Tuberculous Osteomyelitis of the First Metatarsophalangeal Joint Misdiagnosed as Gouty Arthritis

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A 43-year-old man visited our clinic due to pain and swelling of his left first metatarsophalangeal (MTP) joint since 6-months ago. He was diagnosed as gouty arthritis at private clinic and took hypouricemic agent, but he had progressive pain and swelling. There was swelling, erythema and tenderness and ulceration at base of the left first MTP joint. His laboratory results showed elevated C-reactive protein and normal serum uric acid level. The plain radiograph of foot showed bone destruction of left first MTP joint. MRI revealed joint space narrowing, soft tissue swelling and subchondral cyst. He underwent excisional biopsy and histology demonstrated chronic granulomatous inflammation with caseation necrosis. Tissue polymerase chain reaction for mycobacterium tuberculosis was positive. He was diagnosed as tuberculous osteomyelitis. He started on quadruple anti-tuberculous therapy and his symptom was improved. Early diagnosis and anti-tuberculosis therapy could lead to improve outcomes. (J Rheum Dis 2016;23:311-315)

Key Words. Tuberculosis, Osteomyelitis, Metatarsophalangeal joint, Foot, Gout

INTRODUCTION

Tuberculous osteomyelitis is relatively uncommon compared with pulmonary tuberculosis (TB). The bones and joints are affected in just 1% to 3% of all cases of TB, and the spine and the hip are most common sites involved when bone is infected. The foot accounts for only about 10% of all cases of tuberculous osteomyelitis [1]. In the present report, we describe a case of tuberculous osteomyelitis localized to the first metatarsophalangeal (MTP) joint misdiagnosed as gouty arthritis in a 43 year old man.

CASE REPORT

We report a case of a 43-year-old man who presented with a 6-month history of progressive pain and swelling in the left first MTP joint. There was no history of trauma. He was diagnosed as gouty arthritis and had non-steroidal anti-inflammatory drug, colchicine and allopurinol in private clinic. He had suffered from continuous pain and swelling over 6-months. He denied febrile and chilling sense, night sweating and weight loss. He had no history of TB. On physical examination there was swelling, erythema and tenderness of the left first MTP joint. The 5×5 mm sized ulceration was observed at base of the left first MTP joint area with clear discharge. The movement of the first MTP joint was limited by pain. There was warmth and redness around ulceration. Other joints looked normal and lymphadenopathy was not observed. Blood pressure was 150/90 mmHg, pulse rate 60/min, respiratory rate 20/min, body temperature 36.3°C. Blood test revealed a white cell count of 9,600/mm³ (neutrophil 58%), hemoglobin 15.9 g/dL, uric acid 4.5 mg/dL and C-reactive protein 1.637 mg/dL. Liver and kidney function tests were normal. Chest X-ray showed right costo-phrenic angle blunting (Figure 1A), shifting fluid was not observed on right decubitus view. Computed tomography of chest showed diffuse pleural thickening at right lower
lobe (Figure 1B). Urine analysis was unremarkable, and HIV antibody was negative. Sputum acid fast bacilli test was negative. Synovial fluid aspiration was tried in the left first MTP joint, but it was dry-tap. Polarized microscopy revealed no visible crystal. The X-ray of left foot before 6-months showed normal finding (Figure 2A), but X-ray on visit showed bone destruction of the left first MTP joint (Figure 2B). The magnetic resonance imaging (MRI) revealed joint destruction, soft tissue swelling and subchondral erosion in left first MTP joint.

Figure 2. (A) There was no destruction at left first metatarsophalangeal (MTP) joint in foot X-ray at 6-months ago. (B) There was bone destruction at left first MTP joint on day of admission. (C, D) Magnetic resonance imaging revealed joint destruction, soft tissue swelling and subchondral erosion in left first MTP joint.

Figure 3. Three phase bone scan image showed increased perfusion over left foot in the dynamic images. In the blood flow and pool phase, there was increased flow in the left first metatarsophalangeal joint area. These findings are compatible with osteomyelitis.
of left foot revealed destruction of joint, soft tissue swelling and subchondral erosion in left first MTP joint. (Figure 2C and 2D) Three phase bone scan showed increased perfusion over left foot in the dynamic images. In the blood flow and pool phase, there was increased flow in the left first MTP joint area. And delayed uptake was noted over left first MTP joint (Figure 3). The findings were consistent with osteomyelitis. The patient underwent excisional biopsy. Histology of the bone core demonstrated chronic granulomatous inflammation with caseation necrosis compatible with TB (Figure 4A and 4B). Acid fast bacilli stain was negative. Tissue polymerase chain reaction (PCR) for mycobacterium TB was positive and that of non-tuberculous mycobacterium was negative. Mycobacterium culture was also negative. The patient started on quadruple anti-tuberculous therapy, isoniazid 400 mg, rifampin 600 mg, ethambutol 1,200 mg, pyrazinamide 1,500 mg. His symptom improved after 2 months of medication. He is taking isoniazid, rifampin, and ethambutol now. Further treatment is needed for more than 7 months.

**DISCUSSION**

Tuberculous osteomyelitis constitutes 1% to 3% of extrapulmonary cases and most commonly affected sites are spine, femur, tibia, and fibula [1]. The ankle and foot are rarely affected and account for only 1% of all TB

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**Figure 4.** Tissue from excision biopsy of the left first metatarsophalangeal joint showed chronic granulomatous inflammation with caseation necrosis. This histologic finding is compatible with tuberculosis. (H&E: A, ×40; B, ×100).

