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## Case Report

## Navicular tuberculosis: A rare localization of bone tuberculosis

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## ABSTRACT

Tuberculosis (TB) is a global public health problem endemic to Morocco. While extrapulmonary TB uncommonly presents in osteoarticular anatomic locations, tarsal or metatarsal osteitis can occur when TB presents in the tarsal bones. Clinical symptoms are often insidious causing a delay in diagnosis that may lead to bone destruction. While diagnosis can be guided by X-ray imaging, bacteriologic and histologic examination of the tissue allows for pathogen isolation, identification of the bacillus and strain sensitivity to antibiologic treatment.

We report a rare case of navicular osteitis associated with tarso-metatarsal arthritis caused by tuberculosis in a 68-year-old man. This case illustrates an exceptional location of osteoarticular TB and support diagnostic difficulties encountered: (i) imaging is not specific; (ii) lesions are paucibacillary which reduces conventional microbiological methods sensitivity and (iii) the peripheral location of the Koch bacillus within the lesion dictates surgical biopsy than percutaneous puncture. We recommend testing for tuberculosis in any case of chronic osteolysis and/or arthritis of the foot, especially in TB endemic countries.

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## Background

Tuberculosis (TB) remains a global public health burden. In 2014, the World Health Organization (WHO) identified nine million new cases of the disease with 1.5 million deaths [1]. Morocco is an endemic country with 27,000–28,000 new cases of TB reported in 2014 [2]. Osteoarticular tuberculosis (OAT) represents 2–5% of all tuberculosis and 11–15% of extrapulmonary tuberculosis. It affects all age groups with predominance in young people in developing countries and adult patients in developed countries, with no gender predominance. The most common localization is the thoracolumbar spine which accounts for up to 50% [3].

Foot tuberculosis is quite rare with a frequency 5–10% of OAT [4]. The most common sites of foot tuberculosis are the tarsal joints and the calcaneal bone. The patient's prognosis depends on

whether lesions are purely intraosseous or are also involving a joint. Diagnosis is often delayed, on average, by 16–19 months [5] because of insidious symptoms and non-specific imaging findings.

We report a case of navicular tuberculosis which is an exceptional location of tarsal tuberculosis.

## Case presentation

A 68-year-old male was admitted to the orthopedic trauma service for chronic pain and swelling of the tarsal portion of his foot.

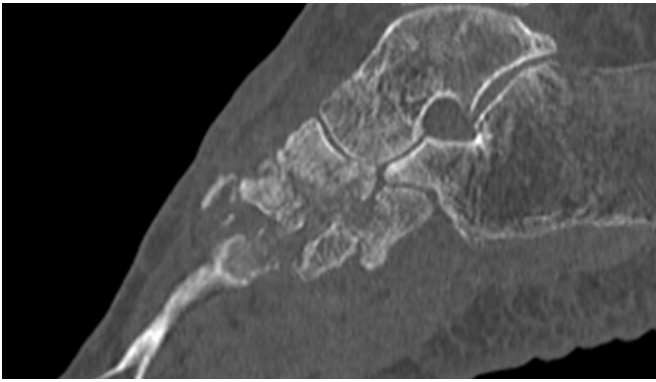
The appearance of mechanical pain at the right foot tarsus began one year before his hospital admission and was treated by analgesics. The evolution was marked by swelling next to the tarsal navicular that gradually increased in size. Historically, the patient and his family had never been diagnosed with tuberculosis. The patient was not diabetic or immunosuppressed.

Physical examination revealed swelling of the tissue overlying the tarsal scaphoid. The area was firm and painful to touch. The patient had full foot mobility and no edema nor skin changes. There were no systemic signs of infection. X-ray showed marked navicular osteitis and tarso-metatarsal osteoarthritis with pronounced bone

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**Fig. 1.** CT scan of the right foot showing a lytic lesion of the navicular bone and the metatarsals.

lysis and sequestration. The computerized tomography (CT) scan confirmed foot osteolysis (Fig. 1). Lung X-ray was normal.

Laboratory tests showed leukocytosis at 13,000/ $\mu$ L and CRP at 60 mg/l. Other laboratory tests were within normal limits. No tuberculin skin test was performed.

