

Surgical Management and Antifungal Therapy for Extensive Eumycetoma of the Right Foot: A Case Report from Resource Limited Settings

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Introduction: Mycetoma is a neglected tropical disease characterized by chronic granulomatous infection of the subcutaneous tissues. It is classified etiologically into actinomycetoma (bacterial) and eumycetoma (fungal). Differentiation is vital as the management protocols differ significantly.

Case Presentation: We report the case of a 25-year-old male from the Hiran region of Somalia who presented with a four-year history of a recurrent, discharging lesion on the right calcaneus. Magnetic Resonance Imaging (MRI) revealed the pathognomonic “dot-in-circle” sign. Intraoperative assessment revealed necrotic tissue containing characteristic black grains. Histopathological examination confirmed the presence of compact fungal grains composed of septate branching hyphae, establishing a diagnosis of eumycetoma.

Conclusion: The patient was successfully treated with wide surgical debridement combined with adjuvant Itraconazole therapy. This case emphasizes the importance of histopathology and clinical grain characteristics in diagnosing fungal mycetoma in endemic regions.

Keywords: eumycetoma, Madura foot, black grains, itraconazole, Somalia, case report

Introduction

Mycetoma is a chronic, progressive inflammatory disease that usually affects the lower extremities.^{1,2} It is endemic to the “Mycetoma Belt,” a region that includes Somalia.^{2,3} The disease results from traumatic inoculation of causative agents into the subcutaneous tissue.^{4,5} These agents are either aerobic actinomycetes, which cause actinomycetoma^{6–8}, or true fungi, which cause eumycetoma^{6–8}. Accurate diagnosis is critical because eumycetoma typically shows limited response to medical therapy alone and often requires a combination of antifungal agents and surgical debridement^{9,10}. In contrast, actinomycetoma is generally treated with antibiotics.^{11,12} We present a case of pedal eumycetoma in a young Somali male, diagnosed via pathognomonic radiological signs and confirmed by histopathological evidence of fungal hyphae, successfully managed with surgery and oral itraconazole.^{13,14}

Case Presentation

Patient Information

A 25-year-old male residing in the Beledweyne District of Somalia presented to the outpatient department of the Mogadishu-Somalia Turkey Recep Tayyip Erdogan Training and Research Hospital. He complained of a chronic, non-healing wound on his right heel (calcaneus) that had been present for approximately four years.

Clinical History

The patient reported a history of local trauma to the area preceding the onset of the lesion. Initially, it manifested as a painless swelling which slowly progressed. Approximately one year prior to presentation, the lesion developed sinuses discharging serosanguineous fluid and pus. This discharge was intermittent and occasionally associated with mild pain. The patient had visited multiple healthcare facilities previously but had not experienced sustained improvement. He had no history of chronic systemic illnesses such as diabetes mellitus, hypertension, or immunodeficiency, and reported no known drug allergies.

Physical Examination

Examination of the right foot revealed a deformed, edematous heel with multiple active draining sinuses. The clinical appearance was highly suggestive of Madura foot (mycetoma).

Diagnostic Assessment

Laboratory investigations revealed a mild elevation of inflammatory markers, with a C-reactive protein (CRP) of 13 mg/L. Complete blood count showed a white blood cell (WBC) count of $4.16 \times 10^3/\mu\text{L}$ and hemoglobin of 14.8 g/dL. Renal and liver function tests were within normal limits.

Imaging Findings

Magnetic Resonance Imaging (MRI) of the right ankle provided critical diagnostic clues. The scans demonstrated extensive involvement of the plantar soft tissues with the characteristic “dot-in-circle” sign, which represents distinct spherical grains within granulomatous cavities (Figure 1). The lesion appeared hypointense on T1-weighted images and mildly hyperintense on T2-weighted sequences. Importantly, the lesion involved subcutaneous tissues and intermuscular planes without the formation of a well-defined abscess cavity. Mild signal intensity changes in the neck of the talus suggested early reactive bone marrow edema.

