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Tuberculosis of the upper limb joints

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Summary. *Seventy-four cases of tuberculosis of the upper limb joints (sterno-clavicular 1; shoulder 12; elbow 42; wrist 10 and fingers 9), treated by two of the authors, were reviewed. Eighty-seven percent presented at an advanced stage of destruction. The diagnosis was proved in 71 out of 74 cases. In most, the treatment was 6–12 months of chemotherapy, plaster immobilization (in order to prevent or correct deformity) and functional rehabilitation whenever possible. The sterno-clavicular and finger joints were not immobilized. Response to chemotherapy was favourable in 66 of the patients followed up. One relapse occurred at the 18th month.*

The affected shoulder joints healed with loss of movement, but were not painful. At the elbow, ten patients developed spontaneous bony fusion in the right-angle position, 27 had a useful range of motion and 19 had more than 70° of flexion-extension movement. One patient had an arthrodesis. At the wrist, two patients healed with painful stiffness and an arthrodesis was performed. All the finger lesions healed with painless stiffness which did not interfere much with function because rehabilitation had been started early. The authors believe that conservative management usually gives better results than arthrodesis or excision of the joint.

Résumé. *Les auteurs rapportent les résultats de leur expérience dans 74 cas d'ostéo-arthrite tuberculeuse du membre supérieur: 1 sterno-claviculaire, 12 scapulo-humérales, 42 coudes, 10 poignets et 9 articulations des doigts, toutes traitées personnellement par les deux auteurs principaux. Sur le plan diagnostique, 87% des patients se présentaient à un stade de destruction avancée. Le diagnostic de certitude fut obtenu dans 71 cas sur 74. Dans la majorité des cas, le traitement a été standardisé: chimiothérapie de 6 à 12 mois, immobilisation plâtrée pour prévenir ou corriger les déformations, suivie de rééducation chaque fois que possible. Les lésions de la sterno-claviculaire et des doigts ne furent pas immobilisées. Les résultats ont été bons en ce qui concerne la chimiothérapie: 66 réponses favorables chez 66 patients suivis. Il y a eu une rechute au 18éme mois. Du point de vue orthopédique, les lésions scapulo-humérales ont guéri avec une raideur de l'épaule toujours importante mais indolore. Au niveau du coude, 10 patients évoluèrent vers la fusion osseuse précoce spontanée, qui se fit à 90° de flexion grâce à l'immobilisation plâtrée; 27 guérirent avec une conservation variable des mouvements du coude dans un secteur fonctionnel et 19 d'entre eux présentaient plus de 70° d'étendue de flexion; 1 patient fut arthrodésé. Au niveau du poignet, 2 patients guérirent avec une raideur douloureuse qui nécessita une arthrodèse. Les lésions des doigts guérirent avec une raideur plus ou moins marquée, bien compensée par la mobilité des autres articulations, conservée intacte par la rééducation. Les auteurs concluent à la meilleure qualité des résultats du traitement conservateur que des classiques interventions d'arthrodèse ou de résection articulaire.*

Key Words: *Tuberculosis, Joints, Upper limb*

The upper limb is affected in only 10% of cases of bone and joint tuberculosis. Relatively little has been written about the subject since Wilson [10] described 31 cases of tuberculosis of the elbow joint in 1953. Robins [7] and Hodgson and Smith [3] published their experiences of tuberculosis of the wrist and hand in 1967 and 1972 respectively. Three of the present authors wrote papers on tuberculosis of the elbow in 1977 [6] and in 1980 [5], and two of us on the wrist and fingers in 1982 [1].

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The aim of the present paper is to report our experience of the management of 74 cases of tuberculosis affecting the joints of the upper limb, and to suggest the appropriate treatment.

Material and methods

All 74 patients were adults mostly between 20 and 30 years of age although 18 were aged over 60 years. There were 21 men and 53 women.

The joints affected were:

sterno-clavicular	1
shoulder	12
elbow	42
wrist	10
metacarpophalangeal	3
proximal interphalangeal	4
distal interphalangeal	2

These 74 represent 10.5% of 654 cases of bone and joint tuberculosis which were seen between 1968 and 1984, and 12.9% of the incidence of joint tuberculosis.

