

# Tuberculous Abscess of the Brachialis and Biceps Brachii Muscles without Osseous Involvement

A CASE REPORT\*

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Tuberculosis of the soft tissue overlying bone can occasionally occur without osseous involvement, as it does in tuberculous bursitis and in tenosynovitis. However, the selective involvement of muscles by a tuberculous process without coexisting active skeletal or

a gradually enlarging soft-tissue mass over the elbow and the anteromedial aspect of the distal part of the right arm. The mass had been present for three months. During the third month, it had grown more rapidly than before and the patient had had local pain and had been unable to extend the elbow fully. She had never resided outside North America. Apart from a hysterectomy, the medical his-

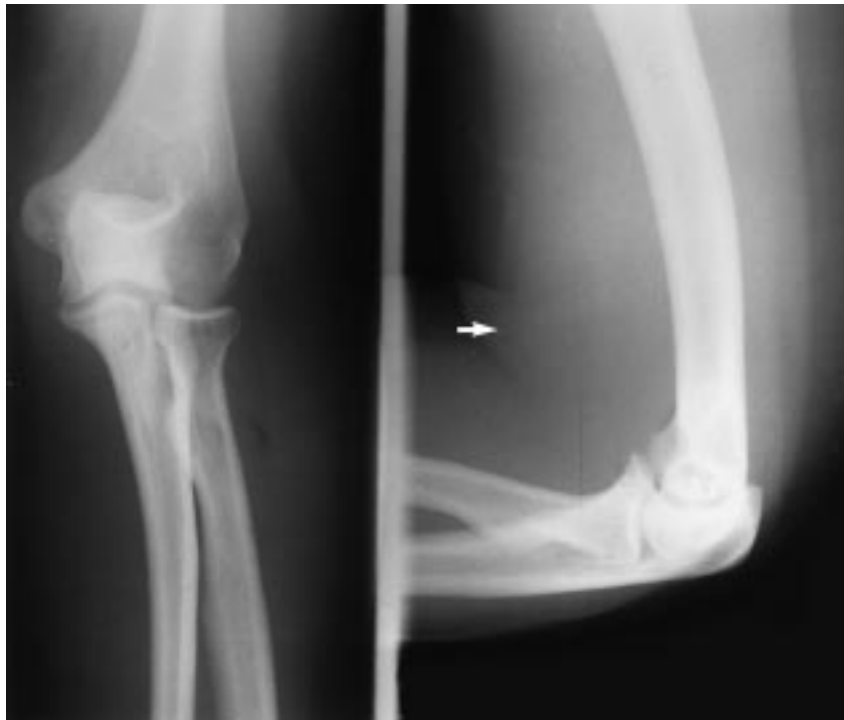


FIG. 1

Anteroposterior and lateral radiographs of the right elbow, showing an intact joint space and normal bones. Soft-tissue swelling (arrow) is seen on the lateral radiograph.

extraskeletal tuberculosis is rarely seen. We present the case of a patient who had such involvement.

## Case Report

A forty-seven-year-old black woman who was working as a corrections officer in a prison in upstate New York had an evaluation of

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tory of this patient was unremarkable. She had no pulmonary symptoms, such as a productive cough. Examination revealed that the patient was afebrile, well nourished, and in no acute distress. The findings on examination were unremarkable except for a large, firm, non-mobile, and tender soft-tissue mass over the elbow and the anteromedial aspect of the distal part of the right arm. As measured with magnetic resonance imaging, this mass was approximately seven centimeters in length, four centimeters in width, and three centimeters in anteroposterior diameter. The overlying skin appeared normal, with no wounds, scars, rash, or sinuses. The range of motion of the right elbow was restricted, with a loss of extension of about 40 degrees. The brachial artery and the median nerve appeared to be normal.

Plain radiography showed the right elbow joint and the adjacent bones to be intact (Fig. 1). Magnetic resonance imaging was performed at another institution, and the multiple pulse sequences of this study demonstrated signal intensities consistent with a large

soft-tissue mass that appeared to be within the brachialis and biceps brachii muscles (Figs. 2-A, 2-B, and 3). A radiograph of the chest revealed normal findings. The erythrocyte sedimentation rate was thirteen millimeters per hour (normal rate in our laboratory, zero to twenty millimeters per hour). The white blood-cell count was  $4.2 \times 10^9$  per liter (normal count in our laboratory,  $3.8$  to  $10.8 \times 10^9$  per liter), with 45 per cent polymorphs (a low value), 38 per cent lymphocytes (a relatively high value), 13 per cent monocytes (a high value), 4.1 per cent eosinophils (a relatively high value), and less than 1 per cent basophils (within normal limits). A tuberculin test was not done.

