

Tubercular Osteomyelitis of Distal Ulna Presenting as Epiphyseal Injury

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ABSTRACT

Tuberculosis (TB) continues to be a public health problem in both developing and industrialized countries. T.B can involve any bone theoretically but involvement of distal metaphysis and epiphysis is a rare presentation. We present a case of 11yr old female child who presented to us with pain and swelling in distal forearm and radiograph revealing an osteolytic lesion in distal ulnar metaphysic and volar displacement of epiphysis. Histopathology and BACTEC culture led us to a diagnosis. Awareness of atypical presentations of TB is most important in endemic areas to ensure proper management of such patients.

Keywords: tuberculosis, osteoatricular, epiphyseal injury, abscess

INTRODUCTION

The World Health Organization has estimated that half a million children became ill with tuberculosis (TB), and 70,000 children are dying (1). In children with TB, 70-80% have the disease in their lungs (pulmonary TB). The rest are affected by TB disease in other parts of the body (extrapulmonary TB) (1). Extrapulmonary manifestations of TB can have a wide range of presentations. Tuberculous osteomyelitis accounts for 1-6% of extrapulmonary TB in childhood. TB can sometimes present as frank puru-

lent abscess with all signs of active inflammation (2). We present a case of TB of distal ulna metaphysis and adjacent physis in a child presenting with frank purulent abscess with epiphyseal injury. □

CASE REPORT

A 11year old female presented with pain and swelling involving the distal third of the left forearm and wrist. There was a history of pain in the distal forearm for the last 15 days after a fall while playing. The swelling had appeared after a week. Patient also had low grade fever

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FIGURE 1A. Clinical picture showing swelling on dorsal aspect.



FIGURE 1B. Radiograph showing epiphyseal injury at the distal ulna.

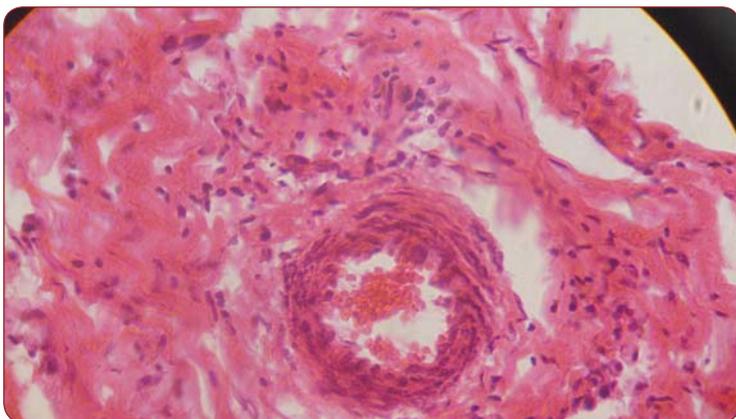


FIGURE 2. Mononuclear inflammatory cell infiltrate is present with a characteristic granuloma composed of a central hypocellular necrotic area and peripherally arranged epithelioid histiocytes and Langhans' giant cells.

without any diurnal variation. There was no history of weight loss or loss of appetite. The distal forearm was warm and tender to touch. Tumefaction was encircling the entire distal third forearm more on the dorsal aspect (Figure 1a). The radiograph was showing lytic lesion in the distal metaphyseal and epiphyseal region of the ulna with evidence of volar displacement of the physal plate (Figure 1b). Hemogram revealed raised leucocytes count, ESR 36 mm, CRP was positive typically suggestive of infection. Ultrasound revealed a collection on dorsal aspect of distal third of forearm. A diagnosis of acute osteomyelitis was made and the patient was posted for incision and drainage. During surgery, the abscess was approached from the ulnar side and some drill-holes were made at the distal ulnar metaphysis. The physal injury was corrected with K- wire used as joy-stick. The K- wire was not left in situ because of the infection and also due to the stability of the reduction. Thick pus with granulation tissue was obtained and sent for routine microscopy, aerobic and anaerobic culture, BACTEC culture and histopathological examination. Pus culture was negative for pyogenic organisms but the histopathological examination revealed granulomatous reaction with numerous granulomas consisting predominantly of epithelioid cell and interspersed with Langhans giant cells and with central necrosis suggestive of TB (Figure 2). BACTEC culture was also positive for *Mycobacterium tuberculosis*. Based on the culture and histopathology, patient was started on anti tubercular therapy with isoniazid (5 mg/kg/day), rifampicin (10 mg/kg/day), ethambutol (15mg/kg/day) and pyrizinamide (25 mg/kg/day) for two months followed by isoniazid and rifampicin for another 4 months. Follow up radiographs showed progression and gradual consolidation of the metaphyseal lesion. At 6 months follow up complete resolution of the lesion along with correction of the physal plate was seen (Figure 3). Patient has completed full course of anti tubercular therapy and now at followup the patient may perform a full range of wrist movements (Figure 4) and bony lesion are well healed without any sequelae. □

