A Case Report of Tuberculosis of Isolated Radial Head - A Rare Location with Diagnostic Dilemma

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Learning Point for the Article:

TB of isolated radial head without involvement of distal humerus and proximal ulna is rarely reported. Its diagnosis is often misleading and hence mismanagement may occur. A combination of a high index of clinical suspicion based on good history taking, clinical and radiological (including MRI) examination and biopsy is essential to establish the diagnosis. Biopsy allows demonstrating the presence of mycobacterium TB by CB-NAAT (Cartridge Based Nucleic Acid Amplification Test) method and in culture and tuberculoma in histopathology so that early appropriate treatment can be instituted for a painless, stable and normally functioning elbow joint.

Abstract

Introduction: Tuberculosis (TB) of isolated radial head is scantily reported in the literature. Nonspecific symptoms and difficulty in interpreting initial screening radiographs often lead to misdiagnosis.

Case Report: We present a case of 42-year-old male elsewhere diagnosed as pyogenic arthritis of left elbow and treated by incisional drainage and broad-spectrum antibiotics, who presented to us 6 months later with multiple non-healing actively discharging sinuses. The repeat radiographs and Magnetic Resonance Imaging (MRI) were reported as chronic osteomyelitis of proximal radius without the involvement of humerus and ulna. The excision of radial head along with sinus tracts was done for clearance of disease and excised tissues, on being subjected to Cartridge Based Nucleic Acid Amplification Test (CB-NAAT), culture and histopathological examination, the diagnosis of TB was established.

Conclusion: The diagnosis of TB of the elbow is generally delayed & mismanagement may occur. Therefore, not only biopsy is essential to demonstrate the presence of mycobacterium TB by CB-NAAT (Cartridge Based Nucleic Acid Amplification Test) method and in culture but also the presence of tuberculoma in histopathology is essential to establish the diagnosis so that early appropriate treatment can be instituted.

Keywords: Tuberculosis, isolated radial head, CBNAAT

Introduction:

Tuberculosis (TB) of skeletal system involvement is seen in 1–3% of the patients and 10% of all extra pulmonary TB [1]. The sites most commonly involved are the spine (51%), the pelvis (12%), the hip and femur (10%), the knee and tibia (10%), and the ribs (7%) [2]. Mycobacterial infection of the upper extremities is extremely rare [3, 4]. Elbow is the most frequently involved joint in the upper limb, accounting for 2–5% of all skeletal localizations [5]. In tuberculosis of elbow, the most common site is the proximal ulna followed by distal humerus [5, 6, 7]. However, the incidence of isolated radial head involvement without involving distal humerus and proximal ulna is scantily reported in the literature. Usually, the diagnosis of elbow TB is delayed because of nonspecific symptoms and difficulty in interpreting screening radiographs in the initial stages [6, 8]. Often the clinical presentation closely mimics septic arthritis and is treated accordingly [8]. We report our experience in the challenge of diagnosis and management of a case of TB of isolated radial head without the involvement of distal humerus and proximal ulna in a 42-year-old male patient.

Case Report:

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Author's Photo Gallery


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Figure 1: Sinus on the anterior and posterior aspect of elbow.