Histopathology and Intraoperative Findings

The patient underwent surgical debridement. Intraoperatively, extensive necrotic soft tissue was noted, containing characteristic black grains (Figure 2). The presence of black grains is a classic clinical sign of eumycetoma (fungal origin), most commonly associated with species such as *Madurella mycetomatis*.

Histopathological examination of the excised tissue (stained with Hematoxylin and Eosin) provided the definitive diagnosis. Sections revealed compact eosinophilic fungal grains composed of septate, branching hyphae (Figure 3).

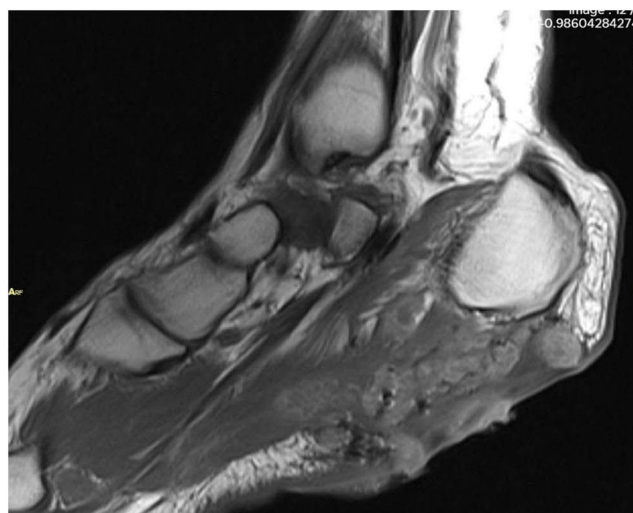


Figure 1 Magnetic Resonance Imaging (MRI) of the right foot (Sagittal and Coronal views) demonstrating extensive soft tissue involvement. Arrows indicate the “dot-in-circle” sign, which is characteristic of mycetoma.

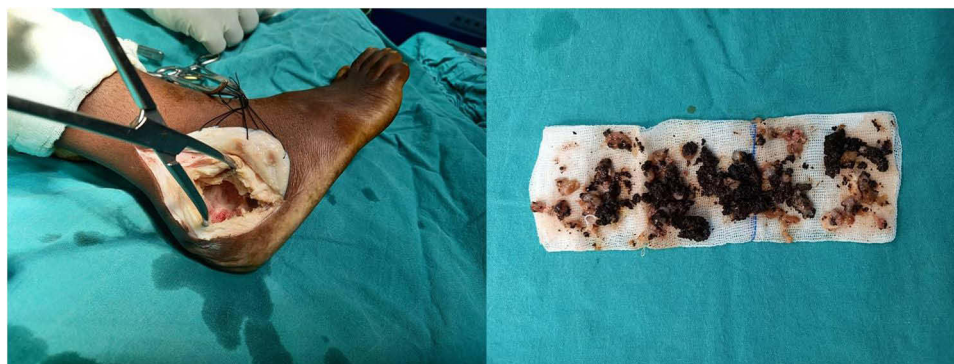


Figure 2 Intraoperative photograph showing the surgical debridement of the calcaneal lesion. Arrows point to necrotic tissue and visible black grains within the lesion.

