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Case Report

Classical Presentation of Madura Foot - A Radiological Case Report

Dr. Gurivi Reddy C, Dr. S. Shrinuvasan, Prof Dr. R. Chidambaram
Department of Radiodiagnosis, Sri Lakshmi Narayana Institute of Medical Sciences, Affiliated to Bharath University, Osudu, Puducherry, India

***Corresponding author**
Dr. S. Shrinuvasan
Email: drshrinuvas@gmail.com

Abstract: Mycetoma (tumour-like mass) is a chronic granulomatous disease caused by actinomycetes or fungi characterized by localized infection of subcutaneous tissues, often extends to the underlying bone [1]. The patient gives a history of previous trauma (prick/cut/splinter) prior to granulomatous reaction. The infection spreads through the skin, facial planes and can involve the bone. Infection most commonly involves the foot but can involve the hands, back or shoulders. Madura foot is more common in tropics and subtropical regions and was first reported in Madurai, a place in south India(hence called Madura foot) .we report here a case of a sixty-year-old daily worker presented with multiple discharging sinuses all over the foot.
Keywords: Mycetoma, actinomycetes, Madura foot

INTRODUCTION:

Madura foot is caused by either fungus (referred to as mycotic mycetoma or eumycetoma) or bacteria (actinomycotic mycetoma or actinomycetoma) [2]. Mycetoma infection results in a granulomatous inflammatory response in the deep dermis and subcutaneous tissue and can extend to the underlying bone. It is characterized by the formation of grains (aggregates of the causative organisms) that may be discharged onto the skin surface through multiple sinuses [3]. The color of the discharging grains differ from species to species and helps in identification of the specific etiologic agent.

Eumycetomas: Black grains: Madurella mycetomatis
Pale grains: Petriellidium boydii, Aspergillus nidulans, Aspergillus flavus
Actinomycetomas: Red grain: Actinomadura pelletieri
Yellow grains: Streptomyces somaliensis
Pale grains: Nocardia brasiliensis, N cavae, N asteroides, Actinomadura madurae.

The foot or lower leg is the most commonly affected part of persons with mycetoma, dorsal aspect of the forefoot being typical. The hand is the next most commonly infected part. *Nocardia* species causes lesions on the chest and back, whereas lesions on the head and neck are commonly caused by *Streptomyces somaliensis.* The infective organism after entering through sites of local trauma (eg, cut on the hand, thorn or foot splinter), initiates neutrophilic response and may be followed by a granulomatous reaction. The infection spreads slowly through skin and facial planes. The infection then spreads to contiguous bone, resulting in destructive osteomyelitis.

CASE REPORT:

A sixty-year-old male patient with a complaint of swelling and multiple discharging sinuses over the right foot for the past fifteen years has been referred from the orthopedic department for x-ray right foot. By occupation, he is a daily worker who works in the paddy field. He is a nondiabetic and non-hypertensive. He gives a history of thorn prick while working in the fields, followed by small ulcer gradually developing multiple discharging sinuses involving entire foot. x-ray foot lateral and anteroposterior views shows multiple radiolucencies involving tarsal, metatarsal bones and phalanges with marked soft tissue swelling. CT foot shows multiple hypodense areas involving tarsal and metatarsal bones with gross surrounding edema.

Fig 1a and 1b showing clinical picture of Madura foot, multiple discharging sinuses with foot swelling and disfigurement is noted.