A 42-year-old male developed an insidious onset swelling on the ventral aspect of left elbow 6 months back for which he consulted elsewhere. Following radiological and blood investigations, he was diagnosed as pyogenic arthritis for which incision and drainage were performed followed by broad-spectrum antibiotics for 3 weeks. Subsequently, he developed multiple persistent discharging sinuses. He also had pain over the left elbow which was aggravated during movement and activities. Range of movement of his left elbow was restricted. There was no h/o trauma, constitutional symptoms such as fever, night cry, loss of appetite, and body weight. Other joints were not involved. There was no past or contact history of TB. Examination revealed two discharging sinuses; one on the ventral aspect and another on the dorsal aspect of left elbow (Fig. 1). Discharge of pus from the sinuses was evident but no h/o history of bony spicules is coming out. Elbow range of motion was 10°–10°–110° and muscles of arm and forearm were wasted. Epitrochlear and axillary lymph nodes were not palpable. Distal neurovascular status was intact. Plain radiograph of the left elbow joint showed irregularity of proximal radius mainly in the metadiaphyseal region and mild periosteal reaction (Fig. 2). Sinogram of the affected side showed a blind-ending linear tract suggestive of sinus formation (Fig. 3). Magnetic Resonance Imaging of elbow joint revealed focal widening of medullary cavity of proximal radius affecting metadiaphyseal region and large bony defect (8.2 mm) in the anterolateral cortex of proximal radius communicating with the skin through a well-defined sinus tract which opens on the ventral aspect of elbow (Fig. 4). Two sinus tracts, one posteromedially and another laterally directed sinus tracts were noted from the affected radius into the subcutaneous plane. No articular extension and involvement of humerus and ulna were seen. These findings were reported as suggestive of chronic osteomyelitis of upper end of the radius with cloaca formation in the anterolateral cortex with sinus tracts formation. Blood parameters were within normal limit except minimal rise in erythrocyte sedimentation rate (33 mm/1 h) and quantitative C-reactive protein (2.43). Chest X-ray was found to be normal. As the patient was an adult and attained skeletal maturity, he underwent radial head excision following exposure by Kocher's approach [9] along with excision of sinus tract under GA brachial block. The excised specimen (Fig. 5) was sent for Gram staining, Ziehl-Nielson (Z-N) staining for Acid Fast Bacilli (AFB), Cartridge Based Nucleic Acid Amplification Test (CB-NAAT) examination, culture for pyogenic and tubercle bacilli and histopathology for etiological diagnosis. Although mycobacterium TB was detected by real time Polymerase Chain Reaction (PCR) method on gene expert platform, acid-fast bacilli was not detected in Z N staining. The histopathological examination showed tuberculoma with central caseation (Figure 6). Rifampicin resistance was not detected. A baseline Liver Function Test (LFT) was done which showed normal parameters. Multidrug antitubercular therapy was started under category 1 under directly observed treatment short course which includes intensive phase of 2 months of isoniazid, rifampicin, ethambutol, and pyrazinamide; continuation phase of 7 months of isoniazid and rifampicin. Elbow was splinted for 2 weeks until subsidence of pain and spasm and then weaned for active and assisted range of motion exercises within pain limits.

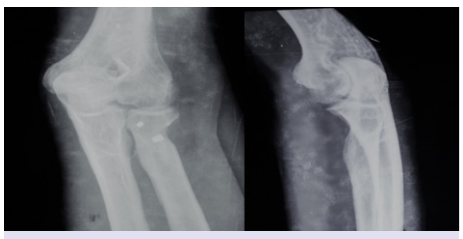

Figure 2: Radiograph of left elbow showing irregularity of proximal radius.

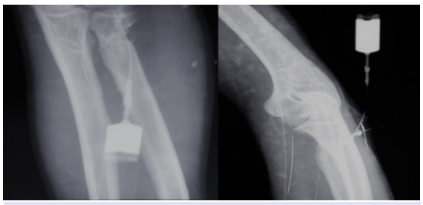

Figure 3: Sinogram in AP and lateral view showing the sinus.

Patient was followed up regularly by clinical examination, blood investigations like Hemoglobin %, blood cell count, LFT etc. and radiographs of left elbow. No drug related ad verse effect was reported by the patient during treatment. At final follow up on completion of antitubercular drugs, the sinuses healed (Figure 9), elbow became painless with full range of motion (Figure 8) and normal functional ability.