DISCUSSION

Tuberculous osteomyelitis of the metaphysis presenting as an epiphyseal injury is not described to the best of our knowledge in our

search of English literature. The atypical presentations are more commonly seen in the developing countries where the disease is endemic and are being increasingly diagnosed in both the immunocompromised and competent hosts (3). TB illness in children is often missed or overlooked due to non-specific symptoms and difficulties in diagnosis due to these atypical presentations (1).

In our case we believe that there was an acute exudative response associated with TB. This pattern is believed to be hypersensitivity response to an already existing tubercular lesion in the body (2,4). The old lesion may be untreated or partially treated but contained by natural immunity (2,5). This variety is manifested more with involvement of superficial bones and joints such as phalanges, metacarpals, clavicle, sternum, shoulder joint, etc (2). The diagnostic dilemma is further intensified in small children where incidence of septic arthritis and acute pyogenic infections is high in developing countries. The abscess aspirate characteristics are typically misleading and may not reveal tubercle bacilli (2).

Tuberculin-sensitivity skin testing just indicates infection with tubercle bacilli (3,6). Tuberculin testing is a nonspecific measure of prior mycobacterial sensitization and also may be positive in individuals who have had previous BCG vaccination (3,6). Thus in developing countries like ours, the role of tuberculin testing is questionable as the prevalence of tuberculosis is fairly high in our region, with nearly 40% of the total population being infected with tubercle bacilli in one form or the other (3,6). QuantiFERON-TB Gold (QFT-G; Cellestis, Ltd., Carnegie, Australia) is a new FDA approved blood test for the detection of tuberculosis infection. As a modern alternative to the 100 year old tuberculin skin test, QFT-G may offer clinicians a simpler and more accurate, reliable, and convenient TB diagnostic tool. QFT-G is highly specific and a positive test result is strongly predictive of true infection with *Mycobacterium tuberculosis*. The test is approved as an aid for diagnosing both active TB disease and latent TB infection (LTBI); however, it does not differentiate the two (7).

The diagnosis of active TB has to be supported with culture or histological confirmation. In terms of histopathology diagnosis, TB can be diagnosed only as "a chronic granulomatous inflammation, suggestive of TB" on a



FIGURE 3. Radiographs at 8 months showing complete healing.

routine surgical pathology report (6). However, histopathology features of chronic granulomatous inflammation can be found in various conditions and diseases other than TB, such as foreign-body reaction, fungal infection, sarcoidosis, cat scratch disease, leprosy, and brucellosis (6). Therefore Acid fast bacilli (AFB) stain, TB tissue culture, and TB-PCR should be performed to enable a definitive diagnosis of TB (6). Though AFB microscopy, and conven-



FIGURE 4. Clinical function at final follow-up.

