

LETTER

Fusarium solani infection in a diabetic patient treated with itraconazole and debridement

Dear Editor,

Fusarium species are fungi that are found in nature, but rarely cause infections in humans. They may lead to a variety of infections that are insignificant, locally invasive, and widespread. Some *Fusarium* infections among healthy patients are generally unimportant, and usually respond well to treatment.¹⁻³ Widespread fusariosis affecting the immunocompromised individual, is frequently more severe and may be fatal.²⁻⁴ We present a diabetic patient with multiple ecthyma-like lesions, which are diagnosed as *Fusarium solani* infection.

A 63-year-old female patient presented with painful ulcers with black crust on her left leg for 3 months. The lesions have occurred after trauma and did not respond to antibiotics. The patient had diabetes mellitus type 2 with sufficient glycemic control with oral antidiabetics. She has been cultivating different types of plants for hobby purposes.

Black crusted multiple ulcerative lesions and surrounding erythematous halo around the lesions were seen on the lower face of the left leg in dermatological examination (Figures 1A and 2A).

The specimen that was obtained with skin biopsy was seeded in Sabouraud dextrose agar (SDA) without cycloheximide and incubated at 25°C. A slide was prepared with lactophenol cotton blue stain. Many partitioned hyphae, fusiform-shaped, one- to two-part macroconidias, abundant undivided microconidias were seen in microscopic examination and revealed *Fusarium* spp. (Figure 3A-D).

The sequences of fungal amplicons obtained using the Biospeedy Fungal DNA Isolation Kit for DNA Isolation were determined using the Sanger method, the ABI Prism Big Dye Terminator Cycle Sequencing Ready Reaction Kit and the ABI Prism 377 DNA Sequencer (Applied Biosystems). The sequence obtained by real-time polymerase chain reaction was found to be compatible with *F. solani*. The forward primer