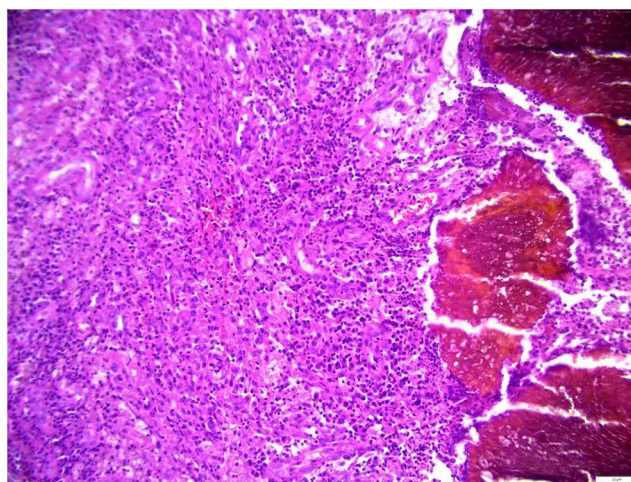


Figure 3 Histopathological section (Hematoxylin and Eosin stain) showing a compact fungal grain with septate hyphae. Arrow highlights the fungal grain, surrounded by a granulomatous inflammatory reaction.

These grains were surrounded by a suppurative granulomatous inflammatory reaction, consisting of neutrophils, epithelioid histiocytes, and giant cells, with focal Splendore Hoespli phenomenon. The surrounding tissue showed fibrosis and chronic inflammatory infiltrate. These findings unequivocally confirmed eumycetoma.

Therapeutic Intervention

Given the diagnosis of fungal mycetoma, a combined modality approach was adopted:

1. **Surgical Management:** The patient underwent thorough surgical debridement under spinal anesthesia. All sinus tracts were explored, and necrotic tissue, purulent material, and fungal grains were evacuated. The wound was irrigated with hydrogen peroxide and normal saline and left open for drainage to prevent anaerobic bacterial superinfection and allow secondary healing.
2. **Medical Management:** Post-operatively, the patient was initiated on itraconazole 200 mg twice daily for 12 months to treat residual fungal elements and prevent recurrence.

Outcome

The patient remained stable throughout the perioperative period. The wound showed healthy granulation during immediate follow-up. During a 12-month follow-up, the patient demonstrated complete wound healing, no signs of recurrence, and

maintained good functional status. The patient continued outpatient follow-up as scheduled, with adherence to the antifungal regimen.

Discussion

Eumycetoma remains a significant cause of morbidity in Somalia^{15,16}. This case illustrates the classic diagnostic pathway for fungal mycetoma. Clinically, the presence of black grains is a strong predictor of a fungal etiology, as actinomycetoma grains are typically white, yellow, or red¹⁷. The “dot-in-circle” sign observed on MRI is highly specific for mycetoma and correlates with the pathological finding of fungal grains embedded in granulation tissue.¹⁸ While culture is often used to identify the specific species, fungal culture was not performed in this case due to limited laboratory resources, representing a limitation. Histopathology remains a rapid and reliable method to distinguish between fungal and bacterial causes¹⁹. In this patient, visualization of septate branching hyphae within the grains confirmed a fungal etiology. Histopathological examination was performed using standard hematoxylin and eosin (H&E) staining, as special fungal stains such as PAS or GMS were unavailable. Treatment of eumycetoma is challenging²⁰. Unlike actinomycetoma, which responds well to antibiotics (eg, Welsh regimen), eumycetoma often forms a fibrous capsule that limits drug penetration.²¹ Therefore, the gold standard of care, as applied in this case, is aggressive surgical debulking followed by prolonged administration of antifungals like itraconazole or ketoconazole.²²

Conclusion

This case report documents the successful management of a classic black-grain eumycetoma in a Somali male. It highlights the critical role of MRI and histopathology in confirming the fungal etiology. Early recognition of the fungal nature of the disease is essential to initiate timely antifungal therapy combined with surgical intervention, which can preserve limb function, reduce morbidity, and prevent amputation. Clinicians in endemic regions should maintain a high index of suspicion to ensure prompt diagnosis and effective management.

Ethical Considerations

This case report was conducted with ethical approval obtained from the Ethics Committee of Jamhuriya University of Science and Technology. According to institutional policy, additional ethical approval was not required for the publication of a single case report.

Consent for Publication

Written informed consent was obtained from the patient for the publication of this case report and any accompanying images.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Disclosure

The authors report no conflicts of interest in this work.

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