Diagnosis

A presumptive diagnosis was based on the clinical findings, laboratory investigations and radiography. Emphasis was placed on the presence of other tuberculous lesions and the skin tuberculin test. The radiological findings were classified as follows:

Stage 1 Localised osteoporosis, but no bony lesion.
Stage 2 One or more erosions or cavities in the bone.
Stage 3 Involvement of the whole joint without gross destruction.
Stage 4 Gross destruction.

The diagnosis was considered to be proved when the tubercle bacillus was cultured and when there were positive histological findings in tissue removed at biopsy.

Treatment

Antituberculous chemotherapy was used in all cases, but the details of the regimes and the drugs used varied during the period of 16 years. They are summarised in Table 1.

PAS and Ethianomide are no longer used, but the daily dosages of the other drugs in adults of more than 50 kg of weight were INH 300 mgms, Rifampicin 600 mgms, Streptomycin 1 G and Pyrazinamide 2 G.

Orthopaedic management included immobilisation, operation and rehabilitation.

Table 1. Summary of drug treatment in tuberculosis of 74 joints of the upper limb

	Months	*Number of patients*	
INH PAS Streptomycin	12	34	
INH PAS Streptomycin	6	3	
INH Ethianomide Streptomycin	6	5	
INH Streptomycin	6	7	40
INH Rifampicin, Streptomycin, Pyrazinamide	6	25	

Plaster casts were used in 6 of the 12 shoulders, in 37 of the 42 elbows and 9 of the 10 wrists. The average time was 60 days. The sternoclavicular and the finger joints were not immobilised.

Abscesses were drained in 7 cases. A hemi-excision of the shoulder was done in one case. The elbow was arthrodesed in one case and the wrist in two.

Rehabilitation was used in three shoulders, 17 elbows, one wrist and for all the finger lesions.

Results

Clinical findings

Fifty of the 74 patients had a sinus when first seen. In 8 there was an abscess and 16 had a painful swollen joint. All patients had painful stiffness of their affected joints. The average delay in diagnosis was 25 months. Associated tuberculous lesions were present in 15 patients. The lung was involved in 3, soft tissue in 2 and 9 had other bone or joint lesions.

Laboratory investigations

The sedimentation rate was raised in all the patients. Pyogenic organisms were cultured from 21 of the 50 sinuses. The skin tuberculin test was positive in 68 of the 71 patients in whom the result was available.

Radiological findings

The extent of involvement in the different lesions is given in Table 2.

Diagnosis. A proven diagnosis was made in 71 cases, by positive culture in 22, by histological examination in 38, and in 11 cases both investigations were positive.

A presumed diagnosis was accepted in 3 patients. In one a specimen was lost, one patient was already on chemotherapy when first seen so a biopsy was not done, and in one patient, treated at the beginning of the series, we did not demand a proven diagnosis.

Table 2. Radiological findings in the 74 patients

	Shoulder*	Elbow	Wrist	Fingers	Total
Stage 1	0	1	0	0	1
Stage 2	1	5	2	1	9
Stage 3	4	20	0	1	25
Stage 4	8	6	8	7	39

