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Case Report

Tuberculous Arthritis in the Elbow Joint in an Adolescent

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ABSTRACT
Musculoskeletal system tuberculosis (TB) accounts for approximately 10% of all TB cases, excluding those involving pulmonary TB. Elbow TB is extremely rare and is seen in 2%–5% of musculoskeletal system cases. The diagnosis of TB arthritis is very difficult because its onset is insidious and progress is slow and there are nonspecific local and systemic symptoms. A delay in treatment can result in irreversible osteoarticular destruction. This paper presents the clinical and radiological findings of a 12-year-old adolescent patient with elbow TB arthritis.
Keywords: Adolescent, tuberculosis, elbow joint

INTRODUCTION

Tuberculosis (TB) arthritis is generally seen in weight-bearing joints or joints exposed to repeated trauma. Vertebrae are affected in half of the cases, and the hip and knee joints can be affected, although less frequently. Upper extremity joint involvement is extremely rare (1, 2).

In as many as half of TB arthritis cases, no proof of active infection, previous infection, or history of exposure to infection can be found. In addition, diagnosis can be delayed because of a negative tuberculin skin test that does not discount diagnosis and when the clinical and radiological findings are similar to those of a number of joint diseases (3). As morbidity and mortality increases when treatment is delayed, timely diagnosis is of the greatest importance. Appropriate and sufficient radiological evaluation plays a key role in early diagnosis.

The aim of this paper is to present the clinical and radiological findings of a case involving a 12-year-old adolescent who had TB arthritis in the elbow joint.

CASE PRESENTATION

A 12-year-old girl presented to our hospital with complaints of pain and swelling in the left elbow for the last 2 months. Any previous occurrence of TB was unknown, and there was no history of any disease that had suppressed the immune system or of any trauma or arthritis. Physical examination revealed that there was swelling, restricted movement, increased temperature, and sensitivity in the left elbow joint. The laboratory values included an erythrocyte sedimentation rate of 38 mm/s, C-reactive protein level of 5.5 mL/L, and leukocytes of 6.7×10^9/L. The skin tuberculin test, TB blood culture, and real-time polymerase chain reaction were reported as positive. Acido-resistant staining was negative. A written informed consent was obtained from the patient's parents.

The lateral and anterior–posterior (AP) radiographs of the left elbow revealed widespread, nonsclerotic, and lytic areas with irregular borders, encompassing the epicondyles, ulna and radial head, and lytic foci in the cortex contours. These radiographs also showed separation of the humerus periosteum and periarticular osteoporosis (Figure 1).

Computed tomography (CT) of the left elbow revealed effusion in the joint space, lytic areas destroying the cortex in the humerus epiphysis, proximal and metaphyseal sections of the ulna and radius, and fluid collection extending to the soft tissue (Figure 2).

Magnetic resonance imaging (MRI) of the left elbow showed increased effusion in the joint space, synovial thickening and disrupted cortical integrity together with contrast in the bone structures, and widespread bone marrow edema. In addition, fluid collection was observed, showing contrast extending to the soft tissue, which was disrupting the cortical integrity in the distal ulna (Figure 3).

Thoracic CT revealed nodular lesions in the posterior of the right lung superior lobe, the largest lesion measuring 19×13 mm. There were calcifications in the middle lobe medial segment as

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Figure 1. a, b. On the lateral (a) and AP (b) radiographs of the left elbow, widespread, nonsclerotic, lytic areas with irregular borders were seen in the epicondyles and ulna and radial head, and there was thickening of the surrounding soft tissue

