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Case Report

A case report of Maduramycosis.

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Abstract

Maduramycosis is a chronic progressive granulomatous condition which causing infection of the skin which ultimately leads to involvement of the bone. Causative organisms maybe either bacteria (actinomycetoma) or fungi (eumycetoma). The causative organism is inoculated usually after minor foot trauma and so it is more often seen in barefoot-walking populations exposed to contaminated soil during minor injuries. It is common in adults aged between 20 to 50 years. The classical clinical features are tumefaction, fistulization of the abscess, and extrusion of coloured grains. In the active phase of the disease the colour of these extruded grains from the fistulas aid in diagnosis. Radiography, ultrasonography, MRI, cytology, histology, immunodiagnosis, and culture are the investigations which are used for diagnosis.

Keywords: Maduramycosis, Mycetoma, MRI, Dot in circle.

Introduction

Mycetoma is a chronic granulomatous disease most commonly affecting body parts that are in direct contact with soil during daily activities, that is feet, legs, hands, and, occasionally, the head or back.[1] It is most commonly seen in tropical and subtropical regions & rarely in temperate regions. It is difficult to diagnose mycetoma based on the similar clinical features of both actinomycetoma & eumycetoma, so it is usually misdiagnosed in the early stages to be a tuberculous or chronic bacterial infection, neoplasm, or neuropathic foot.[2] USG & MRI are frequently used as non-invasive and early diagnostic methods. Biopsy specimens and cultures of microbiology can help in definitive diagnosis but due to fastidious nature of the organisms, it is difficult to achieve. USG and MRI shows the 'dot-in-circle' sign, which is a diagnostic sign for mycetoma.[3]

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Case Report

A female aged 45 years presented with complaints of pain, swelling & multiple discharging sinuses from left foot since one year. The patient underwent radiographic examination of left foot & ankle, CT scan & MRI of left foot & ankle.

Plain radiograph showed swelling of the soft tissues around the ankle joint & foot.

The tarsal bones including the calcaneum, talus, cuboid, navicular, and medial cuneiform showed multiple lytic lesions of variable size with cortical irregularity Figure:1(A & B).

Figure 1(A&B): Radiograph of left ankle & foot shows soft tissue swelling around the ankle joint & foot. The tarsal bones including the calcaneum, talus, cuboid, navicular, medical cuneiform show multiple variable sized lytic lesions with cortical irregularity.

CT scan of left foot & ankle showed multiple variable sized lytic lesions in calcaneum, talus, cuboid, navicular, medial cuneiform, distal end of tibia & fibula. Figure: 2 (A,B & C).

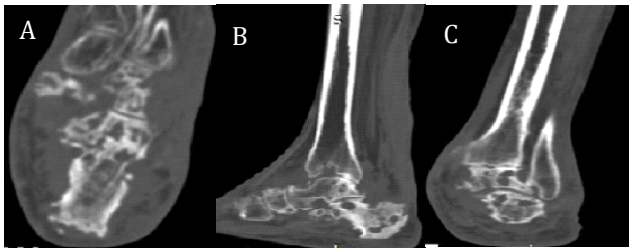

Figure 2(A, B & C): CT scan of the left ankle & foot shows multiple variable sized lytic lesions in calcaneum, talus, cuboid, navicular, medical cuneiform, distal end of tibia & fibula with cortical irregularity & loss of normal architecture with associated soft tissue swelling around the left ankle joint & foot.

Contrast enhanced MRI of left foot & ankle was done in 1.5 Tesla SIEMENS MAGNETOM MRI scanner. MRI showed multiple well defined variable sized confluent T1 hypointense, T2/STIR hyperintense lesions with central hypointense focus giving 'dot in circle' appearance. These lesions are seen as rounded hyperintensity (representing granulation tissue), surrounding low signal intensity rim (representing fibrous septa) with a hypointense dot (representing susceptibility loss due to fungi) in the centre Figure:3 (A &B).

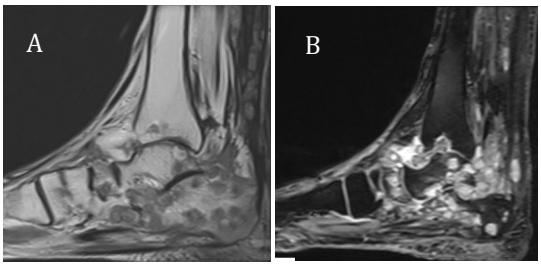

Figure 3 (A&B): MRI of the left ankle & foot T1 & T2 FS shows multiple well defined variable sized confluent T1 hypointense, T2 FS hyperintense lesions showing "Dot-in-circle" sign.

