DOT-IN-CIRCLE SIGN: MRI SIGN FOR MYCETOMA FOOT

Introduction: Mycetoma or Madura foot is a chronic granulomatous infection caused by the bacteria *Actinomyces* (Actinomycetoma) or by true fungi (eumycetoma).

Imaging findings:

Muscles of dorsum and plantar aspect of the foot adjacent to the first to third metatarsals show diffuse altered signal intensity. Multiple small rounded lesions measuring 0.5cm to 1.4cm in size noted within these muscles. These lesions appear hyperintense on T2WI, PDFs sequences with a small punctate low signal intensity focus in the central part *(dot in circle sign)* (Fig 1, 2, 4). Diffuse edema is noted in the muscles around the fourth metatarsal.

Diffuse intramedullary altered signal intensity in the shaft of the fourth metatarsal with thickening of its periosteum and periosteal edema (Fig 3).
DIAGNOSIS:

Chronic fungal granulomatous disease (Mycetoma).

DISCUSSION:

The term mycetoma is a clinical entity, which applies to a chronic inflammatory process of soft tissue, usually of the foot, resulting from the implantation of one or various fungi or actinomycetes.

The infecting organism is presumed to be directly inoculated after penetration of the skin with a sharp object e.g., a thorn. Initially there is inflammation of the subcutaneous tissues which progresses to the formation of sinuses and extrusion of grains. The process is usually indolent but with a potential for abscess formation, draining sinus tracts, osteomyelitis, and fistula formation.

Histologically, the lesion consists of “grains” of fungal hyphae or bacteria in microabscesses within a granulomatous fibrous-tissue reaction.

Initial reports of the MRI findings of mycetoma described lesions with low signal on T1W and T2W images, which were assumed to be due to susceptibility from the metabolic products of the “grains”. The “dot-in-circle” sign, seen as tiny hypointense foci within the hyperintense spherical lesions, was initially described by Sarris et al. in 2003 on T2W, STIR, and T1W fat-saturated gadolinium-enhanced images. Correlating the MRI and histological findings, they suggested that the 

**high-signal areas seen on MRI represented inflammatory granulomata**, the low-intensity tissue seen surrounding these lesions represented the fibrous matrix, and the **small central hypointense foci within the granulomata represented the fungal balls or grains**.

Bone involvement may vary from periostitis to osteomyelitis.

CONCLUSION:

The “dot-in-circle” sign has recently been proposed as a highly specific magnetic resonance imaging (MRI) sign of mycetoma, which may allow a noninvasive as well as early diagnosis.

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