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Cutaneous Mucormycosis in a Diabetic Foot: A Rare but Deadly Infection

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Introduction

Mucormycosis is a rapidly progressing fungal infection caused by fungi of the order Mucorales. Although typically associated with rhino-orbital and pulmonary involvement, cutaneous mucormycosis represents a rarer and often overlooked form, particularly dangerous in patients with underlying immunocompromised states such as uncontrolled diabetes mellitus. In diabetic patients, especially those with diabetic foot ulcers, the risk of cutaneous fungal invasion increases significantly due to impaired local immunity, poor wound healing and frequent microbial colonization. Cutaneous mucormycosis often masquerades as a bacterial infection, delaying appropriate antifungal treatment. If left untreated, the disease can progress to necrosis and systemic dissemination, carrying a high mortality rate. Early recognition and aggressive management are therefore crucial for improving patient outcomes [1].

Description

A 58-year-old male with a 15-year history of poorly controlled type 2 diabetes mellitus presented with a non-healing ulcer on the plantar aspect of his right foot. The ulcer had worsened over the previous two weeks despite broad-spectrum antibiotic therapy. On examination, the lesion was deep with a black eschar at the base, surrounded by erythematous and indurated skin. There was no significant fever or leukocytosis. However, his HbA1c was markedly elevated at 10.8%. Radiological imaging showed soft tissue swelling without bony involvement. A biopsy of the ulcer edge revealed broad, ribbon-like, aseptate fungal hyphae suggestive of mucormycosis. Culture confirmed the presence of *Rhizopus oryzae*. The patient underwent wide local debridement, followed by intravenous liposomal amphotericin B therapy. His glycemic control was aggressively optimized. Over the course of six weeks, the infection was successfully controlled and a split-thickness skin graft was applied to facilitate wound healing. Cutaneous mucormycosis typically occurs following direct inoculation of fungal spores into broken skin. This can happen through trauma, surgery, or existing ulcers in susceptible individuals. The disease often presents subtly, mimicking bacterial cellulitis or necrotizing fasciitis [2].

In diabetic patients, peripheral vascular disease and neuropathy compound the risk by impairing protective sensation and delaying wound care. Unlike its rhinocerebral counterpart, cutaneous mucormycosis may lack systemic symptoms, leading to diagnostic delays. Histopathological examination remains the gold standard for diagnosis, while fungal culture helps in species identification and guides antifungal therapy. Timely surgical debridement and administration of amphotericin B are vital. Posaconazole and isavuconazole may be considered in cases of amphotericin intolerance or resistance. The present case illustrates the importance of considering fungal infections in non-healing diabetic foot ulcers unresponsive to antibiotics. The early biopsy led to prompt diagnosis and treatment, likely preventing progression to systemic involvement. Clinicians should maintain a high index of suspicion, particularly in endemic regions or among immunocompromised patients. Early identification and coordinated multidisciplinary care, including diabetology, infectious disease and surgical teams are essential for successful outcomes. Cutaneous mucormycosis, though rare, is a potentially fatal infection, particularly in patients with poorly controlled diabetes. Its resemblance to more common bacterial infections can mislead clinicians, delaying critical interventions. This case highlights the importance of considering fungal etiologies in chronic or atypical diabetic foot ulcers. Prompt biopsy, aggressive antifungal therapy, surgical debridement and strict glycemic control form the cornerstone of management. Early recognition and comprehensive care are key to improving survival and preventing limb loss [3].

