engineer from northern India was referred with a 4-month history of a painful right knee effusion. He denied trauma or systemic features such as night sweats or weight loss. There was no history of preceding enteritis, urethritis or risk of exposure to a sexually transmitted disease. He had no past medical history of note and he denied any contact with tuberculosis. On examination, he had a tense effusion of the medial aspect of the right knee from which frank pus (10 ml) was aspirated. No organisms were seen on microscopy and a Ziehl–Nielsen stain was negative. Preliminary investigations showed a raised erythrocyte sedimentation rate of 50 mm/hr, C-reactive protein 42 mg/litre and white blood cell 5.2×10^9/litre with normal biochemistry. X-ray of the knee joint showed mild rarefaction of the medial femoral condyle.

He underwent arthroscopy, which showed a peri-articular collection but no fluid within the joint. A synovial biopsy was obtained for histology. Ultrasound of the knee joint showed a mixed solid and fluid collection along the axis of the distal femur, possibly a haematoma. Surgical drainage of the collection was carried out and 150 ml of blood-stained fluid was aspirated. He was commenced empirically on ciprofloxacin, rifampicin, isoniazid and pyrazinamide. Other investigations included normal chest X-ray, negative rheumatoid factor and antinuclear antibodies, negative urinary chlamydia polymerase chain reaction and tuberculin test (0.1 ml of 10 u/ml). Serology for brucella and Lyme disease was also negative.

Subsequent magnetic resonance scan showed a collection on the medial aspect of the knee (*Figure 2*) with a break in the bony cortex indicative of osteomyelitis of the medial femoral condyle. Synovial histology showed multiple epithelioid granulomata with multinucleated giant cells and lymphocytes as well as necrotic fragments. There was no caseation and a Ziehl–Nielsen stain was again negative. The features were consistent with a granulomatous osteomyelitis. Culture of the initial knee fluid yielded *Mycobacterium tuberculosis* after 33 days of culture.

infected material remain the gold standard of diagnosis although a false-negative result may occur if the specimen does not contain synovium or periarticular bone.

In the first case, three biopsy attempts were needed to make the diagnosis. A high degree of suspicion is needed in the presence of a unilateral sacroiliitis with worsening symptoms and radiographic changes, and an open biopsy of the sacroiliac joint may be required to secure the diagnosis. In the second case, microscopy for acid and alcohol-fast bacilli on both aspirated fluid and synovium was negative and a positive culture was not obtained until 1 month after presentation. Of note, a tuberculin test and chest X-ray were both normal in this case. **HM**

Figure 2. Magnetic resonance scan of knee with medial compartment collection and underlying osteomyelitis.

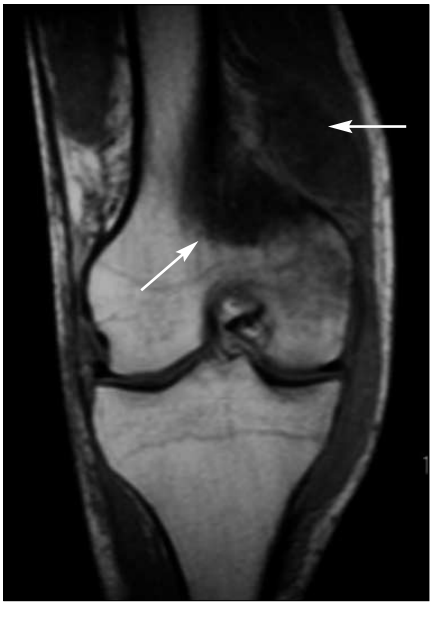
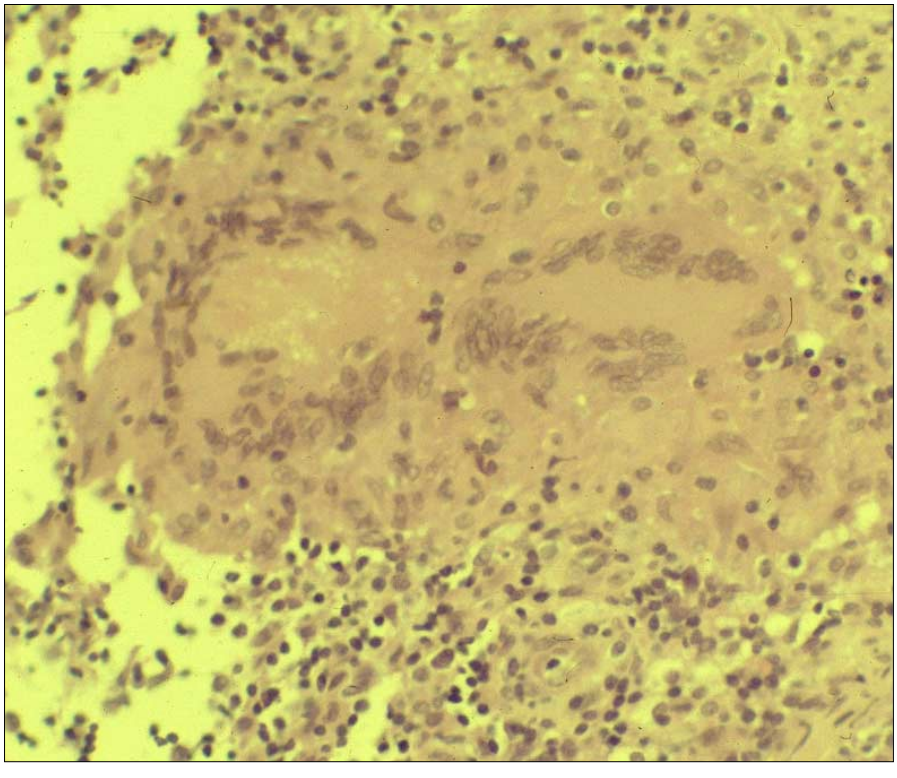


Figure 3. Synovial biopsy from affected knee joint showing granulomata.



Adelman HM, Wallach PM, Flannery MT (1991) Ewing's sarcoma of the ilium presenting as unilateral sacroiliitis. *J Rheumatol* **18:** 1109–11

Gonzalez-Gay MA, Garcia-Porrua C, Cereijo MJ, Rivas MJ, Ibanez D, Mayo J (1999) The clinical spectrum of osteoarticular tuberculosis in non-human immunodeficiency virus patients in a defined area of northwestern Spain (1988-1997). *Clin Exp Rheumatol* **17:** 663–9

Humphrey SM, Inman RD (1995) Metastatic adenocarcinoma mimicking unilateral sacroiliitis. *J Rheumatol* **22:** 970–2

Rose AM, Watson JM, Graham C et al (2001) Tuberculosis at the end of the 20th century in England and Wales: results of a national survey in 1998. *Thorax* **56:** 173–9

Tsay MH, Chen MC, Jaung GY, Pang KK, Chen BK (1995) Atypical skeletal tuberculosis mimicking tumor metastases: report of a case. *J Formos Med Assoc* **94:** 428–31

Vohra R, Kang HS, Dogra S, Saggar RR, Sharma R (1997) Tuberculous osteomyelitis. *J Bone Joint Surg Br* **79:** 562–6

Watts HG, Lifeso RM (1996) Tuberculosis of bones and joints. *J Bone Joint Surg Am* **78:** 288–98