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Tuberculous arthritis of the elbow

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Summary. *Twenty-three patients with tuberculous arthritis of the elbow were treated and followed up for 3 to 8 years. The diagnosis was established by finding mycobacterium tuberculosis in the aspirate or in a surgical specimen in 18, and by histology in 5. A long history of symptoms and extensive involvement of bone and joint are associated with poor results. Early diagnosis and adequate treatment can be followed by good functional results. Postoperative continuous passive motion is valuable in improving the range of movement in elbows with extensive osteoarticular tuberculosis.*

Résumé. *23 patients atteints de tuberculose du coude furent traités et suivis de 3 à 8 ans. Le diagnostic a été posé par isolement du germe à partir d'une ponction ou d'un prélèvement chirurgical pour 18 patients et par l'examen histologique chez les 5 autres. Les facteurs de mauvais pronostics sont la durée de la symptomatologie avant le diagnostic et l'extension de l'atteinte osseuse et articulaire. Le diagnostic précoce suivi du traitement adéqaute conduit habituellement à un bon résultat fonctionnel avec récupération complète de la mobilité. La mobilisation passive continue par attelle motorisée est de grande importance pour la récupération de la mobilité du coude.*

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Table 1. Details of 23 patients with tuberculosis of the elbow

Sex Male : Female	16 : 7
Mean age (Range)	43 (25 to 72)
Side Right : Left	15 : 8
Diagnosis: Culture positive: No Growth	18 : 5
Histopathology	23 all positive
Duration of Symptoms	
3 days	1
3 days to 3 months	3
3 months 6 months	5
6 months to 1 year	10
more than 1 year	4
Draining sinus	7 (30%)
Posterior interosseous neuropathy	4 (17%)
Pulmonary tuberculosis	3 (13%)
Staging Stage I	5
Stage II	2
Stage III	2
Stage VI	14

Introduction

Involvement of the elbow makes up 1% to 5% of all osteoarticular tuberculosis [3, 4, 7, 10]. The onset is usually insidious, the diagnosis is often delayed and the functional results after treatment may be poor, especially when there is extensive bone and articular destruction [8, 11, 13].

This paper describes the clinical manifestations, treatment and results in this condition.

Patients and methods

From 1985 to 1993, 23 patients with tuberculosis of the elbow were treated (Table 1). Tuberculosis olecranon bursitis was excluded. The diagnosis was based on the isolation of myco-

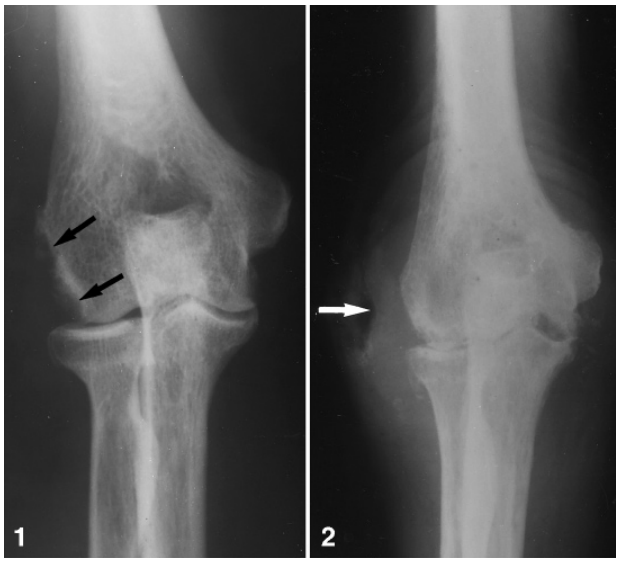

Fig. 1. Stage II tuberculous arthritis of the elbow showing an erosion at the lateral condyle of the humerus (*arrows*)

Fig. 2. Stage IV tuberculous arthritis showing extensive involvement of the whole joint with narrowing of the joint space, multiple erosions and periarticular calcification. A draining sinus was present on the posterolateral aspect (*arrow*)

Table 2. Range of motion in 23 patients

	Preoperative	Postoperative
Group 1 (Stages I and II)		
Mean	142°	140°
Range	130° to 155°	100° to 155°
Group 2 (Stages III and IV, without CPM)		
Mean	61°	32°
Range	20° to 135°	0° to 65°
Group 3 (Stages III and VI, with CPM)		
Mean	42°	96°
Range	25° to 60°	80° to 110°

bacterium tuberculosis in the aspirate in 3 cases and in synovium or bone in 15. In the remaining 5, although the culture was sterile, the histopathological findings of the excised synovium showed epitheloid infiltration, tubercle formation, caseous necrosis and Langhan's giant cells; acid-fast bacilli were also found in 3.

The main complaints were insidious swelling in 20, dull ill-defined pain in 9, restriction of movement in 14 and posterior interosseous nerve palsy in 4. One patient presented with nerve palsy of 3 day's duration; in the other 22 cases, the delay in diagnosis was from 3 months to 2 years (Table 2).