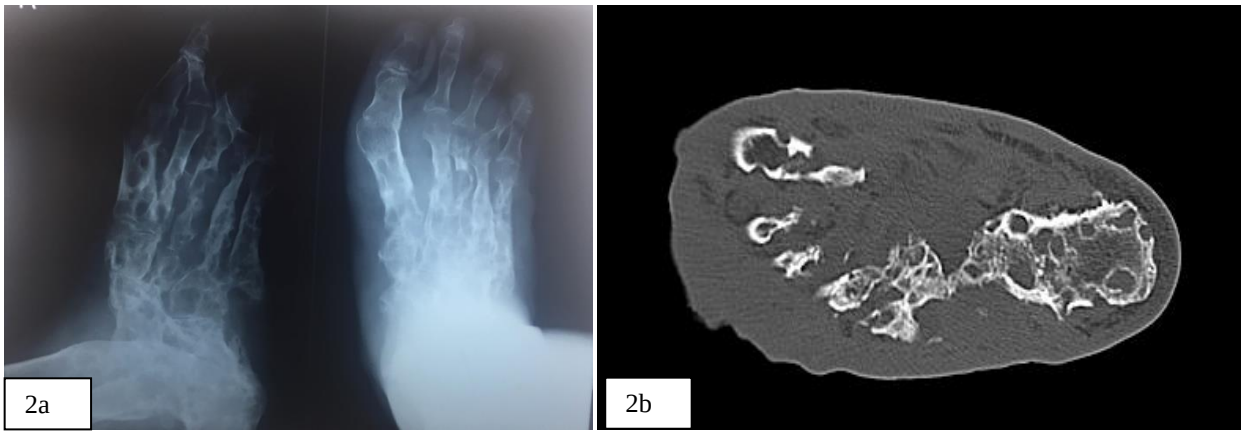

Fig 2: 2a- x-ray right foot AP and oblique views showing gross tarsal and metatarsal bone destruction with multiple lucent areas. 2b-axial CT showing multiple destructive hypodense areas involving tarsal and metatarsal bones with soft tissue edema

DISCUSSION:

Mycetoma was first recognized by Gill [4] in 1842 near Madurai in the southern part of India. Colebrook coined the term Madura foot for the same entity. Vandyke Carter introduced the term mycetoma (fungus tumor) describing the involvement of bony structures and soft tissues of the affected parts. He identified fungal filaments in the grains of the sinus tracts.

Mycetomas are most frequently seen in the tropical and subtropical zones of America, Africa and Asia (India). Fungi, in the form of saprophytes found in the soil, gain entrance through skin wounds (thorn pricks) in those who walk barefooted. Initially, Infection begins as local papular or nodular swelling in the skin and subcutaneous tissue which grows and ruptures, leading to sinus tracts discharging the characteristic colored granules. Few sinuses heal with scarring while fresh sinuses are formed elsewhere in the limb leading to diffuse swelling and disfigurement of the affected foot. Destruction of bone is noted on the long standing infection when grains invade the cortical margins and replace the spongiosa.

Patients usually present with marked swelling of the affected foot with multiple discharging sinuses, disfigurement of the limb, pain, and fever due to bacterial infection. Diagnosis of Madura mycosis is usually made by both clinical and histopathological appearance. The combination of the indurated swelling of the foot with multiple sinuses that discharge pus filled with grains and macroscopically typical grains and the histopathological appearance is characteristic of the diagnosis. Grains usually vary from 0.2 to 3.0 mm in diameter with a different color (black, white, yellow,

pink or red) depending on the microorganism involved [5, 6]. Histopathology's demonstrate the characteristic grains that are surrounded by inflammation with leukocytes, plasma cells, epithelioid cells, and multinucleated giant cells with areas of fibrosis. Based on this, mycetomas are distinguished into two groups- Eumycetoma and Actinomycetoma. Eumycetomas are caused by true fungi while actinomycetomas are caused by fungi like aerobic bacteria. Culture is required for accurate identification of the causative organism. In few cases, DNA sequencing has been used for identifying the organism and correct diagnosis [7].

The main differential diagnoses that mimic Madura foot are chronic bacterial osteomyelitis, tuberculosis and Buruli ulcer (early stages). Other deep fungal infections such as blastomycosis or coccidiomycosis. Leishmaniasis, yaws, and syphilis also give similar clinical picture as Madura mycosis. Botromycosis [8], a chronic bacterial infection caused by gram- positive cocci (Staphylococci, Streptococci) and gram negative bacteria (Escherichia coli, Pseudomonas, Proteus) also cause subcutaneous swelling with draining fistulas similar to Madura mycosis. Kaposi's sarcoma (AIDS related), Leprosy, Syphilis, and Malignant neoplasms should be excluded before confirming the diagnosis.

Medical management of Madura mycosis includes Drugs like ketoconazole, itraconazole [9] and voriconazole [10]. Actinomycetes usually respond well to medical treatment. Eumycetes are resistant to medical management and require surgical interventions including amputation of the affected limb.

CONCLUSION:

We reported a case of Madura foot in this article. Madura foot is a rare granulomatous disease which causes bone deformities. Early diagnosis and treatment is necessary to prevent progression of the disease especially in a country like India where more than 70% of the rural populations are working barefooted in the fields.

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