

BONE AND JOINT TUBERCULOSIS IN CHILDHOOD

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Ten children with bone and joint tuberculosis are reported. The age of onset varied between 18 and 30 months. All patients were treated with curettage and chemotherapy. The results were excellent with complete restitution being achieved in all cases.

Key words: childhood; regeneration of ossification centre; tuberculous osteitis

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Previous studies have shown that the ossification centre and the articular cartilage of long bones in infants can regenerate following partial destruction by osteomyelitis or tuberculosis (Banks et al. 1940, Bergdahl et al. 1976, Foucard & Hjelmstedt 1971).

In this report we describe 10 cases of bone and joint tuberculosis (TB) in children and confirm this regenerative ability. The diagnosis and treatment of these cases are discussed as well as the possible source of the infection.

CLINICAL MATERIAL

Ten infants with tuberculous osteitis of the long bones involving the ossification centre and the metaphysis were treated in our Clinic within a 10-year period (1967-1976). The age of onset of the disease varied between 18 and 30 months.

X-ray examination of the lungs in all cases showed that only one patient had a co-existing tuberculosis of the lungs. In three cases the hip joint was affected, in two the elbow joint, in another two the knee joint, in one the ankle joint, and in two the spine. Three cases with particular problems due to the location and extension of the affected area will be discussed below. The ten cases are summarized in Table 1.

The follow-up period after treatment was up to 12 years.

DIAGNOSIS

A clinical diagnosis was difficult to establish because the general condition of these young patients was good and in the beginning the local signs were not pronounced. Temperature and erythrocyte sedimentation rate were modestly elevated. Radiographically, the bone lesion was localized to the epiphysis and metaphysis usually with only minor reactive changes. Occasionally, there was a small sclerotic zone around the lesion extending across the epiphyseal plate (Figure 1a).

A positive Mantoux test supports the diagnosis of tuberculosis but only a biopsy can prove it. In all our cases the Mantoux test was positive and the material removed from the affected area by biopsy and cultured was positive for TB of the Bovine type in six cases and in the remaining four although they were sterile the histological findings were the same as for the positive biopsies.

Histological study of paraffin sections showed a granulomatous process. The granulomas consisted of epithelioid and giant cells of Langerhans' type and areas of caseation. An infiltration of lymphocytes and plasma cells was present in association with the necrotic areas.

Table 1. Summary of the cases of bone and joint tuberculosis

Case number	Approximate age at first onset (in months)	Sex	Age at operation (months)	Erythrocyte Sedimentation Rate (mm in first hour)	Site of lesion	Histological examination: Tuberculosis	Mantoux test	Approximate interval between operation and most recent examination (in years)	TB culture
1	18	Male	24	15	Distal epiphysis metaphysis of femur	+	+	5	Positive
2	23	Female	30	22	Talus	+	+	12	Positive
3	23	Male	36	25	Spine T ₉ -T ₁₀	+	+	8	Sterile
4	19	Male	29	23	Acetabulum	+	+	4	Positive
5	21	Male	29	23	Femoral neck	+	+	10	Sterile
6	18	Female	24	30	Femoral neck	+	+	6	Positive
7	25	Female	30	31	Elbow joint	+	+	2	Sterile
8	18	Female	21	28	Elbow joint	+	+	6	Positive
9	30	Male	36	38	Spine C ₂ -C ₃	+	+	7	Sterile
10	29	Female	38	32	Distal epiphysis of femur	+	+	7	Positive



TREATMENT

The same treatment was used in all cases: surgical curettage combined with anti-TB chemotherapy, followed by immobilization in plaster for from 6 to 12 weeks, according to the joint affected.

The weight-bearing joints were immobilized for a period of 6 weeks in plaster followed by gradual mobilization, again determined by the joint affected, for a total period of 6 months or until the range of movement was two-thirds of the normal range.

The spinal cases were immobilized in a plaster bed for a period of 12 weeks and for a further period of 4 months they were confined to bed but not immobilized.

Anti-TB chemotherapy was given as follows: Streptomycin (15 mg/kg body weight) for 6 weeks and Isoniazid (5 mg/kg body weight) and Rifampicin (10 mg/kg body weight) for 6 months. This chemotherapy procedure was started as soon as the diagnosis was established by histological examination.

In the three cases described below particular problems were encountered because of the location and extension of the diseased area.

Figure 1a. Lesion extending from the metaphysis to the epiphysis across the epiphyseal plate in the femoral condyles.

b. No evidence of earlier infection at follow-up after 7 years.