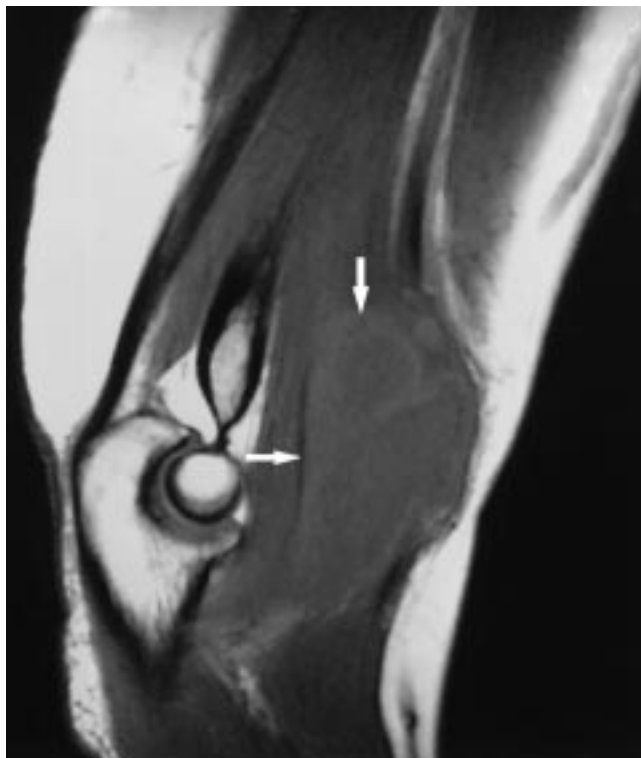


FIG. 2-A

Figs. 2-A and 2-B: Magnetic resonance images of the elbow and the distal part of the right arm. Both images demonstrate a sharply defined mass (arrows) anterior to the distal end of the humerus and the elbow joint. The mass occupies the anatomical site of the brachialis and biceps brachii muscles. It has an isointense signal with that of the surrounding muscles. The elbow joint and the adjacent bones are intact, with normal signal intensity.

Fig. 2-A: Sagittal T1-weighted image (spin-echo sequence with a repetition time of 480 milliseconds and an echo time of fifteen milliseconds).

At the time of the operation, the subcutaneous tissue was found to be edematous. Deeper dissection within the muscles revealed a large abscess. About 200 milliliters of turbid serous fluid poured out of the wound from within the brachialis and biceps brachii muscles. As there was no evidence of any neoplasm, the soft tissues were then debrided. Histological examination of the soft tissues showed caseous necrotizing epithelioid granulomata. *Mycobacterium tuberculosis* grew on culture of a specimen of the tissue.

After the operation, drains were placed in the wound and a large dressing was applied over the elbow and forearm. For six months after the operation, the patient received daily antituberculous chemotherapy consisting of isoniazid (300 milligrams), rifampin (300 milligrams), pyrazinamide (500 milligrams), and pyridoxine (fifty milligrams). By two months after the operation, the swelling had resolved completely and the patient had regained a full range of motion of the elbow. She had a follow-up examination every three months. At one year, she was

in good health and had regained the muscle strength of the brachialis and biceps brachii muscles.

### Discussion

After the introduction of antituberculous chemotherapy, the prevalence of tuberculosis in Europe and North America declined considerably. However, we have since noted an increase in the number of patients in North America who have tuberculosis, independent of those who have the disease in association with acquired immune deficiency syndrome<sup>4</sup>. In Europe and North America, the disease is usually caused by *Mycobacterium tuberculosis*, which affects the lungs primarily in most patients. Although the infection is presumed to spread to the musculoskeletal system through a focus, the prevalence of active pulmonary tuberculosis coexisting with musculoskeletal tuberculosis has been about 29 per cent (147 of 499)<sup>8</sup>.