* includes the sternoclavicular joint

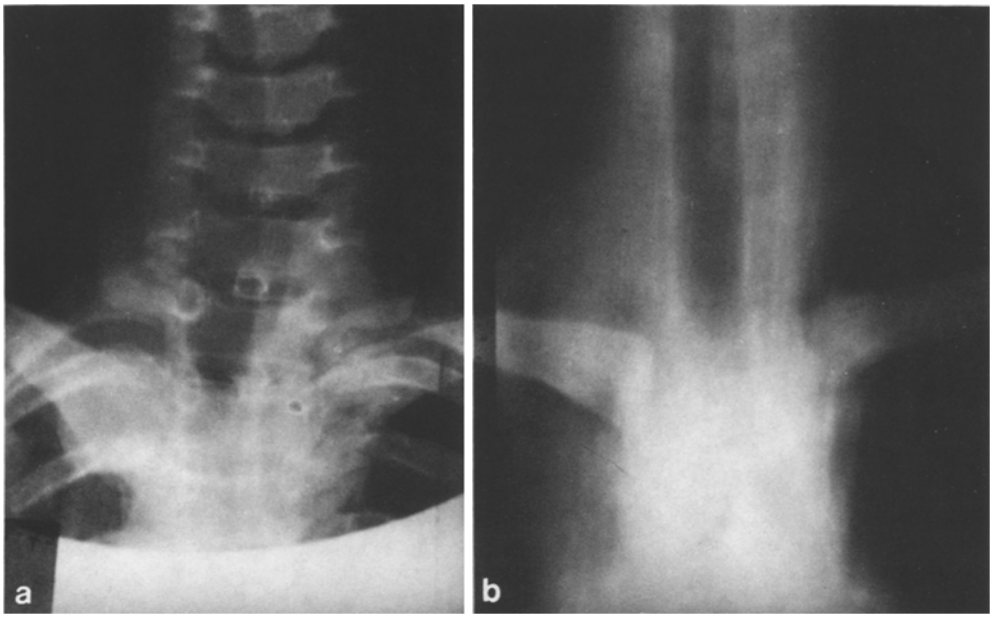

Fig. 1 a, b. Tuberculosis of the left sternoclavicular joint (stage 4). **a** Radiograph; *b* Tomograph

Follow-up. Eight of the 74 patients were lost to follow-up but in the remainder the duration was 6–12 months in 18 patients, 13–24 months in 27, 25–60 months in 13 and over 60 months in 8.

Response to chemotherapy. All the 66 patients who were adequately followed up had a favourable response to chemotherapy, their lesions becoming quiescent. One relapse occurred between the first and second years after initial treatment, but this responded favourably to a further course of chemotherapy and there was no sign of recurrence after a further two years.

The results in different joints are now described. A lesion is regarded as 'healed' when the disease was quiescent at follow-up.

Sternoclavicular joint. The one case had no residual disability (Fig. 1).

Shoulder (Fig. 2). All 12 cases healed and were free of pain. Abduction was less than 60° in 3 cases and more than 60° in 7. External rotation was always restricted to less than 20°. The patient treated by hemi-excision healed with 70° of abduction and 20° of external rotation.

Elbow (Fig. 3). One patient, treated at the beginning of this series, had an arthrodesis and the el-

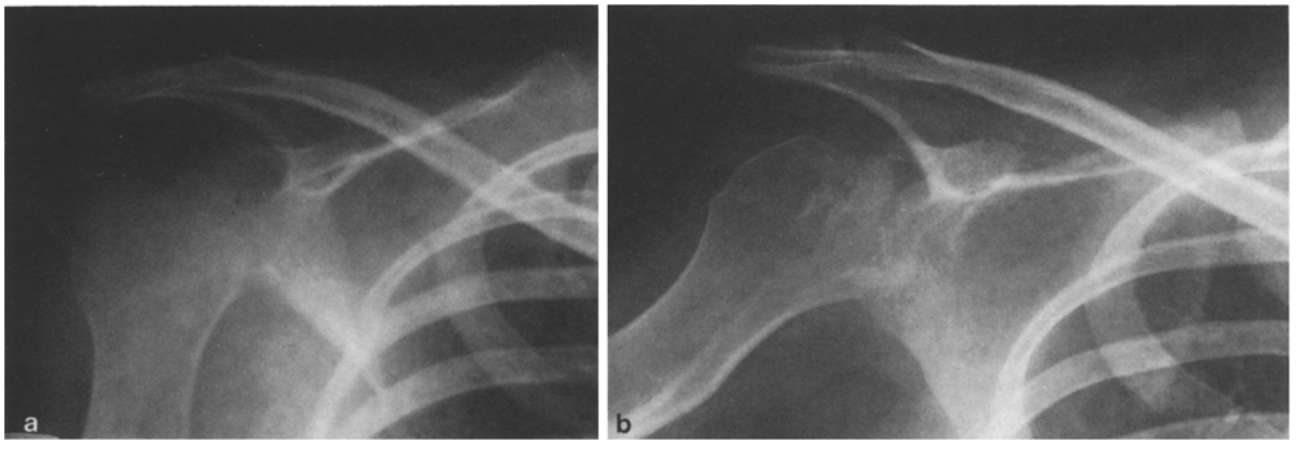

Fig. 2. a Tuberculosis of the scapulo-humeral joint (stage 4); **b** Radiological appearance after treatment