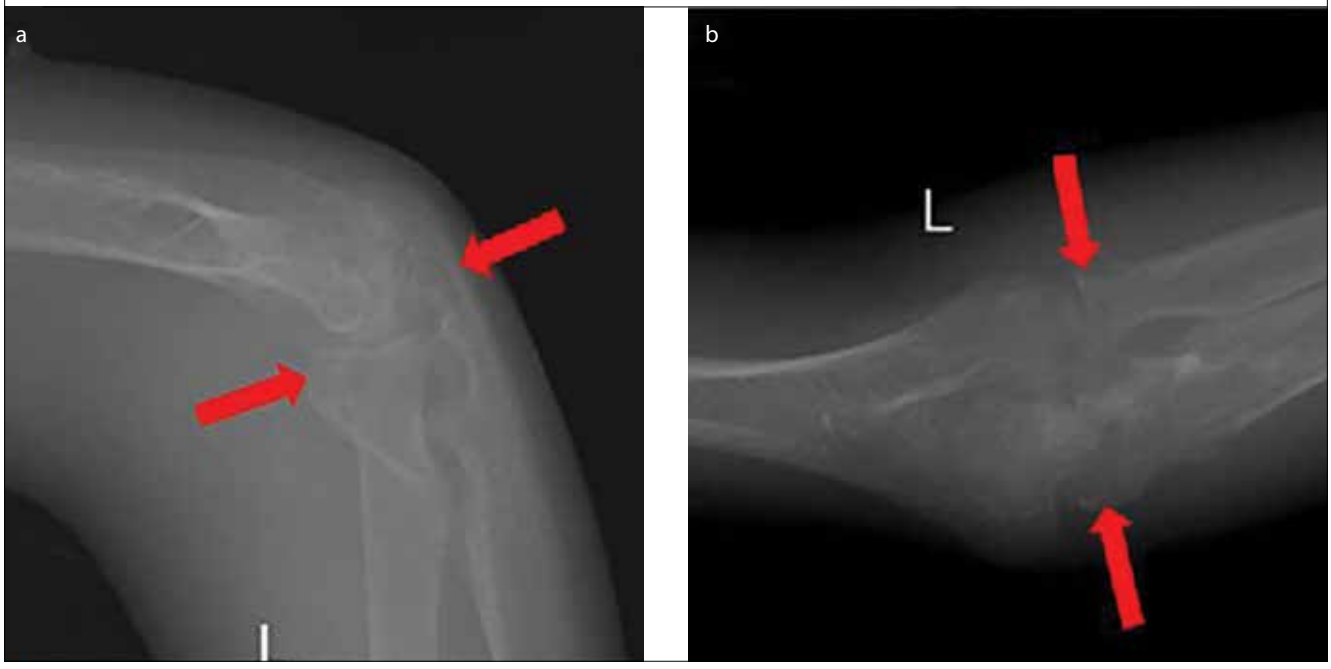
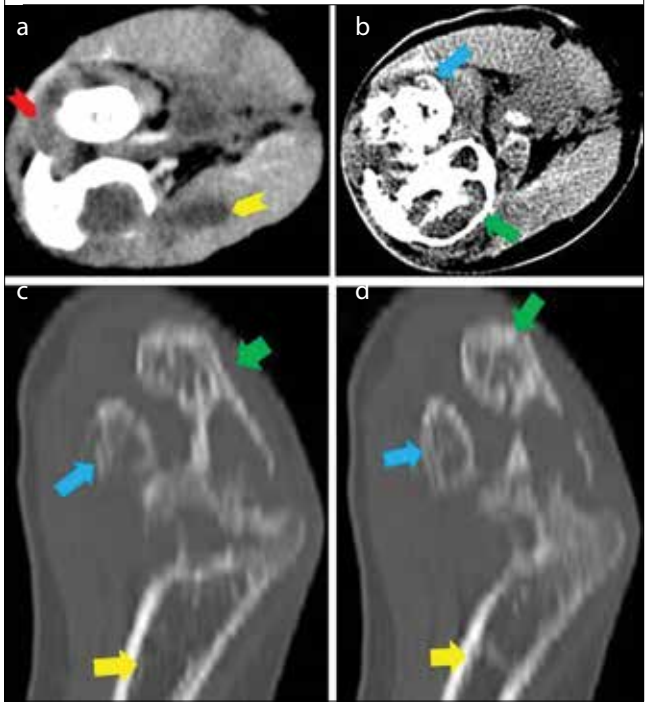


Figure 2. a-d. On CT of the left elbow, in the axial slices, (a) effusion was seen in the joint space (red arrow head), with locular collection extending to the soft tissue (yellow arrowhead), (b) the lytic areas were destroying the cortex in the proximal sections of the ulna (green arrow) and radius (blue arrow), and (c, d) on the coronal sections of the olecranon–distal humerus (yellow arrow), widespread lytic areas were destroying the cortex in the proximal sections of the ulna (green arrow) and radius (blue arrow)



well as calcified lymph nodes in the paratracheal, pretracheal, and right hilum (Figure 4).

Synovectomy was performed by an orthopedic surgeon. Subsequent histological examination of the joint synovial membrane showed granulomatous inflammation (Figure 5). Anti TB treatment started.

DISCUSSION

Osteoarticular TB is usually monoarticular and is polyarticular in only 10%–15% of cases. It is rarely seen in non-weight-bearing joints such as the elbow. In the upper extremity, the shoulder is most often affected, followed by the elbow (4). In addition to reaching the joint space by the adjacent hematogenous and lymphatic pathways, bacteria may settle by direct inoculation. In terms of pathogenesis, juxta-articular demineralization, local bone destruction, and periosteal new bone formation occur because of reactive hyperemia at the beginning of the disease. When the disease reaches the subchondral region, there is separation in the articular cartilage, resulting in cartilage and bone erosion, destruction, and effusion. When the process is prolonged, fibrinous material spreads through necrotic cartilage to the synovial space, tendon sheath, and bursae. If treatment is not given in the early period, para-articular soft tissue mass, cold abscess, and sinus tract can form (4, 5).

