

Diagnosis and Treatment of Ankle Tuberculosis in Sohag University Hospital

Mona Fattouh ¹, Abdel Rahman Hafez ², Zeinab H. Ahmed³

Departments of ¹Medical Microbiology and Immunology, ²Orthopedic Surgery, ³Pathology, Faculty of Medicine, Sohag University
monarahman2002@yahoo.co.uk

Abstract: Isolated involvement of bone in tuberculous infection is uncommon, and the variable clinical and radiological features may mimic pyogenic osteomyelitis, bone tumor or other inflammatory and neoplastic processes of the synovium. In this study we reported four male patients admitted at Sohag University Hospital during the period from January 2009 to January 2012 with isolated tuberculous ankle arthritis. All patients underwent physical examination, routine laboratory tests, plain radiographs, and a biopsy of the infection site for culture on Lowenstein Jensen medium and for histopathological examination. Laboratory findings of the four patients were; an elevated erythrocyte sedimentation rate (ESR) and positive C-reactive protein (CRP). The most common radiologic findings of the affected joints were that of juxta-articular osteoporosis, narrowing of the joint space and subchondral cysts. The final diagnosis of tuberculosis was confirmed by histopathological examination of bone biopsy which demonstrated caseating granulomas and tissue culture yielded growth of tuberculous bacilli. The patients made full recovery on anti-tuberculous treatment and arthrodesis of the ankle joints. In conclusion; osteoarticular tuberculosis can be difficult to diagnose as only about one third of patients have respiratory symptoms. So, when a patient presents with a localized, painful swelling of the ankle, tuberculosis should be considered in the differential diagnosis. Additionally, we highly recommend taking a biopsy of the site of suspected infection because an early diagnosis is the key to successful treatment.

[Mona Fattouh, Abdel Rahman Hafez and Zeinab H. Ahmed **Diagnosis and Treatment of Ankle Tuberculosis in Sohag University Hospital.** J Am Sci 2012;8(6):348-352]. (ISSN: 1545-1003).
<http://www.jofamericanscience.org>. 42

Keywords: Ankle, Tuberculosis, Diagnosis, Treatment.

1. Introduction

Despite extensive efforts to achieve disease control, tuberculosis remains a worldwide public health concern (*Hopewell et al., 2006*). While the first global burden of disease study predicted that tuberculosis would be the seventh leading cause of disability adjusted life years by 2020 (*Murray and Lopez, 1996*), revised projections, based on data from 2002, suggested that tuberculosis may fall to the twenty-third leading cause of death and the twenty-fifth leading cause of disability adjusted life years by 2030 (*Mathers and Loncar, 2006*). Skeletal involvement in extra-pulmonary tuberculosis is extremely rare, bones and joints are involved in 1- 3% of all cases; and foot involvement accounts for less than 10% of osteoarticular tuberculosis (*Dhillon et al., 1993*). Musculoskeletal tuberculosis can be difficult to diagnose as only about one third of patients have respiratory symptoms. Synovial fluid aspirate is relatively unlikely to lead to definitive diagnosis, and a bone biopsy should always be taken for culture and histological examination (*Shah and Splain, 2005*). Tuberculosis osteomyelitis of the foot can also mimic a wide range of pathology. As a result, this condition is often misdiagnosed, or the true nature of the lesion is identified late in the diagnostic process (*WHO, 2008*). Ankle TB often presents clinically as an insidious disease with local swelling, pain, heat, and numbness

of the affected joint, but with limited systemic inflammatory manifestations which make it difficult to diagnose and many patients receive inappropriate treatment (*Shih-Hao et al., 2011*). In this study we have reported our experiences with the diagnosis and treatment of tuberculous infection of the ankle in Sohag University Hospital with the hope of providing sufficient information about these cases to lead to early diagnosis and treatment of cases of tuberculous ankle arthritis.