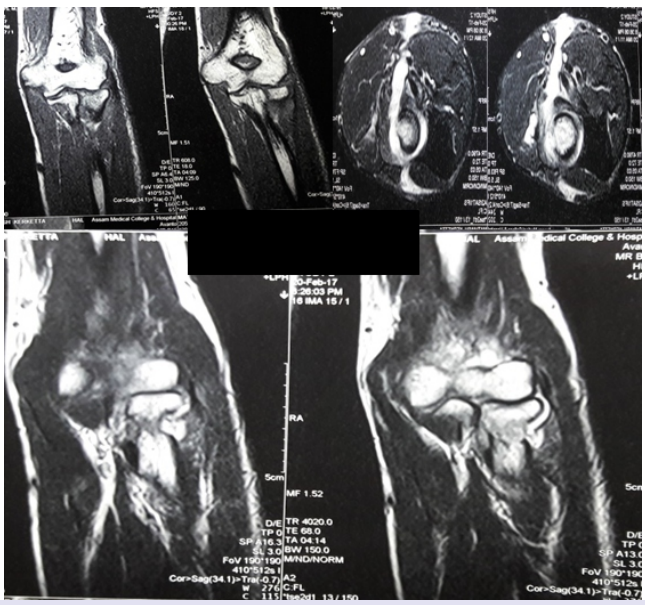

Figure 4: Magnetic resonance imaging showing involvement of radial head without involving distal humerus and proximal ulna.

Figure 5: Excised radial head specimen.

Discussion:

TB of the elbow, like pyogenic arthritis, is characteristically a monoarticular disease, although multifocal osteoarticular TB does occur [5, 10, 11]. Although elbow joint is most frequently involved in the upper extremity followed by shoulder joint [6, 12], the available information on TB of elbow is scarce as only a few cases are seen annually even in centers located in TB endemic zones [1]. TB of isolated proximal radius without concurrent involvement of distal humerus and proximal ulna is even rarer in literature. Aggrawal and Dhammi reported 8 cases of concurrent proximal radius involvement out of 48 TB elbow in their series [6]. Agarwal reported 3 cases of concurrent proximal radius involvement out of 10 TB elbow in children in their series [1]. The diagnosis of TB of the elbow is generally delayed because the lesion is relatively uncommon and there is a lack of awareness among clinicians, especially in non-endemic areas [2]. TB should be considered in the diagnosis of monoarthritis in developing countries [13]. Osteoarticular TB should be suspected in patients of South Asian and African origin presenting with bony and soft tissue infective lesions [1]. Early diagnosis and treatment are possible through a combination of good history taking, clinical and radiological examination and a high degree of clinical suspicion [2]. Usually, due to the late presentation and/or delay in diagnosis, the significant osteoarticular damage is already present [2, 5]. The onset is usually insidious [5, 10, 11]. Symptoms are usually nonspecific [14, 15]. Although pain is the most common symptom [6], edema, redness, warmth, and limitation of motion can be seen [14, 15] Fever, malaise, anorexia, weight loss, night sweats, and tachycardia may also occur [14, 16, 17]. Patients from the Indian subcontinent predominantly have a higher prevalence of exudative disease with or without discharging sinuses and often have advanced disease at the time of presentation [13, 18]. The incidence of sinus formation is 10 to 30% [3, 19]. As a general rule, the cold abscesses and the subsequent sinuses, originating from the joint, are situated on the lateral, posterolateral or posterior aspect of the joint. On the other hand, cold abscesses and sinuses, originating from the supratrochlear lymph node, are situated on the medial aspect. One-third of the elbows (33.3%) had one or more discharging sinuses in the case series reported by Aggarwal and Dhammi [6]. A long history of symptoms, a lack of constitutional symptoms (unless multifocal), a poor response to commonly used broad-spectrum antibiotics, and non-healing ulcers may necessitate a careful workup for the presence of TB; in such cases, a cautious approach should be considered regarding joint drainage for the mistaken diagnosis of septic arthritis [1]. Aggarwal and Dhammi reported that out of 48 cases of TB elbow, 10 patients had a wrongfully performed drainage procedure for the treatment of a misdiagnosed pyogenic joint [6]. Many patients have higher erythrocyte sedimentation, but this is not diagnostic [14, 16, 17]. From a radiographical view-point, tuberculous arthritis is normally characterized by periarticular osteoporosis, peripherally located osseous erosions and gradual narrowing of the cartilage space (Phemister triad) [2, 10, 11]. However, according to Haygood and Williamson [20], there is no single pathognomonic finding that allows making the diagnosis of skeletal TB. The radiological findings are non-specific in the early stages and the initial lesions can be easily missed. Joint effusion with soft tissue edema may be one of the earliest signs of tuberculous arthritis [20]. Periarticular osteoporosis is a common manifestation of tuberculous arthritis and may be more common in the weight-bearing joints of the lower extremities than in the upper extremities. However, the detection of periarticular osteoporosis on plain radiographs is

Figure 7: Immediate post-operative radiograph of left elbow showing excised radial head.