Clinically, articular TB is extremely difficult to diagnose. The most frequent findings are pain, swelling, and restricted movement in the early stage and deformity and loss of function in the later stage. A delay in diagnosis may lead to septic arthritis and irreversible osteolytic complications. There may not be a history of either TB or exposure to TB, and in half of the cases, pulmonary

Figure 3. a, b. On MRI of the left elbow, (a) fat-suppressed coronal image revealed disrupted cortical integrity in the proximal ulna (yellow arrow) and fluid collection, showing contrast extending to the soft tissue (pink arrow), and (b) synovial thickening and contrast were found on the T1-weighted axial post-contrast image (blue arrow)

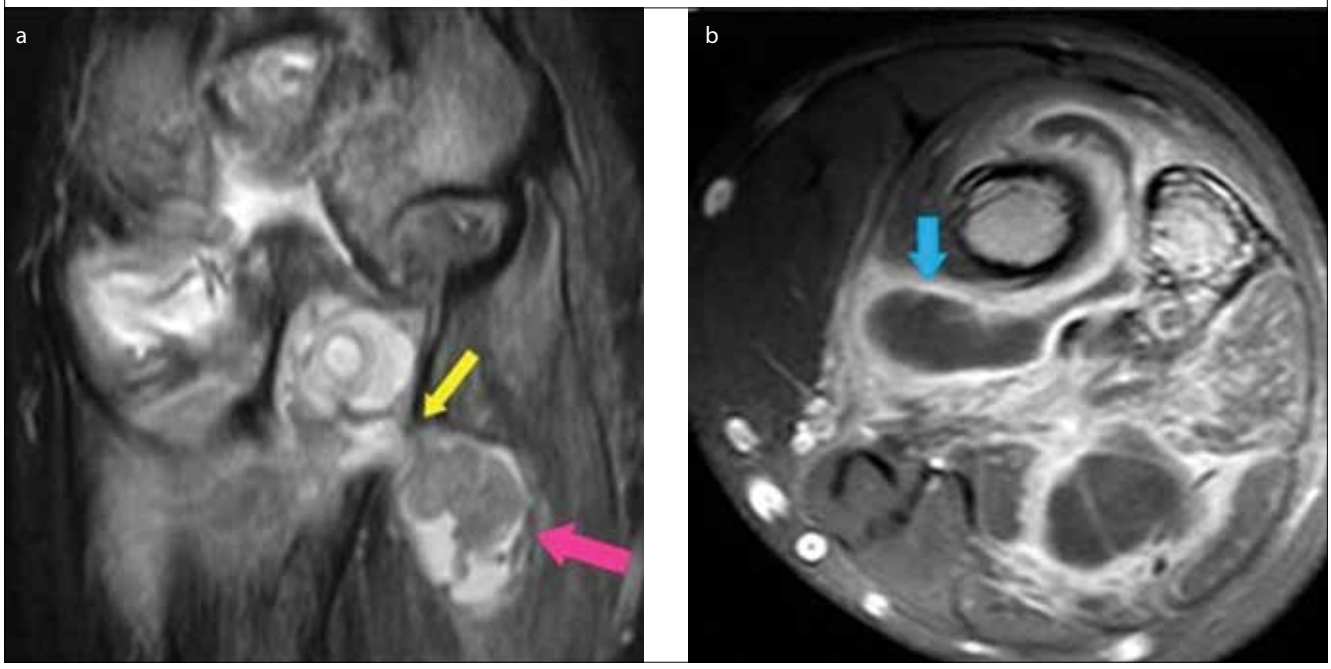
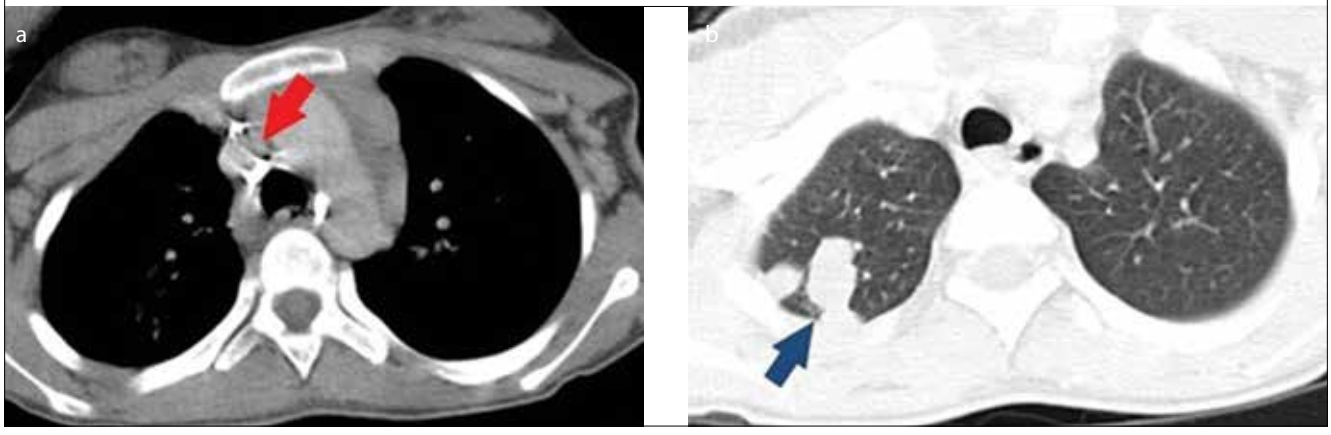