2. Patients and Methods

Our study was carried out in Sohag University Hospital during the period from January 2009 to January 2012. Four male patients with age range from 42 to 55 years were admitted at Sohag University Hospital during the study period, suffering from swelling and pain of the ankle; (3 patients had symptoms in the right ankle and one patient had symptoms in the left ankle), with difficulty in walking. With the duration of symptoms before the patient sought medical advice 3-6 months. On physical examination, the ankle was warm, tender, and had a limited painful range of motion. There was history of trauma only in one patient. Erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), chest radiographic findings and findings of plain radiographs of the affected ankles were analyzed. A biopsy was

taken from the infection site for histopathological analysis and culture of the excised synovial tissue on Lowenstein Jensen medium and staining of the synovial fluid specimen by Zeihl-Neelsen staining for detection of Acid fast bacilli.

- Laboratory findings of the four patients were; an elevated shooting erythrocyte sedimentation rate (ESR) of 100 mm after one hour and a positive C-reactive protein (CRP) (++) test.
- Anteroposterior (AP) and lateral radiographs of the ankle joints showed reduced joint space, bone rarefaction and subchondral cysts. (**Figure 1**). Chest X-rays of all patients were normal.
- Histological examination of the biopsy samples showed granulomas and caseating necrosis compatible with TB lesion; (caseous necrosis, epithelioid lymphocytes, Langhan's giant cells).
- Acid fast bacilli were detected in the synovial fluid specimens by Zeihl-Neelsen staining and *Mycobacterium tuberculosis* was grown from the tissue cultured on Lowenstein Jensen medium.
- Intra operative findings were; watermelon seeds covering the synovial membrane of the ankle joints which is a characteristic feature of tuberculosis infection (**Figure 2**).
- Synovectomy & joint fusion with two cancellous screws were done to the patients (**Figure 3**) and a long leg cast was applied to all patients. After 12 weeks the casts were removed & touchdown weight bearing was allowed & increased as tolerated.

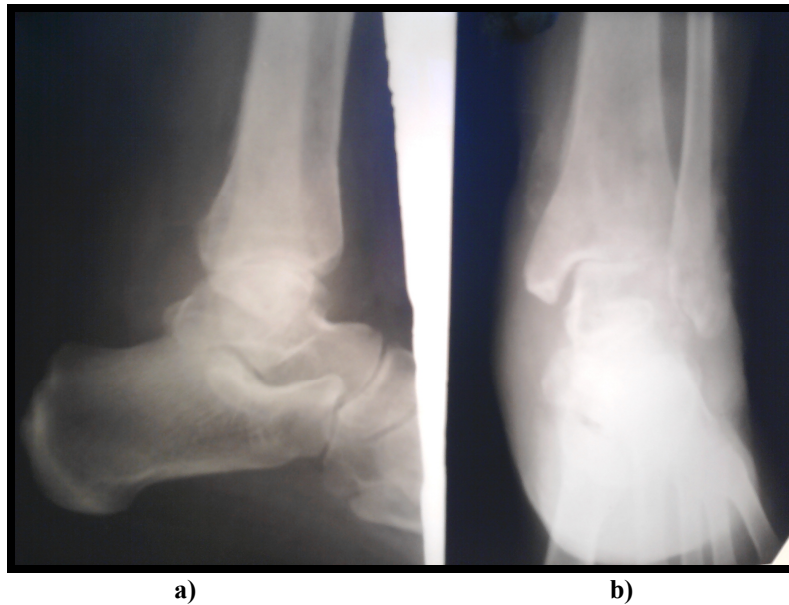


Figure 1: lateral (a) and anteroposterior (b) X-rays of the ankle showing subchondral cysts in the body of the talus and distal tibia with juxta-articular osteoporotic changes and joint space narrowing.