A biopsy of the bone lesion was performed. Bacteriological analysis of the bone fragment after Ziehl Nelsen staining was negative. However, the culture in the Bactec MGIT™ 960 liquid medium was positive after 10 days of incubation. The identification by molecular biology confirmed *Mycobacterium tuberculosis* sensitive to rifampin and isoniazid. Direct microbiological study of sputum (three samples collected on consecutive days) and urine using Auramine and Ziehl Neelsen stains were negative for tuberculosis bacillus. The cultures were also negative.

Histopathological examination revealed an epithelioid and giant cell granulomatous inflammatory process with caseous necrosis consistent with tuberculosis. The patient was treated with a four drug anti-tuberculosis regimen (rifampin, isoniazid, pyrazinamide and ethambutol) for 4 months and the association of rifampicine and isoniazide for 10 months. Clinical improvement occurred after a period of 2 months as he reported decreased pain and swelling of foot and improvement in gait. CT scan 4 months after treatment still showed osteolysis of the tarsal bones (Fig. 2).

## Discussion

Tuberculosis is a disease that remains endemic in many parts of the world particularly in developing countries. Osteoarticular TB is the fourth most prevalent tuberculosis localization after pulmonary, urogenital and lymphatic [4]. Contributing risk factors are

those found for other forms of tuberculosis: immune deficiency, and low socio-economic level. Other risk factors have been reported including dialysis, transplantation, and malignancy pathology [6]. In our case, none of these factors were present, including no past history of TB.

OAT may present as arthritis or osteomyelitis. The latter often involves one single bone but can be multifocal. Foot impairment accounts in 5–10% of OAT. The most commonly involved bones are the calcaneum, metatarsi, cuboid and phalanges [4]. In tarsal location of extrapulmonary TB, lesions of cuneiforms are also described whereas only 3 cases of navicular bone TB have been reported to date [7–9].

OAT symptoms are often chronic and insidious. The most common symptom is pain often associated with fever with diaphoresis. Our patient complained about a mechanical tarsal pain that was relieved by analgesics. Hence, diagnosis was delayed until tarsal swelling appears with abscess formation and bone destruction.

The diagnosis was suspected by X-ray and further supported by CT scan. MRI is the standard imaging modality in early stages when X-ray and CT scan can be normal [10]. However, MRI images of osteolysis can suggest other diagnoses such as chronic osteomyelitis, brucellosis, tumors like osteoid osteoma or chondroma, and metabolic diseases such as hyperparathyroidism and Paget's disease [11].

Histopathologic and microbiologic examination of the lesion is therefore of great value because they allow for the isolation, identification and study of the sensitivity to antimicrobials. The stain sensitivity can be as low as 10–20% for extrapulmonary samples as the lesions contain only small number of bacilli. Culture may take 6–8 weeks for growth to appear [4].

Polymerase chain reaction (PCR), is an useful method for the early and rapid diagnosis of extrapulmonary tuberculosis with paucibacillary samples, due to its detection limit of 1–10 bacilli in various clinical samples. The diagnosis can be established within 24 h with high global sensitivity up to 70–83% [12]. Sensitivity is higher in spinal samples as compared to nonspinal samples; 90% and 62.5%, respectively. Hence, in bone samples from areas other than the spine, histopathology remains the gold standard technique disclosing the classical caseating tubercle granulomas. [13]. However, the tubercle may be absent in many samples as Koch bacillus locate the periphery of the bone lesion. For this reason, surgical biopsy is better than percutaneous puncture to improve the sensitivity of this technique [14].

Therapy is based on 9–12 months of antituberculous chemotherapy. Our patient reported an improvement of gait but in some cases the importance of bone destruction and the resulting functional disability can require orthosis or in some instances surgical procedure for severely deformed foot joints [3].

