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Radiological studies

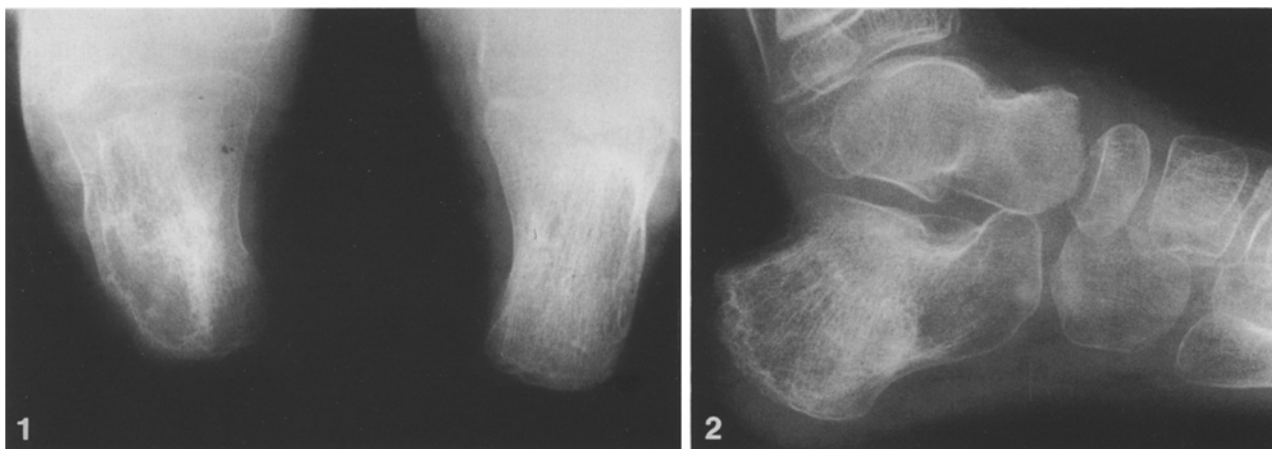


Fig. 1. The left calcaneus shows a destructive lesion in its posterior half, surrounded by a zone of sclerosis. Laterally this zone is less well-defined and destruction of the cortex is seen. Periosteal reaction is minimal and no sequestrum is noted

Fig. 2. The caput of the talus shows discrete irregularity of bone structure with destruction of the subchondral surface the erosion has stimulated no bone reaction. The navicular bone is unaffected

Clinical information

This 6-year-old boy was admitted to the surgical department of the hospital for pain in the left foot of 6 months duration. No history of any other illness was obtained.

Physical findings on admission included a tender and slightly warm swelling beneath the medial malleolus, without erythema. Radiographic examination showed an osteolytic lesion in the left calcaneus and in the caput of the talus. A chest roentgenogram was normal.

An operation on the tarsus was performed. Postoperative laboratory tests included on ESR of 10 mm/h and a negative tuberculin skin test.

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Diagnosis: Tuberculosis of calcaneus and talus with negative tuberculin skin test

On admission a diagnosis of osteomyelitis (bacterial or fungal) was proposed, but the possibility of a tumor, (Ewing's tumor) or eosinophil granuloma was also considered and a surgical biopsy was immediately performed. The differential diagnosis even includes such entities as pyogenic arthritis, juvenile rheumatoid arthritis, hemophilia, aseptic necrosis and pigmented villonodular synovitis [1, 2, 5, 7].

At operation, the surgeon encountered what appeared to be tumor tissue, but histological examination showed granulomatous inflammatory tissue with numerous multiindicated giant cells (Fig. 3). The appearances suggested a diagnosis of tuberculosis, but sections stained by the Ziehl-Nielsen method for acid-fast bacilli were negative. No foreign body particles could be identified when sections were examined by polarized light, and no fungi could be found in sections stained by the PAS method. Material was obtained for routine culture and for cultures for *M. Tuberculosis*. The routine cultures were negative.

One month after biopsy the preliminary report on the culture for *M. tuberculosis* noted the presence of a few acid-fast bacilli: some weeks later the culture was confirmed as positive for *M. tuberculosis*.

After seven and a half months of local symptoms further tuberculin skin tests were carried out and were positive.

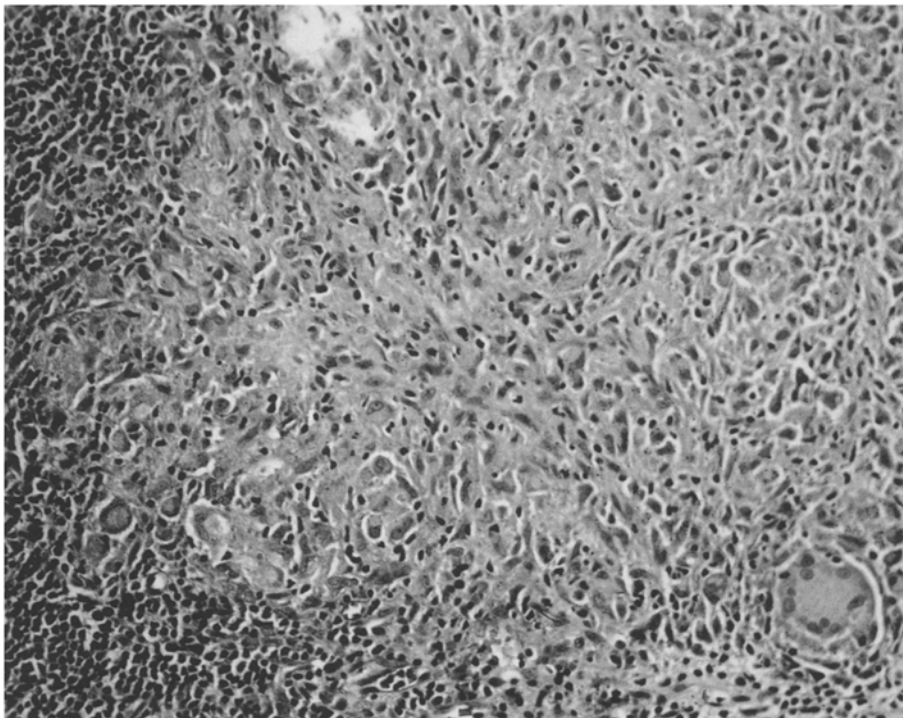
The patient was treated with anti-tuberculosis chemotherapy (Rifampicin and Isoniazid). After two months of treatment radiological evidence of healing was noted. One year later the boy was without symptoms, and the radiographs demonstrated normal bone structure in the calcaneus and the talus.