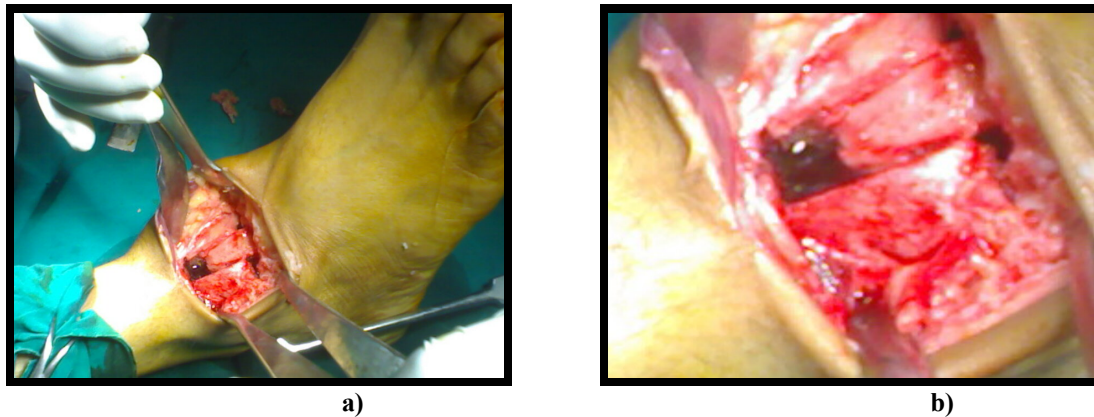


Figure 2: Intra-operative view of the ankle joint (a & b) showing watermelon seeds covering the synovial membrane of the ankle which is a characteristic feature of TB synovitis.

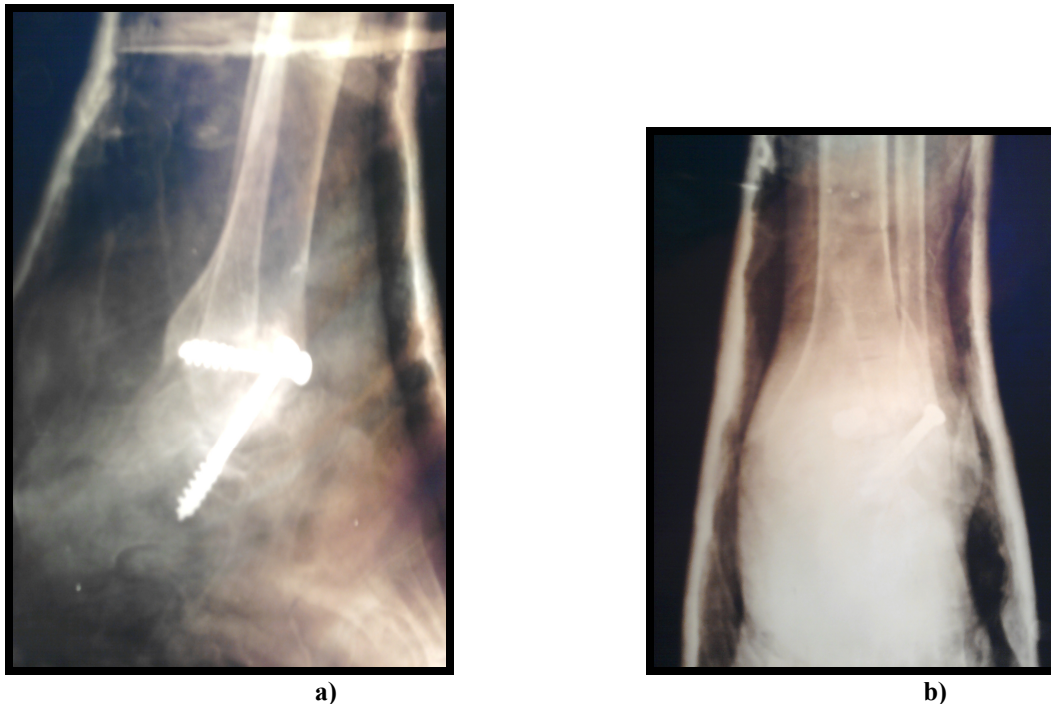


Figure 3: Post operative lateral (a) and anteroposterior (b) X-rays of arthrodesed right ankle joint using two cancellous screws.

- Surgical treatment was completed by medical treatment; as the patients received six months of anti-TB chemotherapy, consisting of combination of three drugs given at the same time; isoniazid [INH], ethambutol, and rifampicin. At the end of the medical treatment laboratory tests (ESR and CRP) and radiological examination were done the patients to evaluate the disease activity. Anti-TB chemotherapy was stopped when the ESR and CRP returned to normal and radiological findings of fusion were evident.

