TUBERCULOUS OSTEOMYELITIS

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Tuberculous osteomyelitis which does not involve a joint is uncommon and may fail to be diagnosed by an orthopaedic surgeon. We treated 28 lesions of tuberculous osteomyelitis in 25 patients between 1988 and 1995. The duration of symptoms was from two to 39 months, and most of our patients had been treated initially with non-steroidal anti-inflammatory drugs which failed to provide relief. Bone pain which does not promptly respond to analgesic medication is often due to infection or neoplasia.

In the early stages, when plain radiographs are normal, MRI or CT may help to localise lesions. On plain radiographs, more advanced lesions may mimic chronic pyogenic osteomyelitis, Brodie’s abscess, tumours or granulomatous lesions. Biopsy is mandatory to confirm the diagnosis, and antituberculous drugs are the mainstay of treatment. When operative findings at biopsy have the features of skeletal tuberculosis curettage of the affected bone may promote earlier healing.

Received 21 January 1997; Accepted after revision 11 April 1997

Tuberculosis remains a major international problem despite advances in radiological diagnosis and antituberculous therapy. It affects approximately one-third of the world’s population; each year there are about 20 million prevalent cases and 8 million new cases. Some developed countries have now recorded a resurgence in the incidence of tuberculosis, attributed, particularly in the USA, to a rise in the number of people with immunosuppression, the development of drug-resistant strains of Mycobacterium, an ageing population, and an increase in the number of health-care workers exposed to the disease.

The human immunodeficiency virus (HIV) remains an important risk factor for the reactivation of latent tuberculous infection. Presentation of skeletal tuberculosis in an immunocompromised patient may be atypical and reach an advanced stage by the time of diagnosis.

Isolated involvement of bone by tuberculous infection is uncommon, and the variable clinical and radiological pictures may mimic chronic pyogenic osteomyelitis, Brodie’s abscess, tumours or granulomatous lesions. We have reviewed our experience in the hope of stimulating a high index of suspicion for early diagnosis.

PATIENTS AND METHODS

Between 1988 and 1995 we treated 28 sites of tuberculous osteomyelitis in 25 patients. There were 20 males and 5 females with an average age of 26 years (18 months to 47 years). In the upper limbs, the 12 bones affected were the phalanges (4), metacarpals (2), humeral shaft (2), medial condyle of the humerus, olecranon, ulnar shaft, and lower end of the radius. In the lower limbs ten lesions involved the metatarsals (4), greater trochanter (2), talus, cuboid, medial cuneiform, and a phalanx. In the girdle bones the six affected sites were the ischial tuberosity (2), ischium, ischium-ilium junction, clavicle, and scapula. Six of our patients had skeletal tuberculosis at seven other sites including the dorsal spine (3), cervical spine, elbow, wrist and the foot. Six patients had associated pulmonary tuberculosis.

Pain and swelling were the most common symptoms with a duration ranging from two to 39 months. Eight patients had sinuses, three of which developed after the surgical drainage of abscesses. Six patients had palpable abscesses. The draining lymph nodes were considerably enlarged in seven patients, and loss of weight and appetite with low-grade fever were seen in four.

The ESR was significantly raised in 22 patients, ranging from 31 to 83 mm/hour. A positive tuberculin skin test was found in 21. In ten patients serological testing for tuberculosis by the enzyme-linked immunosorbent assay was positive in six. We performed serological testing for HIV in seven young or middle-aged patients with either multiple
lesions or with a history of multiple sexual contacts: in all it was negative.

All patients had plain radiographs of the affected area. In one, these were normal but MRI located an abnormality. Only eight lesions showed the characteristic radiological findings of tuberculosis; six had the appearance of chronic pyogenic osteomyelitis or a Brodie’s abscess, and nine were cystic. One patient presented with features of a neoplasm and three lesions of tubercular dactylitis had a coarse trabecular pattern.

In 22 patients the diagnosis was confirmed by histological examination of the material obtained from the lesions and in the remaining three by histopathological examination of the material obtained from associated osteoarticular lesions. In 19 patients the macroscopic appearance at biopsy was suggestive of tuberculosis with soft friable whitish-grey debris resembling clumped cheesy material typical of caseous necrosis. In these we also performed curettage of the affected bone and the excision of a sinus, if present. In three patients in whom the diagnosis had been doubtful during surgery only biopsy was performed. Mycobacterium tuberculosis was cultured in nine cases, and culture for pyogenic organisms was positive in five lesions with sinuses.