In addition to pulmonary tuberculosis, rare manifestations of the disease, such as tuberculous tenosynovitis (which had not been reported for decades), have begun to appear<sup>3,7</sup>. Tuberculous bursitis is well known, with the radial and ulnar bursae and the bursae about the ischial tuberosity and the greater trochanter the most commonly involved. However, isolated tuberculosis of the bursa is uncommon. To our knowledge, there have been no reports of isolated tuberculous trochanteric bursitis in the English-language literature since the 1950s<sup>14</sup>. The bursae and the tendon sheaths become involved in the tuberculous process through the synovial membrane. Involvement of muscles by tuberculosis is usually by direct extension from a neighboring bone, which is a frequent

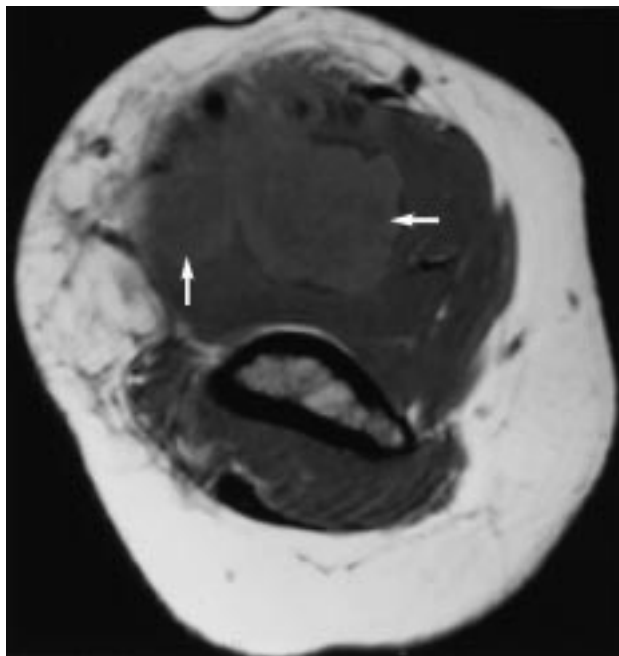


FIG. 2-B

Axial T1-weighted image (spin-echo sequence with a repetition time of 480 milliseconds and an echo time of fifteen milliseconds).

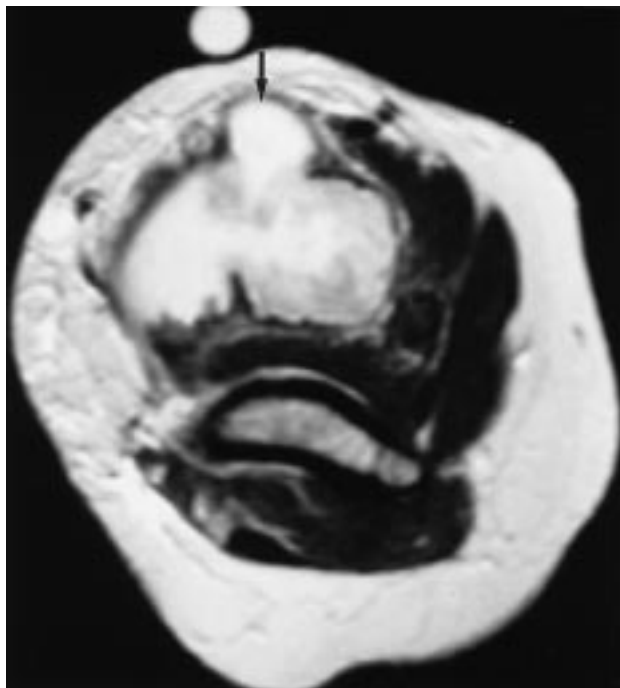


FIG. 3

Axial T2-weighted image through the region of the distal end of the humerus (spin-echo sequence with a repetition time of 3910 milliseconds and an echo time of ninety milliseconds), revealing the mass (arrow) to have an irregular, sharply defined margin with bright, heterogeneous signal intensity. The overlying subcutaneous tissue and fascia are bright, which is consistent with the edema noticed during the operation. The small areas of low signal intensity may represent debris and proteinaceous material within the abscess.

occurrence in tuberculous spondylitis<sup>5</sup>.