Fig. 3. a Tuberculosis of the elbow joint (stage 3); **b** Radiological appearance after treatment: range of movement from 30° to 120°

bow fused at 90°. Ten patients developed spontaneous bony fusion between 90° and 100°. Twenty-seven patients healed with the following ranges of movement, which always took place in a non-disabling sector 70–130 degrees in 19 patients, 40–70 degrees in 4 and 20–40 degrees in 4. All the elbows were free of pain.

The range of pronation and supination was less satisfactory. Only 8 patients had a combined range of more than 130°, 4 had a range from 80° to 130° and 6 had less than 50°. Eight patients had no rotation at all. In two the result is not known.

Wrist (Figs. 5 and 6). Two patients had an arthrodesis which fused in a satisfactory position. Four patients fused with less than 20° of movement and 3 with a range of more than 40°. All were free of pain. In one case the result is not known.

Fingers and thumb (Figs. 7 and 8). The functional results was satisfactory in all cases: stiffness or deformity was compensated for by mobility in other joints. Arthrodesis or prosthetic replacement were never needed.

Discussion

The incidence of tuberculosis of the upper limb joints in relation to the overall incidence of joint tuberculosis was 12.9% in our series. This is higher than in previous papers quoted by Debeyre and

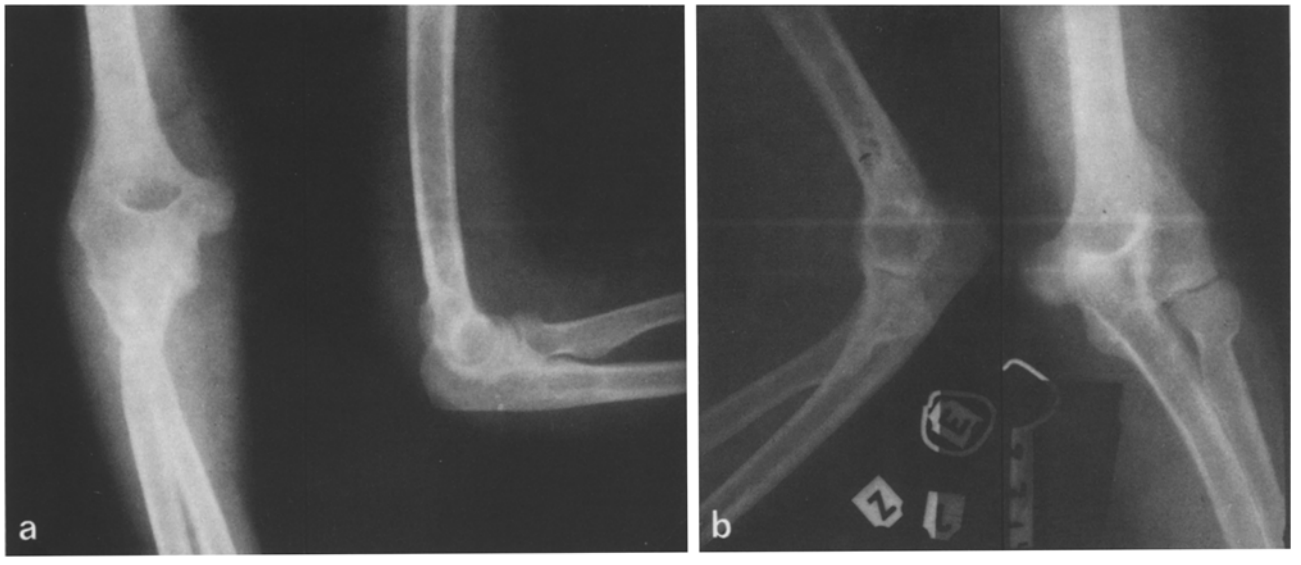

Fig. 4. a Tuberculosis of the elbow joint (stage 3) with discreet bony lesions and diminution of the joint space; **b** Early spontaneous bony fusion occurred during treatment