Figure 4. a, b. On thoracic CT, (a) there was a mediastinum window axial slice and calcified lymph nodes in the left paratracheal, pretracheal, and right hilum (red arrow), and (b) a parenchyma window axial slice and nodular lesions in the posterior of the right lung superior lobe (blue arrow)

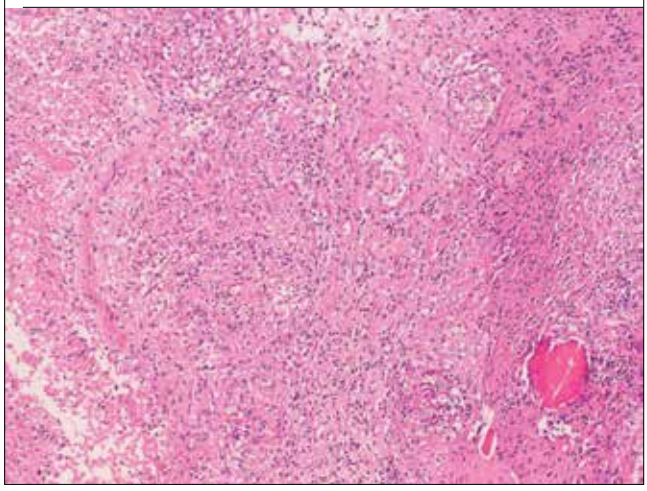


involvement cannot be determined radiologically (6). In the current case, no findings of deformity were determined in the postoperative 6-month follow-up examination. Lung radiograph and thoracic CT showed parenchymal consolidation and calcified lymph nodes, which are compatible with previous primary pulmonary TB.

During the early stage of TB arthritis, radiographic findings are not specific and the first lesions can easily be overlooked. Soft tissue edema or effusion may also be seen. On progression of the disease, periarticular osteopenia develops, and varying degrees of cartilage and periarticular bone destruction start occurring in the chronic phase (7). On direct radiographs, the triad of Phemister is seen, comprising osteoporosis around the joint, peripheral bone erosions, and narrowing of the joint space (8). The distal humerus and proximal ulna are most frequently affected. Especially in children, the "ice-cream scoop" appearance in the proximal ulna on direct radiographs is significant in terms of TB. As long as there is no additional pyogenic infection, periosteal reaction is rarely seen (9). In the current case, bone erosion and periarticular osteoporosis together with soft tissue swelling were observed as the late-stage findings.

Computed tomography evaluation of the degree of bone destruction, spread to soft tissue, and formation of sequestrum is useful (10). MRI is extremely effective in showing osteomyelitis

Figure 5. Histopathological report of synovial membrane of the left elbow joint showing multiple granulomas, some with areas of necrosis



and bone marrow edema, chondral and subchondral bone erosion, synovial thickening, joint effusion, narrowing of the joint space, and spread to the surrounding soft tissue. Bone marrow edema is hypointense on T1-weighted images and hyperintense on T2-weighted images and is seen after intravenous gadolinium enhancement. Synovial thickening in TB arthritis is seen as hypointense on T2-weighted images, which is different from other synovial arthropathies (11, 12). No sequestrum was determined on CT in the current case. Synovial thickening and spread to the soft tissue were clearly seen on MRI.

Radiological imaging provides useful information about the findings and spread of the disease in elbow TB (13, 14). However, aspiration or synovial biopsy is necessary for a definitive diagnosis.

Pyogenic arthritis, pigmented villonodular synovitis, hemophilic arthropathy, rheumatoid arthritis, osteochondromatosis, and neoplasms should be considered in the differential diagnosis of patients with elbow involvement (15).

CONCLUSION

Tuberculosis arthritis should be considered in the differential diagnosis for adolescent patients who present with complaints of pain and swelling in the elbow. Sufficient and appropriate clinical and radiological evaluation is extremely important for preventing morbidity and mortality related to TB arthritis.

Informed Consent: Written informed consent was obtained from patients father who participated in this study.

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