## Conclusion

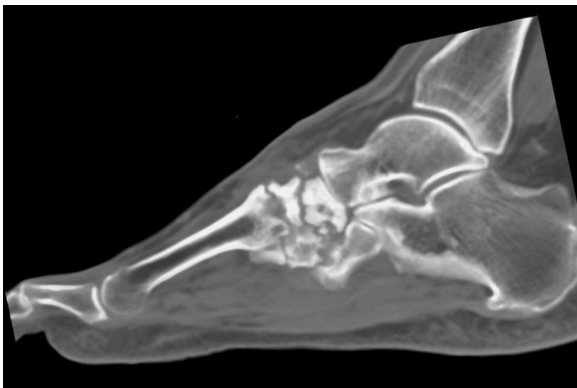
Osteo-articular tuberculosis is difficult to diagnose as clinical symptoms are insidious and standard imaging non-specific (especially for small bones). MRI is superior to X-ray and CT scan but histological study after surgical biopsy remains the gold-standard for diagnosis and strain sensitivity testing.

## Competing interests

The authors have no conflicts of interest to declare.

## Author contributions

LM, FM have been involved in drafting in the manuscript, BB had revising the manuscript, JA, BA, BM have participated to



**Fig. 2.** CT scan of the foot 4 months after antituberculous chemotherapy: osteolysis of navicular and tarsometatarsal arthritis.

surgical care and follow up, JM have given imaging reading, and ELM have given final approval of the version to be published.

## References

- [1] Global tuberculosis control, 2014. Available at [www.Who.int/tb/publications/global\\_report](http://www.Who.int/tb/publications/global_report).
- [2] Plan national d'accélération de la réduction de l'incidence de la tuberculose 2013–2016. Ministère de la santé Direction de l'épidémiologie, royaume du Maroc.
- [3] Pertuiset E. Tuberculose osseuse et articulaire des membres. *EMC Rhumatol Orthop* 2004;1:463–86.
- [4] Dhillon MS, Sameer A, Prabhakar S, Bachhal V. Tuberculosis of the foot: an osteolytic variety. *Indian J Orthop* 2012;46(March–April (2)):206–11.
- [5] Grosskopf I, Ben David A, Charach G, Hochman I. Bone and joint tuberculosis – a 10-year reviews. *Isr J Med Sci* 1994;30:278–83.
- [6] Pertuiset E, Beaudreuil J, Lioté F, Horusitzky A, Kemiche F, Richette P, Clerc-Wyél D, Cerf-Payrastré I, Dorfmann H, Glowinski J, Crouzet J, Bardin T, Meyer O, Dryll A, Ziza JM, Kahn MF, Kuntz D. Spinal tuberculosis in adults. A study of 103 cases in a developed country, 1980–1994. *Medicine* 1999;78:309–20.
- [7] Tuli SM. Tuberculosis of the skeletal system (bones, joints, spine and bursal sheaths). 2nd ed. New Delhi: Jaypee Brothers Medical Publishers (P) Ltd.; 1991. p. 3–122.
- [8] Yombi JC, Vandercam B, Cornu O, Lecouvet F, Leemrijse T. Tarsal osteoarthritis: a rare localization of tuberculosis. *Rev Chir Orthop Reparatrice Appar Mot* 2007;93(November (7)):740–5.
- [9] Birjandinejad A, Parsa A, Ebrahimzadeh MH. Isolated tuberculosis of the talonavicular joint in a child. *Foot (Edinb)* 2012;22(September (3)):255–7.
- [10] Pittet-Barbier L. les infections ostéoarticulaires, neurodiagnostic, neuroradiologie-appareil locomoteur. *Encycl Med Chir* 1995;A10:31–218.
- [11] Murray RO, Jacobson HG. The radiology of skeletal disorders. 1st ed. Edinburgh: Churchill Livingstone; 1977. p. 559–61.
- [12] Pandey V, Chawla K, Acharya K, Rao S, Rao S. The role of polymerase chain reaction in the management of osteoarticular tuberculosis. *Int Orthop* 2009;33(June (3)):801–5.
- [13] Urbanczik R. Present position of microscopy and of culture in diagnostic mycobacteriology. *Zentralblatt Für bakteriologie Mikrobiologie Hygiene Ser Med Microbiol infect Dis Virol Parasitol* 1985;260:81–7.
- [14] Lemaître F, Damade R, Pouchot J, Barge J, Boussougant Y, Vinceneux P. Osteoarticular tuberculosis. Diagnostic contribution of local sampling. *Rev Med Interne* 1995;16(3):191–4.