**Table 1.** Summary of foot and ankle tuberculosis case series

<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>Number</th>
<th>Time to diagnosis (mo)</th>
<th>Location</th>
<th>Diagnostic method</th>
<th>Debridement (arthrodesis)</th>
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<tbody>
<tr>
<td>Samuel et al. [2]</td>
<td>India</td>
<td>16</td>
<td>22 (1 ~ 36)</td>
<td>Ankle joint 6</td>
<td>Biopsy 16</td>
<td>10 (5)</td>
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<td>Bone 4</td>
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<tr>
<td>Mistal et al. [3]</td>
<td>India</td>
<td>44</td>
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<td>Foot – Bone 37, soft tissue 7</td>
<td>Biopsy 7</td>
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<td>Bone 35</td>
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<td>Gursu et al. [4]</td>
<td>Turkey</td>
<td>70</td>
<td>26.4 (1 ~ 180)</td>
<td>Ankle joint 29</td>
<td>Biopsy 70</td>
<td>52 (5)</td>
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infections. TB of foot and ankle was reported globally especially in developing countries [2-4]. There have been two case series of foot and ankle TB in Korea [5,6]. One of them was about TB osteomyelitis of tarsal bone in infants. We summarized case series of foot and ankle TB of Korea and foreign countries in Table 1. In foot, the lesion involves calcaneum, talus, first metatarsal and navicular bones in order of decreasing frequency. Pulmonary involvement is uncommon and present in less than 50% of cases [7]. In our case pleural thickening was observed, we tried ultrasound guided thoracentesis twice, but it failed because of scanty pleural fluid. We did not perform pleural biopsy because we could presume TB pleurisy clinically based on the results of bone biopsy and TB-PCR in foot lesion. The route of infection is thought to either direct inoculation or secondary to lymphohematogenous dissemination to the bone at the time of initial pulmonary infection, with local reactivation at a later date [8]. The clinical manifestations of tuberculous osteomyelitis include joint pain, swelling and limited range of motion. Chronic discharging sinus or chronic skin ulcer might be present in longstanding cases [9]. Groin lymphadenopathy may be present.

Its diagnosis becomes more difficult in the absence of pulmonary symptoms. Systemic symptoms such as fever, night sweat and weight loss may be present in 50% cases. Because of its indolent nature and lack of specific symptoms, skeletal TB may underrecognized for months to years. The average duration from first symptom to diagnosis varies depending on reports, it was between 11 to 26 months in most studies [1]. The rarity of the problem and a low index of suspicion often lead to delayed diagnosis and potentially worse outcomes. In our case, patient had no systemic symptoms like fever or night sweating. He took non-steroidal anti-inflammatory drug, colchicine and allopurinol because he was misdiagnosed as gouty arthritis. He was not diagnosed properly until 6 months after symptom on-set. Lack of awareness and a confusing clinical and radiological picture, there is often misdiagnosis such as chronic osteomyelitis, gouty arthritis or secondary malignancy. When tuberculous osteomyelitis involves the first metatarsal bone as our case, it can be misdiagnosed as gouty arthritis. The difference of clinical course of two diseases can be a clue for differential diagnosis. Gouty arthritis usually showed intercritical inflammation attack, but TB osteomyelitis manifests as chronic inflammation without intercritical period. Response to medication, radiologic and histologic findings can also help differential diagnosis.

The radiologic features of tuberculous osteomyelitis are nonspecific. The plain radiography is necessary for detecting bone destruction, but radiographic features are noted 2 to 5 months after symptom on-set, only a joint effusion is early sign in most cases [1]. MRI is accepted as most useful imaging modality in aiding diagnosis and revealing the extent of the disease. MRI is useful for looking at bone marrow edema, cortical erosions, joint effusions and soft tissue collections [10]. Bone scintigraphy is useful test for tuberculous osteomyelitis due to its high sensitivity up to 90%. The whole body survey can detect multiple sites of involvement and be useful in assessing the treatment response of the anti-TB therapy. Radionuclide imaging using with 99mTc-Technetium, 111Indium, 67Gallium citrate or 18F-fluoro-2-deoxy-D-glucose positron emission tomography was usually performed [11]. Our patient showed bone destruction at left first MTP joint on plain radiography. MRI revealed destruction of the left first MTP joint with soft tissue swelling. Three phase bone scan image was compatible with osteomyelitis. Definitive diagnosis of tuberculous osteomyelitis is established by histologic finding and culture results of bone tissue. Bone tissue can be obtained by computed tomography guided fine needle aspiration or surgical biopsy [12]. Histologic finding shows caseation necrosis surrounded by chronic inflammatory cells including epithelioid histiocytes and giant cells [13]. Positive acid-fast bacilli stain does not differentiate between tuberculous and non-tuberculous mycobacteria. The DNA detection via PCR is highly sensitive and specific method for diagnosis mycobacterial TB [14,15]. Initial empirical treatment is same as the standard regimen for active pulmonary TB. Duration of treatment is 9 to 12 months. Surgery is reserved for biopsy to establish the diagnosis, debridement of abscess and infected tissue for failure of medical treatment. Routine surgical treatment is not warranted. Early diagnosis and medical treatment is important for recovery and joint rehabilitation.

**SUMMARY**

Tuberculous osteomyelitis is rare disease. There is often a delay diagnosis because of nonspecific symptom and sign. Definite diagnosis is bone biopsy. Early diagnosis and prompt initiation of chemotherapeutic medication is important in order to avoid further destruction of the joint.
CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

REFERENCES