

***Scedosporium apiospermum* infection in a non-healing diabetic foot ulcer patient: First report from Pakistan**

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ABSTRACT

Diabetic foot ulcers (DFUs) are a common and challenging complication of diabetes mellitus, often resulting from neuropathy, vascular insufficiency, trauma, and infection. Fungal infections, though less commonly recognized than bacterial infections, can contribute to non-healing ulcers. *Scedosporium apiospermum*, an emerging opportunistic fungal pathogen, is a rare cause of skin and soft tissue infections, especially in DFUs. To the best of our knowledge, this report describes the first documented case of a DFU caused by *S. apiospermum* in Pakistan. A 65-year-old man with a 20-year history of diabetes mellitus, hypertension, and ischemic heart disease presented with two non-healing ulcers on his left leg. Physical examination and laboratory evaluation revealed generalized edema and ulcers with purulent discharge. Pus and tissue specimens obtained from the shin ulcer were cultured on Sabouraud dextrose agar, resulting in the isolation of *Scedosporium apiospermum*, which was identified based on its characteristic macroscopic and microscopic features.

The patient was treated with oral voriconazole, in addition to wound care and regular dressing changes, and scheduled for follow-up. This case emphasizes the importance of considering rare fungal pathogens, such as *S. apiospermum*, in the differential diagnosis of non-healing DFUs, especially in patients with multiple comorbidities. Mycological evaluation should be performed in diabetic patients with chronic non-healing ulcers, particularly when antibacterial therapy fails. Accurate identification of the fungal pathogen is crucial for appropriate antifungal therapy, as *S. apiospermum* exhibits resistance to many conventional antifungal agents. A multidisciplinary approach, including glycemic control, wound care, and targeted antifungal therapy, is essential for successful management.

Keywords: *Scedosporium apiospermum*, Diabetic foot ulcer, Diabetes mellitus, Mycology, Culture

INTRODUCTION

Diabetic foot ulcers represent one of the most challenging complications of diabetes mellitus, affecting approximately 15–25% of diabetic patients.¹ These ulcers result from complex interactions between peripheral neuropathy, vascular insufficiency, foot deformities, and external trauma, often complicated by infections. While bacterial pathogens are the most common infectious agents in diabetic foot infections,

fungal etiologies are increasingly recognized as significant contributors to non-healing ulcers.

Scedosporium apiospermum, the asexual form of *Pseudallescheria boydii*, is a filamentous fungus ubiquitously distributed in the environment, found in soil, polluted water, sewage, and animal manure.² This organism has emerged as an important opportunistic pathogen, particularly in immunocompromised hosts and individuals with chronic debilitating conditions. *S. apiospermum* can cause a wide spectrum of clinical manifestations, ranging from localized infections to disseminated disease.^{2,3}

Among diabetic patients, mycotic infections may significantly increase the risk of developing diabetic foot syndrome, yet the prevalence of fungal foot

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infections in diabetic populations remains underreported and possibly underdiagnosed.⁴ The occurrence of *S. apiospermum* as an etiological agent in diabetic foot ulcers is particularly rare, with only a few cases documented in the literature.²

To the best of our knowledge, this report presents the first documented case of a diabetic foot ulcer caused by *S. apiospermum* in Pakistan, adding to the limited global literature on this uncommon fungal etiology in diabetic foot infections. The case underscores the importance of considering rare fungal pathogens in the differential diagnosis of non-healing diabetic wounds, particularly in patients with multiple comorbidities or other risk factors.

CASE PRESENTATION

A 65-year-old man presented to the outpatient clinic with complaints of two ulcers on his left leg that had persisted for approximately one month. The patient had a history of diabetes mellitus and hypertension for more than 20 years. He also had ischemic heart disease, for which he had undergone coronary artery bypass graft (CABG) twice, in 1998 and 2019.

On physical examination, the patient exhibited generalized edema, which was more pronounced in both lower extremities. Two distinct ulcers were observed on the left leg: one located in the interdigital space between the first and second toes, and another on the medial aspect of the shin. Both ulcers measured approximately 1 × 1 cm in size, with exposed subcutaneous tissue and slightly scabbed purulent discharge.

After all aseptic measures were observed, the shin ulcer was gently debrided. Pus and tissue samples were collected and inoculated onto Sabouraud dextrose agar (SDA) and subsequently submitted to the microbiology laboratory for fungal culture. After seven days of incubation, mold growth was observed on the culture plates, which fully matured after an additional two weeks of incubation.

Macroscopic examination revealed colonies with a cottony texture and concentric growth pattern. Initially, the surface appeared light bluish in color and later turned to grayish-brown with continued incubation (Figure 1). The reverse surface of the colonies



Figure 1. Macroscopic appearance of the colony of *Scedosporium apiospermum*.

exhibited a grayish appearance. Microscopic examination using lactophenol cotton blue staining demonstrated thin, delicate, septate hyphae with simple, long conidiophores bearing single conidia. The conidia were unicellular, oval, and appeared dark in color (Figure 2). The macroscopic and microscopic features were consistent with *Scedosporium apiospermum*.

The treating physician was informed of the findings, and the patient was prescribed oral voriconazole therapy, along with thorough wound cleaning and regular dressing changes. Significant improvement in diabetic ulcer healing was observed at follow-up, and the patient was advised to continue antifungal therapy. The patient was scheduled for a follow-up appointment in the outpatient clinic after 15 days to assess the treatment response and wound healing.