Fig. 5. a Tuberculosis of the wrist. Clinical photograph when first seen; **b** Appearance after treatment

Fig. 6. a The same patient as in Fig. 5. Radiological appearance when first seen (stage 4); **b** Complete spontaneous fusion of the whole carpus after conservative management

Fig. 7. **a** Tuberculosis of the metacarpophalangeal joint of the thumb (stage 4); **b** Radiological appearance after conservative management

Fig. 8. **a** Tuberculosis of the proximal interphalangeal joint of the index finger; **b** Bony healing after conservative management

Derrion [2] which were Sorrel 10.8%, Gerard-Marchant 6% and Debeyre 8.5%. It is also higher than in the more recent series of Silva [8] and Lafond [4]. This is probably because most of our cases were adults. The frequency of involvement of the different joints in the upper limb is the same in our series as in the others.

Most of our cases presented with advanced disease, which is usual in Algeria, and this explains the high incidence of sinuses (50 out of 74 cases) and the superimposed pyogenic infection. The outcome for the severe destructive lesions was not as bad as we had anticipated.

It is important to obtain a definite diagnosis and a surgical biopsy should be done before starting treatment, the specimen being sent for both culture and histology.

The treatment regime changed as new drugs

became available. Since 1981 we have used INH and Rifampicin daily for six months, supplemented by Streptomycin and Pyrazinamide daily during the first two months. All lesions became quiescent after treatment and there was a recurrence in only one patient, due to the development of an INH-resistant strain. A course of Ethianomide, Cycloserin and Kanamycin resulted in the lesion healing (Rifampicin was not available in Algeria at the time).

The orthopaedic management needs to be discussed in relation to the individual joints involved. In the shoulder immobilisation in a spica cast applied in abduction and external rotation is always indicated in order to avoid disabling stiffness in adduction. This is followed by rehabilitation. Unfortunately, the elderly cannot tolerate a shoulder spica, but the functional result is normally acceptable since these patients do not demand much movement from their shoulder joints. The single case treated by hemi-excision did not regain more movement than others of the same age who were treated conservatively.

We have pointed out the value of conservative management of tuberculosis of the elbow in two previous papers [5, 6], and we advise immobilization in a cast from axilla to palm, with the elbow at 90° and the forearm in neutral rotation. The position of 90° is chosen to relieve pain and to avoid stiffness or fusion in extension. When signs of inflammation disappear, usually after two months, rehabilitation is started. Treatment is given daily for from three to six months and is stopped when there is no improvement at two successive monthly examinations. A back splint is used in between sessions until the power of flexion is regained so that deformity in extension is prevented. Srivastava [9] has also reported satisfactory results in 25 cases managed conservatively. We believe that the functional outcome is much better than that achieved by either arthrodesis or excision of the joint. The problem of rapid spontaneous fusion, which occurred in 10 out of our 42 cases, remains unresolved. No treatment, even early rehabilitation, seems able to prevent it and we have not been able to explain why it should happen. Fortunately, immobilization of the elbow at a right angle in a plaster cast ensures that ankylosis in extension is avoided.

In the wrist chemotherapy and immobilization did not always lead to a stiff and painless joint. In 3 of our 10 patients we proposed an arthodesis which was accepted by two of them. Operation should, however, only be considered after rehabilitation and when the wrist is so persistently painful that the patient asks for further treatment. We carried out an arthrodesis far less frequently than Silva [8] who operated on 8 out of 10 cases of tuberculosis of the wrist.

In the fingers conservative management, with an emphasis on rehabilitation, produced good functional results in spite of the extent of joint destruction.

Conclusions

Our review of 74 patients with tuberculosis of the joints of the upper limb shows that conservative management (chemotherapy and immobilization, followed by rehabilitation) usually gives good functional results, even when there is advanced destructive disease. The outcome was better than that achieved by arthrodesis or excision of the joint. Operation is still indicated when there is persistent disability or disabling deformity after adequate conservative treatment. In our experience this was rarely necessary and then, in practice, only at the wrist. These conclusions are similar to those put forward recently by the authors in relation to bone and joint tuberculosis affecting other sites.

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