Osteoarticular tuberculosis of the extremities is the second most common type of tuberculosis, after tuberculous spondylitis. The typical radiographic features of osteoarticular tuberculosis are metaphyseal or epiphyseal reactive lesions that lack sclerosis, sequestration, or periosteal reaction and involve the adjacent joint space. The normally sharp subarticular cortical outline becomes blurred, smudged, or even invisible. Secondary marginal erosions follow. In due course, destruction of the articular cartilage leads to narrowing of the joint space. Marginal erosions are especially characteristic in tight joints that lack free mobility, such as the sacro-iliac joint or the weight-bearing articulations (for example, the hips, knees, and ankles). A triad of radiographic findings — juxta-articular osteoporosis, peripherally located osseous erosions, and gradual narrowing of the cartilage space (the Pheemister triad) — is characteristic of tuberculous arthritis. The joints of the upper extremity are less affected than are those of the lower extremity. Tuberculous osteomyelitis can remain localized to the bone or it can involve the adjacent joint. Tuberculosis confined to the tubular bones is relatively infrequent, and tuberculous osteomyelitis originates in the shaft of long tubular bones less than 1 per cent of the time. Tuberculous dactylitis, or so-called spina ventosa, is more common in children; the prevalence in children who have

tuberculosis has ranged from less than 1 per cent (four of 510) to 20 per cent (forty of 200)<sup>9,12</sup>. Its frequency decreases after the age of five years, and it is rare after the age of ten years. It then increases in frequency in adults. Twenty-five to 40 per cent of children who have tuberculous dactylitis have multiple foci (no numbers reported)<sup>9,10,15</sup>. The disease is characterized by expansion, sequestration, sclerosis, sinus formation, and positive radiographs of the chest. In adults, it causes local osseous destruction. The joint space is preserved until late in the disease, and there is little sclerosis. Tuberculous bursitis and tenosynovitis also affect the extremities, but they are uncommon. Their exact prevalence is not known. The tendons of the wrist are by far the most frequently affected by tuberculous tenosynovitis, and extension of the infection along the synovial sheaths of the hand is common. There are only a few reports of involvement of the sheaths of the peroneal, anterior tibial, and posterior tibial tendons<sup>1-5</sup>.

Sporadic reports in the literature have indicated that primary tuberculosis in muscles may be transmitted by syringes<sup>6,11,16</sup>. The infected patients in these reports were infants and children. It was subsequently discovered that the infection had one of two causes. Either a nurse who had pulmonary tuberculosis gave the patient an injection<sup>11,16</sup> or a child who had a tuberculous abscess was given an injection of penicillin, the needle and syringe that were used for that injection became contaminated with tubercle bacilli, and then the contaminated needle and syringe were used on other patients<sup>6</sup>.

In a search of the literature, we were unable to find other causes that could explain the primary involvement of muscles by tuberculosis without osseous or bursal involvement. In our patient, although the abscess was anterior to the elbow, the elbow joint as well as the distal end of the humerus and the proximal ends of the ulna and the radius were normal, as demonstrated with both plain radiography and magnetic resonance imaging. Also, the radiograph of the chest revealed normal findings. The olecranon bursa is the only bursa about the elbow region, and there are no bursae related to the involved muscles.

In our recent case report<sup>1</sup>, a toddler had a cold abscess in the gluteal muscles. The adjacent hip was not involved. Computerized tomographic scans of the chest and abdomen revealed normal findings. We assumed that the tuberculous process had originated in the bursa of the greater trochanter and had dissected its way through the gluteal muscles instead of spreading to the adjacent greater trochanter, as usually happens. To the best of our knowledge, this case and that of our patient are the only two reported cases in which the tuberculous process affected only the muscles. There was no active pulmonary disease in either patient. Our patient may have been infected because of exposure to prison inmates who had tuberculosis.

With its multiplanar capability and excellent contrast for soft tissue, magnetic resonance imaging is the best modality for evaluating soft-tissue masses, including inflammatory infectious processes. The magnetic resonance imaging study that we received from our patient's referring physician was incomplete. When T1 and T2-weighted images are used, it is sometimes difficult or even impossible to differentiate neoplasms (benign or malignant) from non-neoplastic diseases, including inflammatory processes. The small areas of relatively low

signal intensity within the abscess on the T2-weighted images generally represent debris and proteinaceous material<sup>13</sup>.

In the present study, the outcome was excellent after the abscess was drained, the surrounding tissue was debrided, and the patient was managed with six months of antituberculous chemotherapy. With no evidence of coexistent active skeletal or extraskkeletal tuberculosis, the pathogenesis of this intramuscular tuberculous abscess is still not clear.

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