In addition to medical and surgical management, optimizing systemic factors is crucial for improving outcomes in cutaneous mucormycosis. Poor glycemic control, as seen in this patient, impairs neutrophil function and cellular immunity, creating a permissive environment for invasive fungal growth. Nutritional status, vascular perfusion and comorbidities such as renal impairment also influence healing capacity and susceptibility to infection. Therefore, a holistic approach that includes tight glycemic control, correction of electrolyte imbalances and addressing peripheral arterial disease is essential. Advanced wound care techniques, such as negative pressure wound therapy and hyperbaric oxygen therapy, may provide adjunctive benefits by enhancing tissue oxygenation and promoting granulation, although robust clinical evidence remains limited. From a preventive perspective, education on foot care and early recognition of suspicious lesions is vital for diabetic patients to minimize the risk of severe infections like mucormycosis. Regular podiatric assessments and prompt treatment of minor wounds can prevent progression to deep fungal infections. Moreover, healthcare providers should be vigilant in endemic areas or in patients with known immunosuppression. Research into novel antifungal agents and immunomodulatory therapies continues to evolve, aiming to improve prognosis in mucormycosis, which still carries high morbidity and mortality despite advances in treatment. Ultimately, multidisciplinary collaboration and patient engagement remain the cornerstones in managing this complex condition effectively [4].

Given the rising incidence of diabetes mellitus globally and the increasing prevalence of immunocompromised states, the burden of cutaneous mucormycosis is expected to grow. Future research should focus on the development of rapid and accurate diagnostic tools capable of distinguishing fungal from bacterial infections in diabetic foot ulcers at an early stage.

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Point-of-care molecular diagnostics, such as PCR-based assays or next-generation sequencing, may offer promise in reducing diagnostic delays and guiding timely antifungal therapy. In addition, further studies are warranted to identify reliable clinical and biochemical markers that can predict susceptibility to mucormycosis in high-risk patients. Understanding host-pathogen interactions at the molecular level may also reveal novel therapeutic targets or preventive strategies. From a clinical management perspective, establishing standardized treatment protocols that integrate surgical debridement with targeted antifungal therapy is essential. Exploring the role of adjunctive therapies, such as hyperbaric oxygen or immunomodulatory agents, may also enhance treatment outcomes.Lastly, education and awareness campaigns aimed at healthcare providers, particularly in regions with a high prevalence of diabetes, can facilitate early recognition of atypical fungal infections. As the landscape of opportunistic fungal infections continues to evolve, a multidisciplinary and proactive approach will be key to mitigating the impact of cutaneous mucormycosis [5].

Conclusion

Cutaneous mucormycosis, though rare, is a potentially fatal infection, particularly in patients with poorly controlled diabetes. Its resemblance to more common bacterial infections can mislead clinicians, delaying critical interventions. This case highlights the importance of considering fungal etiologies in chronic or atypical diabetic foot ulcers. Prompt biopsy, aggressive antifungal therapy, surgical debridement and strict glycemic control form the cornerstone of management. Early recognition and comprehensive care are key to improving survival and preventing limb loss.

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Conflict of Interest

None.

References

1. Tanabodee, Monton, Junjira Sawasdipong, Poonnawis Sudtikoonaseth and Vesarat Wessagowit. "Rare indolent zygomycosis caused by subcutaneous *Saksenaea vasiformis* infection." *Australas J Dermatol* 61 (2020): e94-e96.

2. Morales-Franco, Berenice, Mario Nava-Villalba, Edgar Octavio Medina-Guerrero and Yair Adonai Sanchez-Nuno, et al. "Host-pathogen molecular factors contribute to the pathogenesis of Rhizopus spp. in diabetes mellitus." *Curr Trop Med Rep* 8 (2021): 6-17.

3. Vallabhaneni, Snigdha, Kaitlin Benedict, Gordana Derado and Rajal K. Mody. "Trends in hospitalizations related to invasive aspergillosis and mucormycosis in the United States, 2000–2013." *Open Forum Infect Dis* 4 (2017): 268.

4. Bougnoux, Marie-Elisabeth, Sophie Brun and Jean-Ralph Zahar. "Healthcare-associated fungal outbreaks: new and uncommon species, new molecular tools for investigation and prevention." *Antimicrob Resist Infect Control* 7 (2018): 1-9.

5. Hoang, Kathy, Tony Abdo, J. Matthew Reinersman and Rufei Lu, et al. "A case of invasive pulmonary mucormycosis resulting from short courses of corticosteroids in a well-controlled diabetic patient." *Med Mycol Case Rep* 29 (2020): 22-24.

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