tional Lowenstein Jensen (LJ) culture remain the cornerstone of the diagnosis of TB, these traditional bacteriological methods are either slow or their sensitivity is quite low, especially with clinical samples that contain small number of organisms (8). The radiometric culture system or BACTEC (Becton Dickinson Biosciences, Sparks, MD) has been accepted for culture isolation of mycobacteria using an enriched liquid media called Middlebrook 7H12 containing ^{14}C labeled palmitic acid. Medium is otherwise also called as BACTEC 12B. Mycobacterial growth is determined by utilization of ^{14}C with release of $^{14}\text{CO}_2$ by multiplying mycobacteria and is detected in an ionic chamber, with an electronic detector in the BACTEC instrument (9). It took an average 24.03 days required for detection of mycobacteria by LJ culture and 12.89 days by radiometric BACTEC technique (6,8). A disadvantage with BACTEC system is the radioactive $^{14}\text{CO}_2$ that it releases. Although the gas is still confined within the vial and not harmful in small amount, disposal is still a problem (9). New liquid medium-based systems have recently been introduced for the nonradiometric susceptibility testing of *M. tuberculosis*. These include the ESP Culture System II (AccuMed International, Westlake, OH), the MB Redox system (Biotest, Dreieich, Germany), the BACTEC MGIT 960 mycobacterial growth indicator tube system (Becton Dickinson Microbiology Systems, Sparks, MD), and the MB/BacT system (bioMérieux, Marcy l'Etoile, France) (10). Extent of the soft tissue involvement along with involvement of bone

with marrow oedema is well appreciated on MRI (3).

Tubercular osteomyelitis has an insidious course. Localized pain and swelling are seen as early clinical manifestations. Cutaneous stigmata such as chronic discharging sinuses are late manifestations. In our case clinical examination, histopathology and tubercular culture helped us reaching a diagnosis of mycobacterium tuberculosis as the causative organism. Decompression of abscess eliminated the swelling, but without a complete course of anti tubercular therapy recurrence would have occurred.

Atypical presentation of tuberculosis is on the rise. The once "forbidden" tissues/organs for tuberculosis are no longer immune from the vagaries of atypical tuberculosis. Awareness of its atypical presentations is most important in endemic areas to ensure proper management of such patients. □

COMPETING INTEREST STATEMENT

Each author certifies that he or she has no commercial associations (eg, consultancies, stock ownership, equity interest, patent/licensing arrangements, etc) that might pose a conflict of interest in connection with the submitted article. No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article. All the authors have contributed towards the study and preparation of the manuscript and agree to the same in congruence.

REFERENCES

1. World Health Organization Tuberculosis fact sheets. Available at <http://www.who.int/tb/childhoodtbfact-sheet.pdf>. WHO. Accessed 3 Apr 2012
2. Agarwal A – Acute suppurative presentation of osteoarticular tuberculosis in children. *Indian J Tuberc* 2011;58:66-71
3. Neogi DS, Jain S, Mishra KK, et al. – An unusual cause of Wartenberg's syndrome: tuberculosis of brachioradialis muscle. *Eur J Orthop Surg Traumatol* 2010;20:335-338
4. Arora A – Basic science of host immunity in osteoarticular tuberculosis - A clinical study. *Ind J Orthop* 2006;40:1-15
5. Teklali Y, El Alami ZF, El Madhi T, et al. – Peripheral osteoarticular tuberculosis in children: 106 case reports. *Joint Bone Spine* 2003;70:282-6
6. Nag HL, Neogi DS, Nataraj AR, et al. – Tubercular infection after arthroscopic anterior cruciate ligament reconstruction. *Arthroscopy* 2009;25:131-136
7. New York City department of health and mental hygiene fact sheets. Available at <http://www.nyc.gov/html/doh/downloads/pdf/tb/tb-qt-factsheet.pdf>. Accessed 14 June 2012
8. Negi SS, Khan SF, Gupta S, et al. – Comparison of the conventional diagnostic modalities, bactec culture and polymerase chain reaction test for diagnosis of tuberculosis. *Indian J Med Microbiol*. 2005;23:29-33
9. Mendoza MT, Feralyn Reyes L, Pascual M, et al. – Culture isolation of mycobacterium tuberculosis using the radiometric bactec system compared with the conventional Lowenstein-Jensen media. *Phil J Microbiol Infect Dis* 1993;22:17-22
10. Garrigó M, Aragón LM, Alcaide F, et al. – Multicenter laboratory evaluation of the MB/BacT Mycobacterium detection system and the BACTEC MGIT 960 system in comparison with the BACTEC 460TB system for susceptibility testing of Mycobacterium tuberculosis. *J Clin Microbiol*. 2007;45:1766-70.