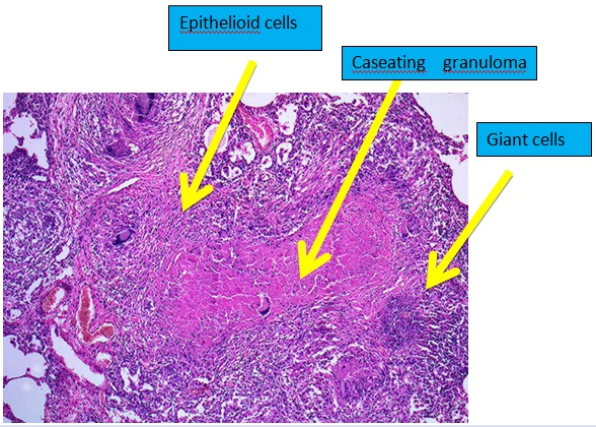

Figure 6: Histology showing Caseating granuloma, epithelioid cells and giant cells.

Figure 8: Final follow-up showing full range of motion of left elbow.

Figure 9: Clinical photo showing healing of sinus tract at 2 months.

subjective [20]. Para-articular round or oval lytic lesions with poorly defined margins are common findings in extremity TB [1, 6]. In patients, with elbow TB, the proximal part of the ulna is the most common site of involvement [6] and "ice cream scoop" appearance of the proximal part of the ulna should prompt an investigation for TB [1]. Ultrasound shows synovial thickening with joint effusion. Computed tomography (CT) can be used to evaluate the degree of bone destruction, soft tissue extension and sequestrum formation [7]. Magnetic resonance imaging (MRI) features include bone marrow changes indicating osteomyelitis or bone marrow edema, bone erosions, synovial thickening, and joint effusion. Synovial thickening associated with osteoarticular TB is hypo intense on T2-weighted MRI images, distinguishing this from other proliferating synovial arthropathies [7]. Radiological findings in osteoarticular TB are non-specific and may require aspiration or synovial biopsy for definitive diagnosis [7]. Despite the presence of TB infection, aspiration material is not stained or reproductive [14, 15]. Microscopy and cultures of synovial fluid yield positive results in up to 80% of patients with osteoarticular TB and remainder diagnosed through synovial or bone biopsies [7]. Hence, performing a biopsy is important for diagnosis. Histology shows Caseating granulomas even when a Ziehl-Nielsen stain is negative [7]. In our present case, surgical resection of radial head along with sinus tract helped in biological clearance of the disease as well as for obtaining adequate amount of tissue for various diagnostic tools. Detection of mycobacterium TB by Cartridge Based Nucleic Acid Amplification Test (CB-NAAT), in culture and presence of tuberculoma in histopathology in surgically resected tissue proved to be diagnostic. After the diagnosis of TB, treatment should be initiated very quickly and maintained for adequate duration. In total, 90–95% of the patients will recover if treatment is started in the early period [14, 15, 17]. In cases of advanced TB, extensive loss of elbow motion may occur with residual deformity [21]. Usually, within 3 weeks after the start of antitubercular treatment, the pain subsides, and the patient can start physiotherapy [1].

Conclusion:

This case report highlights the clinical and radiological manifestations of rarely reported TB of isolated radial head without involvement of distal humerus and proximal ulna. Its diagnosis is often misleading and hence mismanagement may occur. Therefore, a biopsy is essential to demonstrate the presence of mycobacterium TB by CB-NAAT (Cartridge Based Nucleic Acid Amplification Test) method and in culture, and tuberculoma in histopathology to establish the diagnosis so that early appropriate treatment can be instituted.

Clinical Message

The diagnosis of TB of the elbow is generally delayed. A combination of a high index of clinical suspicion based on good history taking, clinical and radiological examination and biopsy for various tests allow early diagnosis and treatment of rarely occurring tuberculosis of isolated radial head for a painless, stable and normally functioning elbow joint.

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