3. Results

This study was carried out in Sohag University Hospital during the period from January 2009 to January 2012. Four male patients with age range from 42 to 55 years were admitted at Sohag University Hospital during the study period, suffering from inflammatory ankle arthritis which were diagnosed as tuberculous ankle arthritis depending on findings of the physical examination, Laboratory findings, findings of plain radiographs of the affected ankles, and results of the biopsy samples analysis which were taken from the infection sites for histopathological analysis and culture of the excised synovial tissue on Lowenstein Jensen medium and staining of the synovial fluid specimens by Zeihl-Neelsen staining for detection of Acid fast bacilli. Treatment of our patients was in the form of surgical treatment; (Synovectomy and arthrodesis of the ankle joints) combined with

antituberculous chemotherapy. Clinical signs of healing included a decrease in pain and swelling, improvement in gait and gain in body-weight; were evident in most patients as early as five weeks. At the end of anti-TB therapy, the patients had no pain or limp and laboratory tests (ESR and CRP) returned to normal and complete joint fusion was achieved after six months in all cases with normal general condition. In the follow up period there were no clinical manifestations, laboratory or radiological findings of recurrence of disease activity.

4. Discussion

Osteoarticular TB is an uncommon disease, and ankle TB is considered rare (*Choi et al., 2008*). Extra pulmonary TB is noted in 23 –30% of patients, with only 1 –3% having osseous disease (*Anand and Sood, 2002*). The ankle and foot are rarely affected (*Mittal et al., 1999*). In a report of 74 patients with foot or ankle TB, *Dhillon and Nagi, 2002* found only one case of talus TB. Osteoarticular TB arises from hematogenous, lymphatic, or direct contiguous spread from visceral tuberculosis (*Keles, 2005*). Our study was carried out in Sohag University Hospital during the period from January 2009 to January 2012. Four male patients with age range from 42 to 55 years were admitted at Sohag University Hospital during the study period, suffering from tuberculous ankle arthritis. *Bozkurt, 2005* reported that; the symptoms of osteoarticular tuberculosis are nonspecific and often indolent, including pain, joint swelling, or reduced range of

motion. Subsequently, there may be delays in diagnosis and therapy, with progression to bone and joint destruction and deformities. Our patients suffered from these indolent symptoms for 3-6 months before accurate diagnosis was achieved. Radiographic signs of osteoarticular TB are nonspecific as well, including soft tissue swelling, osteopenia, joint space narrowing, and subchondral cyst. (*Dhillon and Nagi, 2002*). In our study the most common radiological findings were Juxta-articular osteoporosis, joint space narrowing, and subchondral cyst. MRI can demonstrate lesions in and adjacent to bone before they are evident on plain radiography (*Sobel and Levitz, 1995*). *Canale and Beaty, 2008* suggested that; the ESR is almost always elevated in patients with tuberculosis. In our patients the ESR was shooting of 100 mm after one hour. Diagnosis can be made through these means but confirmation is brought by the identification of the bacillus from the local lesion or by a histological study of the biopsy (*Canale and Beaty, 2008*). In our study a biopsy was taken from the infection site for histopathological analysis showed granulomas and caseating necrosis compatible with TB lesion, and *Mycobacterium tuberculosis* was grown from the excised synovial tissue on Lowenstein Jensen medium. Acid fast bacilli were detected in the synovial fluid specimens by Zeihl-Neelsen staining. *Shih-Hao et al., 2011* suggested that if a case with a negative culture of excised synovial tissue concurrently had histopathological evident of TB of the affected ankle and microbiologically confirmed TB involving any other site, it was also categorized as definitive ankle TB. As for the treatment options of tuberculous ankle arthritis *Inoue et al., 2004* suggested that; in early stages treatment of choice is antituberculous medication for 12 months associated with meticulous debridement and synovectomy with good results. In late stages in addition to antituberculous treatment ankle fusion is recommended. *Yoshida et al., 2009* described arthroscopically assisted ankle fusion or the use of vascularized iliac bone graft which had good satisfactory results. In our study, Synovectomy & joint fusion with two cancellous screws were done to our patients. Surgical treatment in our study had two benefits: diagnosis by providing a material for bacteriological and histological study and therapeutic through debridement and evacuation of caseous material and excision of the necrotic tissues. Surgical treatment was completed by medical treatment as all patients received anti-TB chemotherapy for six months. The treatment was completed with an excellent outcome after joint fusion and drug therapy.