Draining sinuses were present initially in 5 patients with advanced bone and articular destruction, and another 2 developed sinuses during the course of treatment. The sinuses arose from the posterolateral aspect of the radiohumeral joint just behind the lateral collateral ligament. Leucocytosis was present in 5 cases and the erythrocyte sedimentation rate was from 20–30 mm/hr in 5, and greater than 30 mm/hr in 18.

Chest radiographs were normal in 20; 2 had fibro-exudative lesions and one had miliary lesions.

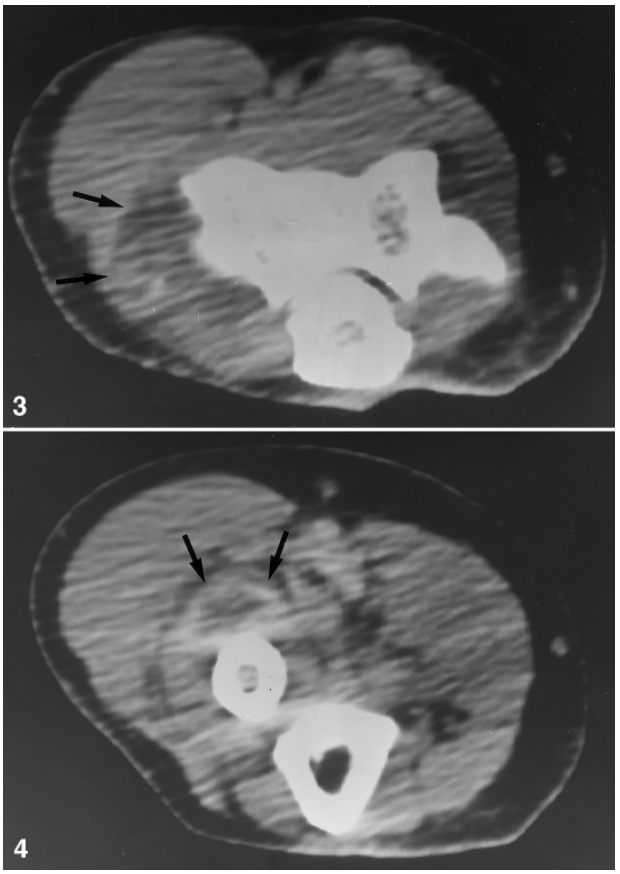

Fig. 3. Computed tomograph at the level of the olecranon showing synovial effusion and capsular distension just above the radiohumeral joint (*arrows*)

Fig. 4. Stage IV disease with posterior interosseous nerve palsy. Computed tomograph at the level just below the radial neck shows an inferolateral synovial cyst with heterogeneous contents (*arrows*)

Table 3. Flexion contracture in 23 patients

	Preoperative	Postoperative
Group 1 (Stages I and II)		
Mean	5°	6°
Range	–5 to 20°	0 to 25°
Group 2 (Stages III and VI, without CPM)		
Mean	35°	34°
Range	0 to 60°	15 to 60°
Group 3 (Stages III and VI, with CPM)		
Mean	42°	24°
Range	20 to 60°	15 to 30°

The radiological findings at the elbow were classified as follows [7]:

Stage I	Localised osteopenia without a bony lesion	5
Stage II	One or more erosions or cavities (Fig. 1)	2
Stage III	Extensive involvement of the whole joint without gross destruction	2
Stage IV	Advanced lesions with gross destruction (Fig. 2)	14

Of the 4 patients with posterior interosseous nerve lesions, 2 had stage I and 2 had stage IV disease.

Computed tomography of the elbow was available in 12 patients and all showed a joint effusion with capsular distension (Fig. 3). In patients with stage II, III and IV disease, bony destruction was also demonstrated. A synovial cyst situated on the anterolateral aspect below the neck of the radius (Fig. 4) was seen in 8; 4 of them had complete or partial posterior interosseous nerve palsy.

In the 7 patients with stage I or II disease, flexion was from 130° to 155° (average 142°) (Table 2). The 16 patients with stage III and IV disease had severely restricted movement with one exception (Tables 2, 3).

The patients were all treated by combined therapy with isoniazid, ethambutol and rifampicin for 12 months; after that isoniazid was continued for a further 6 months in 4 patients.

In the 2 cases of posterior interosseous nerve palsy which were associated with stage I disease, exploration of the nerve, synovectomy and drainage was carried out [2].

In 3 patients with stage I and II disease, the diagnosis was established after culture of aspirate and they were treated with antituberculous drugs without operation.

Synovectomy through a posterolateral approach was carried out in 2 patients who had stage I or II disease, and one patient with stage III.

In 15 patients with stage III or IV disease with restricted movement, a synovectomy, intra-articular debridement and curettage were carried out to remove caseous and necrotic material. Bony prominences which blocked movement were removed, and fibrotic bands and adhesions were released to allow a range of at least 120°. In 2 patients with a posterior interosseous nerve palsy, an anterolateral cyst was drained through the posterolateral approach. In the 5 draining sinuses, the track was excised. The wound was closed primarily and compression dressings applied.