DISCUSSION

Scedosporium apiospermum is an emerging opportunistic fungal pathogen that has gained recognition in recent years for causing a wide spectrum of infections,

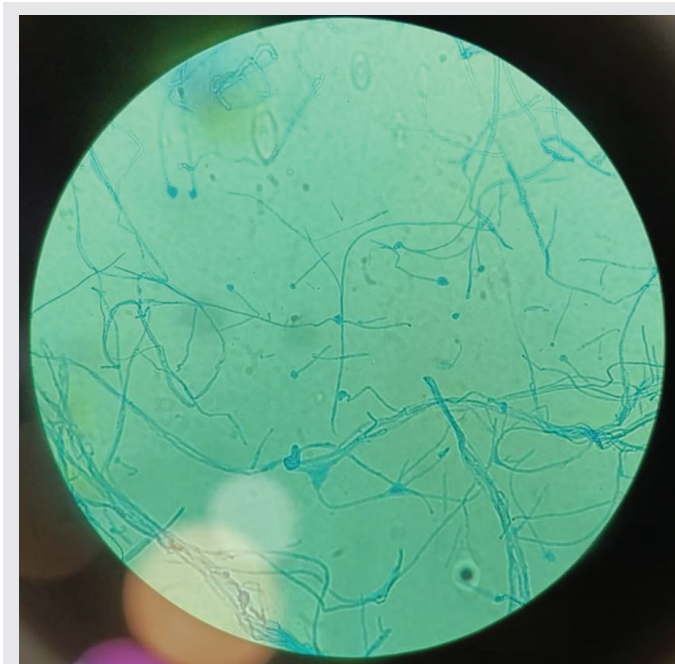


Figure 2. Microscopic morphology of *Scedosporium apiospermum* (magnification: 40x).

particularly in immunocompromised hosts. It is the asexual (anamorphic) form of *Pseudallescheria boydii*, a filamentous fungus isolated from various environmental substrates, including soil, polluted water, sewage, and the manure of poultry and cattle.³ Despite its ubiquitous presence in the environment, *S. apiospermum* remains an uncommon cause of skin and soft tissue infections, especially in diabetic foot ulcers.

To the best of our knowledge, the present case represents a rare instance of *S. apiospermum* isolated from a diabetic foot ulcer and is the first documented case from Pakistan. This finding is significant because it expands our understanding of the geographic distribution of this pathogen in diabetic foot infections. Previous reports of *S. apiospermum* in diabetic foot ulcers are limited, with a notable case reported from India involving a 70-year-old male with uncontrolled diabetes.²

Diabetic patients are particularly susceptible to fungal foot infections due to various factors, including impaired microcirculation, neuropathy, altered immune response, and metabolic disturbances. Studies have

demonstrated a correlation between fungal foot infections and factors such as age, sex, duration of diabetes, and glycemic control.⁴ In individuals with type 2 diabetes mellitus, the prevalence of positive fungal cultures has been significantly associated with poorer glycemic control, a finding that may be relevant to our patient, who had a long history of diabetes.⁴

The pathogenesis of *S. apiospermum* infection in our patient likely involved traumatic inoculation, as the fungus is commonly introduced through breaks in the skin following contact with contaminated soil or water.² The patient's compromised vascular status, resulting from long-standing diabetes and ischemic heart disease, probably contributed to the establishment and persistence of the infection.

Treatment of *S. apiospermum* infections poses challenges due to the organism's inherent resistance to many conventional antifungal agents. Voriconazole has emerged as the preferred antifungal agent for *S. apiospermum* infections based on in vitro susceptibility data and clinical experience.⁵ In our case, oral voriconazole was prescribed, consistent with current therapeutic recommendations. The patient's management also included proper wound care, regular dressing changes, and glycemic control, which are fundamental aspects of diabetic foot ulcer management regardless of the causative pathogen.⁶

The prognosis for localized *S. apiospermum* infections with appropriate antifungal therapy is generally favorable, though long-term follow-up is essential to monitor for recurrence or progression.⁷ In immunocompromised hosts or patients with disseminated infection, outcomes may be less favorable, underscoring the importance of early diagnosis and targeted therapy.⁸

CONCLUSION

Our case highlights the importance of considering rare fungal pathogens, such as *Scedosporium apiospermum*, in the differential diagnosis of non-healing diabetic foot ulcers, particularly in patients with long-standing diabetes and multiple comorbidities. As the first documented case from Pakistan, it contributes to our understanding of the geographic distribution and clinical presentation of this uncommon fungal infection.

The case emphasizes several key clinical lessons. First, mycological evaluation should be considered in diabetic patients with chronic non-healing ulcers, especially when conventional antibacterial therapy fails to yield improvement. Second, accurate identification of the fungal pathogen is crucial for guiding appropriate antifungal therapy, as *S. apiospermum* exhibits resistance to many conventional antifungal agents. Third, a multidisciplinary approach incorporating proper glyce-mic control, wound care, and targeted antifungal therapy is essential for successful management.

Further research is needed to better understand the epidemiology, risk factors, and optimal treatment strategies for *S. apiospermum* infections in diabetic foot ulcers. This case report serves as a reminder to clinicians of the diverse microbial etiologies of diabetic foot infections and the need for comprehensive microbiological investigation in persistent or atypical presentations.

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