Summary and Conclusion

Tuberculosis is on the rise and it is important to recognize the less common presentations of this condition to enable early diagnosis and successful

treatment. Ankle TB should be included in the differential diagnosis of patients who present with subacute or chronic arthritis; as the uncommon site, lack of awareness, and ability to mimic other disorders clinically and on radiographs, lead to diagnostic and therapeutic delays. There may be no history of TB contact, or any 'typical' symptoms or signs. In patients with risk factors, or any suspicion of TB, a biopsy should be performed to make the diagnosis and initiate treatment. Surgical treatment in the form of synovectomy and arthrodesis of the ankle joint combined with antituberculous chemotherapy is a satisfactory method for treatment of tuberculous ankle arthritis.

Corresponding author

Mona Fattouh

Department of ¹Medical Microbiology and Immunology, Faculty of Medicine, Sohag University
monarahman2002@yahoo.co.uk

5. References

- Anand A, and Sood LK. (2002):** Isolated tuberculosis of the talus without ankle and subtalar joints involvement. *Med J Malaysia.*; **57**: 371 – 373.
- Bozkurt M. (2005):** Isolated medial cuneiform tuberculosis: a case report. *J Foot Ankle Surg.*; **44**:60-3
- Canale S and Beaty J. (2008):** Tuberculosis. *Campbell's Operative Orthopaedics*, 11 th edn. Philadelphia, Pennsylvania, Mosby; 758.
- Choi WJ, Han SH, and joo JH. (2008):** Diagnostic dilemma of tuberculosis in the foot and ankle. *Foot Ankle Int.*, **29**:711-715.
- Dhillon MS, and Nagi ON. (2002):** Tuberculosis of the foot and ankle. *Clin Orthop Res.*; **1**: 107 – 113.
- Dhillon MS, Sharma S, Gill SS, and Nagi ON. (1993):** Tuberculosis of bones and joints of the foot: an analysis of 22 cases. *Foot Ankle*; **14**:505-13.
- Hopewell PC, Pai M, Maher D, Uplekar M, and Raviglione MC. (2006):** International standards for tuberculosis care. *Lancet Infect Dis.*; **6**:710-725.
- Inoue S, Matsumoto S, Iwamatsu Y, and Satomura M. (2004):** Ankle tuberculosis: a report of four cases in a Japanese hospital. *J Orthop Sci.*, **9**(4):392-8.
- Keles I. (2005):** Multifocal osteoarticular tuberculosis: a case report. *Rheumatol Int*; **25**:307-10.

- 10. Mathers CD, and Loncar D. (2006):** Projections of global mortality and burden of disease from 2002 to 2030. *PLoS Med.*; 3:e442.
- 11. Mittal R, Gupta V, and Rastogi V. (1999):** Tuberculosis of the foot. *J Bone Joint Surg Br.*; **81**: 997 – 1001.
- 12. Murray CJL, and Lopez AD. (1996):** The global burden of disease: A comprehensive assessment of mortality and disability from diseases, injuries, and risk factors in 1990 and projected to 2020. Boston, MA, Harvard School of Public Health.
- 13. Shah BA and Splain S. (2005):** Multifocal osteoarticular tuberculosis. *Orthopedics*, **28**:329.
- 14. Shih-Hao Chen, To wang, and Chen-Hsiang lee. (2011):** Tuberculous Ankle versus pyogenic septic arthritis a retrospective coparison. *Jpn.J. Infect, Dis.*, 64: 139-142.
- 15. Sobel E, and Levitz S. (1995):** Tuberculosis of the foot: a diagnostic challenge. *JAm Podiatr Med Assoc*; 85:83-90.
- 16. World Health Organisation. (2008):** Report on Global Tuberculosis Control.
- 17. Yoshida T, Sakamoto A, and Iwamoto Y. (2009):** Vascularized iliac bone graft in cases of ankle tuberculosis. *J Reconstr Microsurg.*; 25(2):125-31

5/11/2012