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Mycetoma of Foot: MR Imaging Demonstrated the "Dot-in-Circle" Sign

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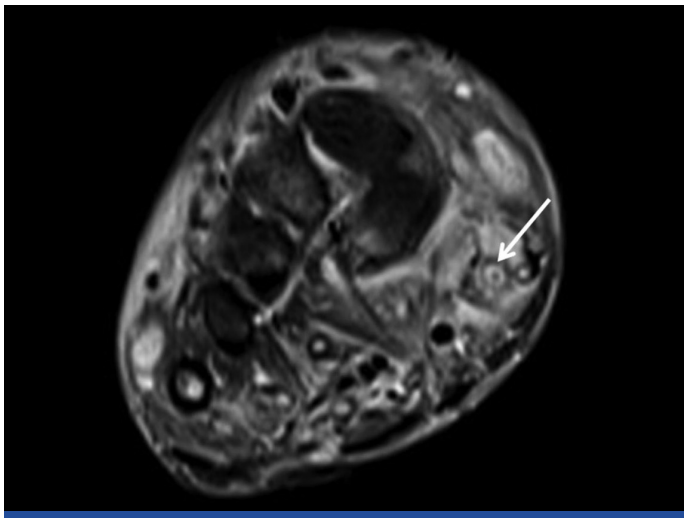
ABSTRACT

We are reporting here, a rare case of mycetoma involving the left foot in a 36-year-old male, that was correctly diagnosed with the help of the characteristic "dot-in-circle" sign on magnetic resonance imaging.

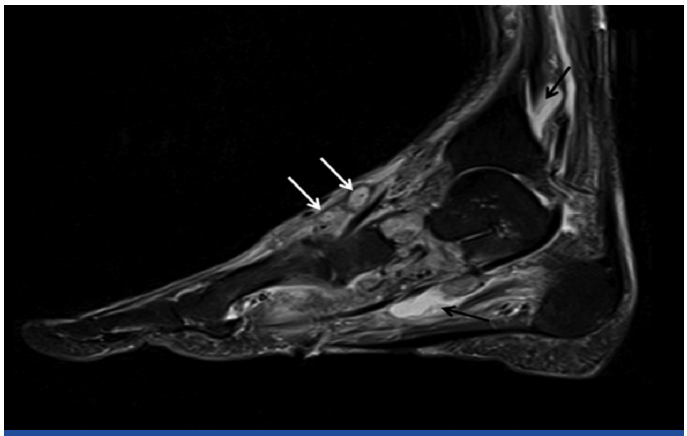
Key Words: Mycetoma, Madura foot, Magnetic resonance imaging (MRI)

CASE REPORT

A 36-year-old male farmer presented with swelling of the left foot, which had been progressively increasing for the past 3 years. Recently, the patient had noticed discharging sinuses developing on the dorsum of the foot. The discharge contained a blackish brown-coloured fluid. There was a history of trauma to the left foot during farming in his paddy fields, three years back. Keeping in view the endemicity of mycetoma in the southern parts of India and the patient's clinical history, the orthopaedician considered the possibility of a Mycetoma of foot. The patient was sent for magnetic resonance imaging (MRI) of the left foot. Patient carried an ankle radiograph which showed erosions in the cuboid and navicular bones, with soft tissue swelling. Magnetic resonance imaging was performed on a 1.5T MRI scanner, which revealed a large heterogenous soft tissue mass longitudinally involved the dorsal and the plantar subcutaneous tissues of the proximal half of the foot, and sparing the ankle joint. The intrinsic muscles of the foot were also involved. The mass displayed a hypointense signal on the T1 images and a hyperintense signal on the T2 images and on the inversion recovery (IR) sequences. In addition, multiple rounded hyperintense areas with a peripheral hypointense rim were noted within the soft tissue mass on the T2 images and on the IR sequences. These rounded areas showed central dot like hypointensities within them, suggestive of fungal granules, which were characteristic of the Mycetoma foot [Table/Fig 1A & B]. A biopsy from the soft tissue mass showed multiple, brown, fungal hyphae with relatively uniform parallel walls and septations, suggestive of a fungal mycetoma.



[Table/Fig-1A]: Axial inversion recovery image of left foot showing dot-in-circle sign within the soft tissue mass (white arrow).



[Table/Fig-1B]: Sagittal inversion recovery image of left foot showing dot-in-circle sign within the soft tissue mass (white arrows). Fluid collections are also noted tracking along flexor tendons of foot (black arrows)

DISCUSSION

Mycetoma, which is also known as the Madura foot, is a rare, chronic subcutaneous infection which is caused by the bacteria, Actinomyces (Actinomycetoma) or true fungi (Eumycetoma) [1,2]. This infection results in a granulomatous inflammatory response in the deep dermis and the subcutaneous tissues, which can extend to involve the underlying bones. Mycetoma was first described in the Madurai district of southern India and hence the eponym, 'Madura foot' [3,4]. The infection is introduced by the direct implantation of the organisms that are the normal inhabitants of the soil, secondary to a penetrating skin injury, such as a thorn prick [5,6]. The infection is generally indolent, but it can lead to sinus tract formation, abscess, osteomyelitis and fistula formation, if left untreated [7]. Mycetoma is characterized by the development of aggregates of the organism, which are known as 'grains', surrounded by abundant inflammatory granulation tissue, within the abscesses. This feature gives the characteristic MR appearance of the conglomerates of small (2–5 mm), rounded, hyperintense areas of granulation tissue, with central, low signal,

intensity dots, which represent the susceptibility effect caused due to the presence of the fungal grains. A peripheral, low-signal-intensity rim around these hyperintense areas represents the fibrous matrix which intervenes between the inflammatory granulomas [1]. This unique appearance, known as the "dot-in-circle" sign is highly suggestive of mycetoma. It was first described by Sarris et al., [3] in two cases of mycetoma which involved the soft tissues of the foot. Our case demonstrated the characteristic "dot-in-circle" sign on MRI. An appropriate management of this infection depends on its early diagnosis and the extent of the disease. Antimicrobial therapy is sometimes curative for mycetoma which involves the soft tissues of the foot. However, in cases of a bony involvement, a non-surgical cure is unlikely and partial resection or amputation of the foot may be required [4].

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