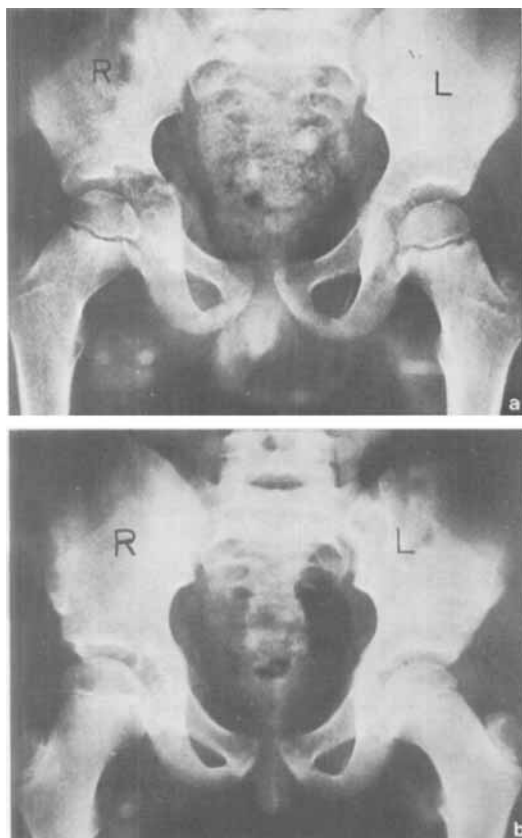


Figure 2a. Affected acetabulum in a 28-month-old child.
b. The same case 4 years after treatment.

Case 10

In this case the lesion extended across the distal epiphyseal plate of the femur (Figure 1a). At follow-up after 7 years there was no radiographic or clinical evidence of the disease (Figure 1b).

Case 4

The tuberculous osteitis was located in the roof of the right acetabulum (Figure 2a). We avoided a direct approach to protect the blood supply of the joint. Instead, we achieved a good surgical curettage of the affected acetabulum by means of an intra-pelvic approach. Four years later, the clinical and radiological picture of this hip joint is excellent (Figure 2b), except that the X-rays reveal a possible increase in the size of the right femoral head and a thickening of the neck due to the hyperaemia caused by the infection.

Case 2

Case 2 where the ankle joint was affected is a good

example of the regenerative ability of the ossification centre. It is well known that the body of the talus is capable of withstanding great pressure and has a distinct and sensitive vascularization (Trueta 1968). The talus of this ankle joint was severely affected (Figure 3a). However regeneration was almost complete 12 years after treatment (Figure 3b). The regeneration capacity of the epiphysis and the articular cartilage at this age even after destruction by tuberculosis infection is very high.

DISCUSSION

Our cases were from the population of Northern Greece where there is a moderate frequency of tuberculosis. Despite this the case histories revealed that none of the children had even been in contact with persons suffering from TB. They had, however, as babies, all been given cows' milk as their first feed and there were scattered cases of tuberculous cows in the areas where these children lived. The possibility of BCG vaccination

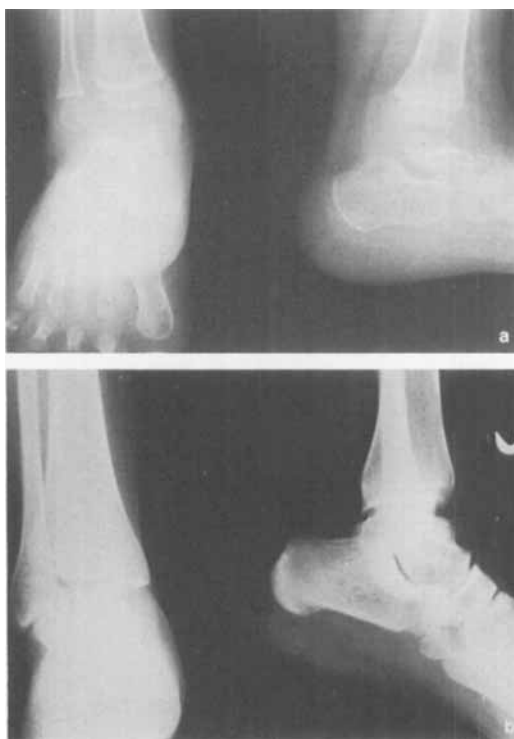


Figure 3a. The body of the talus is severely affected.
b. Almost complete regeneration of the damaged area of the talus 12 years later.

having played a role in these cases (Foucard & Hjelmstedt 1971) can be eliminated as BCG vaccination is not compulsory in Greece and none of the patients had been immunized.

As already mentioned the diagnosis was indicated by the clinical and radiological picture, the erythrocyte sedimentation rate, and the Mantoux test. However, the decisive factors in the diagnosis were the culture of the material removed by biopsy and the histological study. The culture gave positive results in all cases except four where the cultured material was sterile even though the results of the histological study of this material were compatible with tuberculosis.

The same treatment programme was followed in every case, viz., surgical curettage and chemotherapy followed by a short period of immobilization.

The final results were excellent because there was complete functional rehabilitation without any residual deformity. A significant contributing factor as regards the results was probably the regenerative ability of the epiphyseal centre and the articular cartilage at this age when the epiphyseal plate is intact (Banks et al. 1940, Bergdahl et al. 1976).

CONCLUSION

Our treatment was radical curettage and anti-tuberculosis chemotherapy followed by a period of immobilization in plaster and subsequent physiotherapy.

In bone and joint TB in childhood the regenerative ability of the epiphysis and the articular cartilage is very high and the above treatment gave excellent results.

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