Active and passive movement was begun after operation in 8 patients and continued for 6 months. In another 8 patients, a continuous passive movement (CPM) device (Toronto Medical Corp, Canada) was used after operation. The arc of movement was set at 30° to 90°, and then increased to a level which the patients were able to tolerate. This was continued for 2 to 4 weeks until movement exceeded 120°. Physiotherapy was continued for a further 6 months.

Follow up was for an average of 4.5 years (range 3 to 9 years). Final assessment was based on pain, range of movement, flexion deformity and subjective evaluation of functional disability. The range of movement in 3 groups (stages I, II, and stages III and IV without CPM; stages III and IV with CPM) were analysed by using the Mann-Whitney's test and the rank sum analysis. A p value less than 0.05 was considered significant.

Results

Uneventful healing occurred in 15 patients, but 3 had persistent sinuses after excision and 2 developed sinuses after synovectomy and arthrolysis. The sinuses were treated by local application of 0.5 g streptomycin powder twice a day, and healed in 4 to 8 weeks in the 5 patients.

The ESR returned to normal in 2 to 6 months in every case.

The patients who were operated on had difficulty in regaining movement and aggressive physiotherapy was needed for 6 months or more.

There was no recurrence of infection during the follow up period.

Three patients had occasional mild pain, but the rest had no pain.

In 8 cases with stage I or II disease, the final range was 100° to 155° (Table 2). A flexion deformity of 10°, 10° and 25° was present in 3 patients (Table 3). In 8 cases with stage III or IV disease who did not have postoperative CPM, there was an average restriction of movement of 32° (range 0 to 65°) and an average flexion deformity of 34° (range 15° to 60°) in spite of physiotherapy. One patient had a bony ankylosis. Two had occasional pain, 6 mild disability and 2 severe disability interfering with activities of daily living.

In 8 cases with stage III or IV disease who had CPM, the average range of movement was 96° (range 80° to 110°) with an average flexion deformity of 24° (range 15° to 30°). One patient had occasional pain, the others in this group had no pain and only 2 had mild functional disability (Tables 2, 3).

The Mann-Whitney's test and rank sum analysis showed that those with stage I or II disease had a better range of movement than those with stage II or IV ($p < 0.01$). Those with stage III or IV disease and who had CPM had better movement those who did not ($p < 0.01$).

Discussion

Osteoarticular tuberculosis is the result of haematogenous, lymphatic or direct local spread from other lesions [5, 10, 12], except for rare lesions due to direct inoculation [1]. In this series, only 3 patients had pulmonary tuberculosis; chest radiographs were normal in the other 20.

Tuberculosis of the elbow has been said to start in the olecranon or lower end of the humerus [11], but in some cases the primary lesion is in the synovium or upper end of the radius [9, 10, 13]. Martini's classification, which we have used, implies that the initial site is synovial, followed by bone erosion and later bone and destruction [7]. In our series, the initial infection could only be recognised in 7 cases, being synovial in 5; in 2 cases with stage II disease, a bony lesion in the lateral condyle overshadowed the synovial lesion. In other cases with more extensive lesions, the initial site was difficult to determine.

In stages I and II, antituberculous drugs alone gave good results, and early movement is rec-

ommended rather than prolonged rest. In stage III and IV tuberculous arthritis of the knee in children, better results are reported after medical treatment alone; more stiffness developing after synovectomy and curettage [6]. We found that, in similar stages in the elbow, stiffness was common and operation was usually needed to restore movement.

Associated posterior interosseous nerve palsy [2], either in stage I, II or IV, should be treated by drainage of the synovial cyst by a posterolateral or anterolateral approach which is effective in achieving decompression of the nerve.

In patients with olecranon bursitis, stage I or II lesions, the functional recovery was good, in spite of slight restriction of movement [9, 11]. The subsequent mobility of the joint was poor in those patients with stage III and IV disease who needed the type of surgery we have described, or such procedures as arthrodesis or excision [8, 11, 13]. Parkinson et al. reported 5 cases with excellent function after treatment [9]. Vohra and Kang reported 10 cases in which a full range of movement was obtained when there was early disease, whereas a range of only 20 ° to 60 ° was achieved in those with stage III and IV disease [11]. In our series the most important factors associated with a poor prognosis were advanced bone and joint involvement.

In the past, tuberculous arthritis was treated by immobilisation in a plaster cast for more than a year. When antituberculous drugs were introduced the stay in hospital was shortened and prolonged immobilisation, which led to joint stiffness, was no longer necessary [8]. In our series, isoniazid, ethambutol and rifampicin were given for 12 to 18 months and were effective in eradicating the disease. Nevertheless, those joints with severe intra- and extra-articular destruction usually became stiff with fibrosis and adhesions. Debridement, curettage and arthrolysis, followed by vigorous physiotherapy, are essential to achieve a better range of movement. Postoperative CPM significantly improves the functional results in elbows with stage III and IV disease.

Tuberculosis of the elbow usually presents insidiously with swelling for several months or years before the joint becomes destroyed. Since the results are much better in the earlier stages of the disease, prompt diagnosis and adequate treatment are essential. Tuberculosis should be suspected in any patient with unexplained swelling of the elbow, and aspiration or biopsy may be necessary to confirm the diagnosis.

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