There were multiple ring enhancing lesions along with mild post-contrast enhancement in the tarsal bones, distal tibia & fibula, muscles & soft tissues of distal 1/3rd of left leg, ankle & foot Figure:4 (A, B & C).

Discussion

Mycetoma was characterized first in the mid-1800s in Madura district of southern India and was initially known as Madura foot[4]. Mycetoma or Madura foot is a chronic granulomatous inflammatory disease affecting subcutaneous tissues and skin. The causative organisms fall under two groups namely bacteria Actinomyces (Actinomyetoma) or true fungi (Eumycetoma).[5] Predominance of rainfall favours infection by actinomycetoma and eumycetoma infection is more commonly noted in regions receiving scarce rainfall.[6] Extremities are usually affected (most commonly the foot, leg or hand) owing to penetrating injury by which the organisms in the soil are implanted. The course of the disease is an indolent one in which infection may persist latent for a long time and the disease evolves slowly and it is usually painless with delayed presentation.[7] This infection results in a granulomatous inflammatory response in the deep dermis and the subcutaneous tissues with formation small, subcutaneous swellings that enlarge, soften with pus and breach the skin surface, with invasion of deeper tissues.[8]

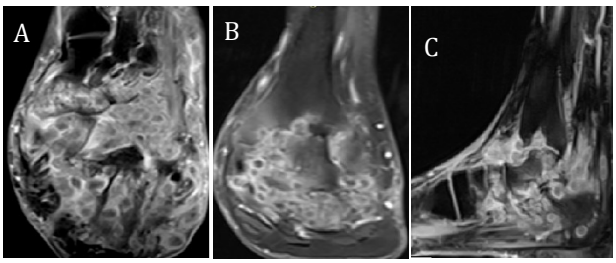

Figure 4 (A,B & C): Post contrast T1 FS shows multiple ring enhancing lesions with mild enhancement of the tarsal bones, distal tibia & fibula, surrounding muscles & soft tissues of distal 1/3rd of the left leg, ankle & foot

After many years as the disease progresses, bone invasion results in replacement of osseous tissue by grains and multiple foci of osteolysis. Other features seen in this infection are abscess formation, draining sinus tracts, osteomyelitis, and fistula formation, resulting in severe deformity and disability if early treatment is not provided.[9] The colour of the grains in the discharge will indicate the type of infection. Black or pale grains are usually seen in eumycetoma and white, yellow or red grains are seen in actinomycetoma.

Early in the course of disease, no abnormality is seen on radiographs because the bone

may not be involved. Common radiographic findings are bone sclerosis, periosteal reaction, bone cavities, cortical scalloping, osteoporosis and soft-tissue thickening. Bone lesions of eumycetoma usually form few cavities, which are one centimetre or greater in diameter usually, whereas those of actinomycetes usually have more number of cavities but are smaller in size, showing moth-eaten appearance.[10] CT scan is better in delineating the bone changes than radiographs.

MRI findings of mycetoma are small foci showing hypointense signal on both T1W and T2W which is due to susceptibility artefacts from the formation of microabscesses consisting of aggregates of the organism (known as “grains”) and surrounded by abundant granulation tissue. This can be visualised as "dot-in-circle" sign, initially described by Sarris et al in 2003, seen as tiny hypointense foci inside the hyperintense spherical lesions, 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 represent inflammatory granulomata, the fibrous matrix surrounding these lesions correspond to low signal intensity, and within the granulomata there fungal balls or grains which appear as central hypointense foci. “Dot in circle” appearance was suggested to be a specific sign for mycetoma.[11]

Ultrasound shows multiple round hypoechoic lesions with central hyperechoic foci showing "dot-in-circle" appearance which is similar to its appearance in MRI.[12]

Histologically, a typical mycetoma consists of a large granulomatous area with a purulent center surrounded by a thick fibrous capsule. Biopsy or staining and microbiological culture of discharge from the lesion helps in definitive diagnosis, but these are time-consuming procedures and hence diagnosis may be difficult to achieve.[13]

Conclusion

Mycetoma is a chronic granulomatous infection of the feet. MRI demonstrates tiny hypointense foci inside the hyperintense spherical lesions seen as “Dot in circle” appearance which is diagnostic for mycetoma.

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