Antituberculous drugs used for medical treatment included rifampicin (10 mg/kg in adults and 10 to 20 mg/kg in children), isoniazid (5 to 10 mg/kg in adults and 10 to 20 mg/kg in children), pyrazinamide (20 to 40 mg/kg), ethambutol (15 to 25 mg/kg), and streptomycin (15 mg/kg). Treatment for 18 months was used in five patients, for 12 months in nine and for nine months in 11. There was no recurrence of disease after any of these durations of treatment.

RESULTS

The mean follow-up was 41 months (13 to 96). All patients were relieved of pain within six months of the initiation of treatment and sinuses healed within 14 weeks. In 20 patients the ESR returned to normal within six months of the beginning of treatment. Demineralisation of the affected region persisted for a maximum of five months. During healing, we noticed increased radiodensity in all cases. By the end of treatment for nine months 23 patients had regained full range of painless movements of the adjacent joints; only two had slight limitation.

Imaging appearances. In the early stage plain radiography may not show any abnormality. If the clinical features favour skeletal tuberculosis MRI may be useful (Fig. 1), but the diagnosis is confirmed by biopsy. Subtle radiological changes may be missed (Fig. 2), but clinical progression, or the formation of a sinus with obvious involvement of the bone, reinforces our view that the radiologist must be told the precise site of pain initially. A small focal area of osteolysis located eccentrically with little or no surrounding reactive bone is characteristic, and the presence of local...
osteopenia helps to diagnose tuberculosis. In our series only eight lesions had such radiological findings. In one patient (Fig. 3) a pathological fracture was seen.

Osteoporosis, bone lysis, sclerosis and periostitis are seen in both tuberculous osteomyelitis and chronic pyogenic osteomyelitis and it is often difficult to differentiate the two conditions. Six of our 28 lesions had radiological findings similar to those of chronic pyogenic osteomyelitis or a Brodie’s abscess; histopathological examination was required for diagnosis (Figs 4 and 5).

One type of tuberculous osteomyelitis is cystic tuberculosis, which is more commonly encountered in children than in adults. The multifocal form is more common than solitary lesions and, in a series of 13 children with histologically confirmed tuberculosis of bone, solitary cystic lesions were found in ten. We detected nine solitary cystic lesions in six adults and three children (Figs 6 and 7). In four the lesions were expansile with underlying bone destruction and periosteal thickening giving the appearance that has previously been termed spina ventosa. Although this is more common in the metacarpals and metatarsals we found this appearance in the ulna in one of our patients (Fig. 8).

In three cases of tuberculous dactylitis the radiological finding was diffuse bone infiltration with a coarse trabecular pattern (Fig. 9). One patient appeared to have a neoplasm of the ischium (Fig. 10), but the appearances at biopsy and the subsequent histology showed it to be tuberculosis.

DISCUSSION
Our aim was to draw attention to tuberculous osteomyelitis which is rare compared with skeletal tuberculosis involv-
ing the spine or a joint. Because of that, and a low index of suspicion for its diagnosis, early lesions may be neglected. Osteoarticular tuberculosis is a major problem in many parts of the world. The spine is the site of bone tuberculosis in about half the cases, and isolated bone involvement without spread to a joint often fails to attract attention. Because of the subtle nature of the symptoms, the diagnosis is not made until the process is well advanced.

Nearly all of our patients had initial treatment with non-steroidal anti-inflammatory drugs which offered some relief of pain or swelling or both. The repeated use of these drugs created a false sense of security until it became
apparent that their continued use had failed to provide complete relief. Mild pain and swelling of bone, with slight warmth and tenderness, and overlying boggy swelling of the soft tissues should alert clinicians to the possibility of skeletal tuberculosis. Enlargement of regional lymph nodes and the presence of an abscess or sinus are also of great significance.

Bone pain which does not respond to analgesic medication may be due to infection or neoplasia. If plain radiographs are normal more sensitive investigations such as MRI and CT are required to detect and localise lesions. The presence of a sinus from which pyogenic organisms are grown on culture, may lead to a diagnosis of chronic pyogenic osteomyelitis; but if the sinus persists after suitable antibiotics, underlying tuberculous osteomyelitis must be considered. Because of the variety of radiological findings biopsy is mandatory to confirm the diagnosis. Antituberculous drugs remain the mainstay of treatment and, in our experience, judicious surgical intervention may help to promote early healing.

We wish to thank Mr Ramakrishnan and Mrs Paramjit Kaler for their help in preparing the manuscript.

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