Discussion

Skeletal and articular tuberculosis is rare in Denmark although it is relatively common in certain immigrant groups. In view of the diagnosis, of tuberculosis, it is of interest that the patient belongs to a Pakistan family who immigrated to Denmark 3 years prior to the onset of the boy's illness.

Denmark consists of a well-defined population of approximately 5,1 million citizens, of whom 2.1% are immigrants. All cases of tuberculosis are reported centrally to The Danish Institute of Clinical Epidemiology.

In Denmark, tuberculosis is typically seen in elderly people with complicating diseases, and middle-aged alcoholic men. Among the immigrants a more classical incidence is seen, dominated by younger people like this patient [6]. Although the incidence of newly diagnosed pulmonary tubercu-



Pathological study

Fig. 3. Photomicrograph of a section (H/E) from the surgical biopsy of the left calcaneus shows the granulomatous inflammatory tissue in which several giant cells are seen

losis in Denmark has decreased in the last decade, extrapulmonary tuberculosis has stabilized at around 70 cases each year. In 1984/85 503 new cases of bacteriologically verified tuberculosis were found [10]. Out of these, 137 were patients with extrapulmonary disease. Of 108 solely extrapulmonary affected patients, the immigrants constituted 32% (against 15% in the group of patients with pulmonary tuberculosis). Nineteen percent of the extrapulmonary infections were localized to bones or joints. Spondylitis was the predominant disease [8].

In a major review of extrapulmonary tuberculosis from Boston City Hospital and other hospitals, 136 patients were found to have extrapulmonary tuberculosis, in a ten year period [1]. Twenty infections (15%) were localized to bones or joints, comprising 0.81% of cases of newly diagnosed tuberculosis. Anatomical sites of involvement included: spine in 16; hip in 2; knee in 1; and great toe in 1.

Roentgenographic abnormalities are present in almost all patients with skeletal tuberculosis. The only early abnormality may be soft-tissue swelling, which is easily missed [1]. The typical radiological manifestations of an osseous lesion are characterised by subchondral osteoporosis, followed by irregular areas of destruction, around which no marginal sclerosis appears until the stage of quiescence is reached. Periosteal reaction, when present, is minimal. Slow enlargement of the focus occurs, eventually followed by involvement of an adjacent joint. All such lesions may subsequently undergo contraction and calcification as activity of the infection subsides. Sequestration is much less common than in osteomyelitis [7].

In joints, continuing, slow, destructive peripheral, erosive defects of the articular surfaces and considerable periarticular osteoporosis is observed. Joints rarely ankylose spontaneously [7].

Isolation of *M. tuberculosis* remains the most sensitive and specific diagnostic method for all types of tuberculosis [1]. However, as in this case, the time required for the growth of the tubercle bacilli limits the clinical utility of cultures. A positive culture is often available after 3 to 4 weeks, but a final negative result is not possible until after 7 weeks, since growth may be observed as late as this time period. For this reason less specific measures, such as the tuberculin skin test, remains an invaluable diagnostic tool, since it is usually positive in early stages of clinical disease [1, 3, 4]. A positive tuberculin skin reaction has significant diagnostic implications that increase as the age of

the patient decreases. As the incidence continues to decrease in the general population, the diagnostic significance of a positive tuberculin skin test will increase even further. It has been postulated that a negative skin reaction virtually excludes tuberculosis [9], a statement that was not applicable in this case.

Skeletal and articular tuberculosis is usually caused by haematogenous spread from a primary focus, but it need not be associated with active tuberculosis elsewhere. Time and location for the primary infection in this patient are unknown, but the focal osseous symptoms existed for nearly 8 months before the tuberculin skin test became positive.

In *summary*, a case has been presented of a 6-year-old boy, of Pakistanian origin, with tuberculous osteomyelitis in the left calcaneus and talus. Such infections are a result of hematogenous seeding from a primary focus. Despite the existence of a previous infection, and despite 6 months of focal symptoms, the tuberculin skin test was negative.

The radiological features and the clinical manifestations were described. The differential diagnosis was discussed, and epidemiological considerations were considered.

After seven and a half months of focal symptoms, the reaction was finally positive in a tuberculin skin test. This finding was confirmed by a positive culture.

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