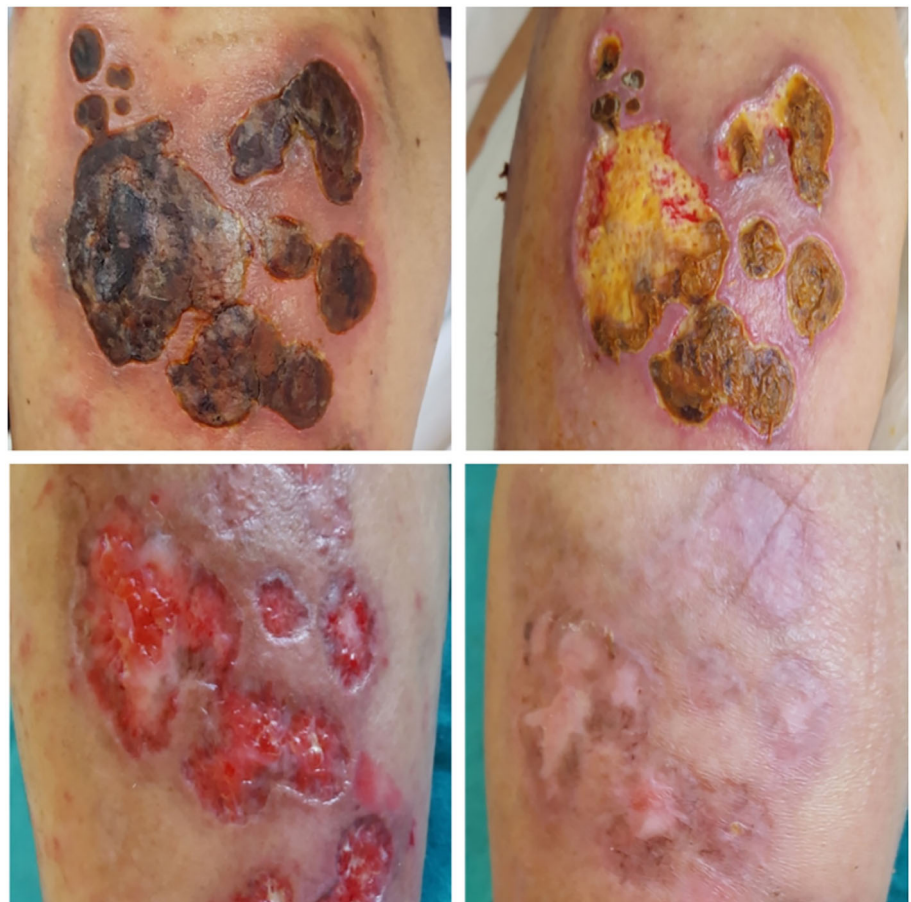


FIGURE 1 The clinical appearance of the patient before and after treatment

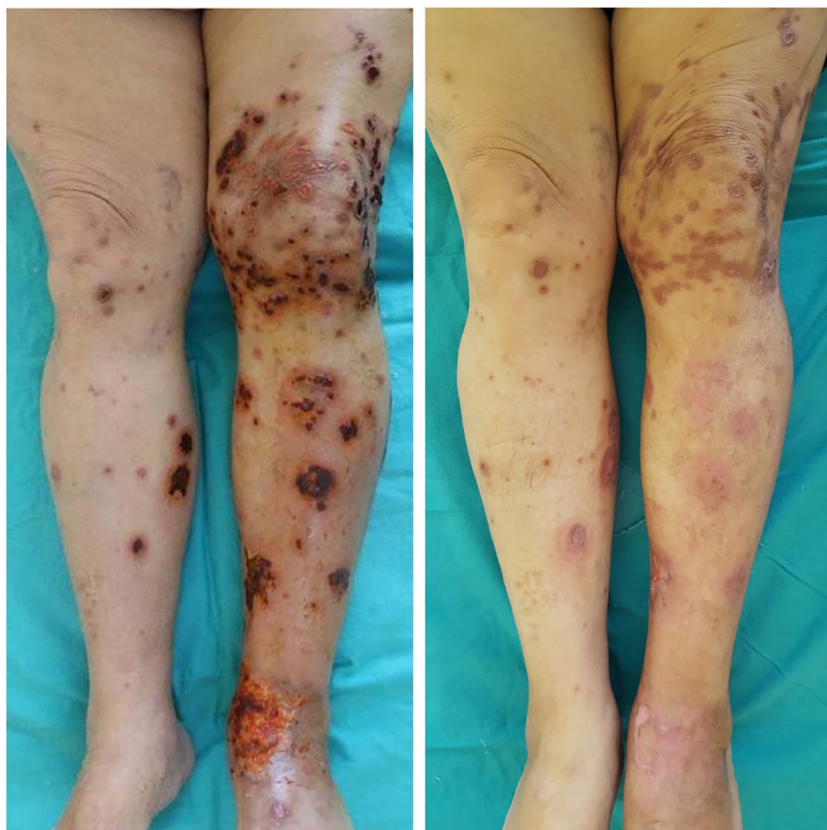


FIGURE 2 Gradual recovery after step-by-step debridement

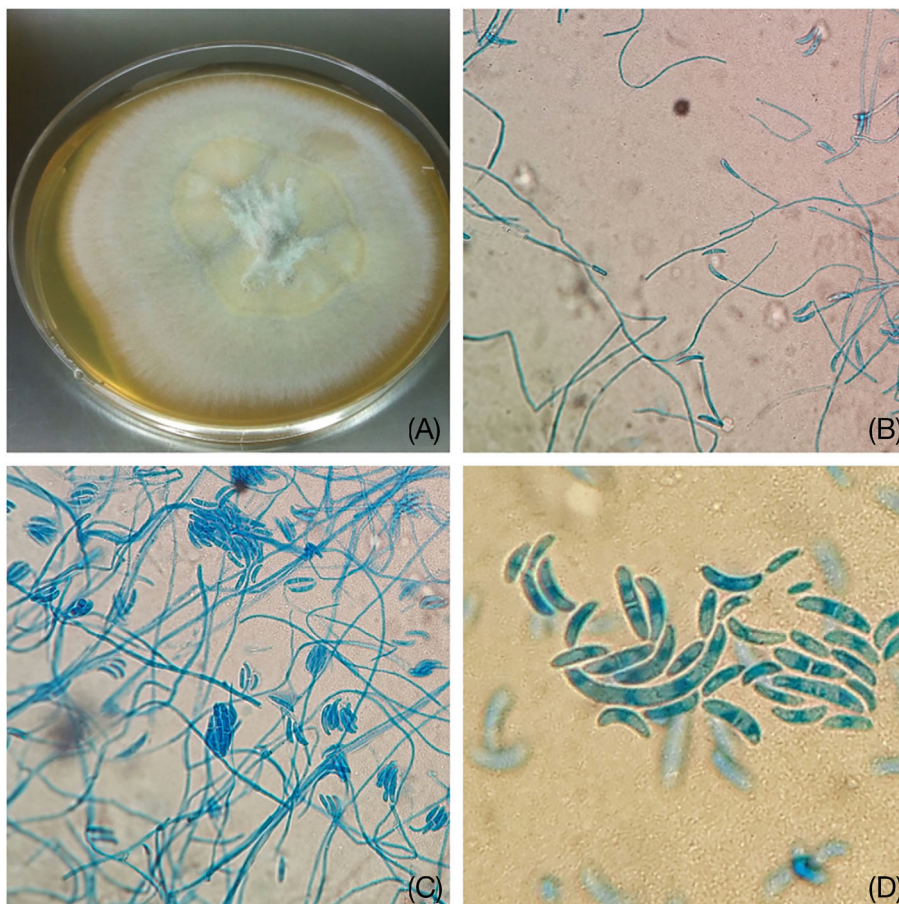


FIGURE 3 A, Six days of *Fusarium solani* culture (Sabouraud dextrose agar [SDA], at 25°C); B, conidiophores and monophialids; C,D, macroconidials and microconidials

(TCCTCCGCTTATTGATATGC) and reverse primer pairs (GGAAGTAAA AGTCGTAACAAGG) specific to the ITS1-5.8S-ITS2 region were used in fungi genomic DNA. In the NCBI DNA database (<http://blast.ncbi.nlm.nih.gov/Blast.cgi>), the ITS region was compared with the designated species and it received the sequence entry number KY484811.1.

Histopathological examination revealed branching septate hyphae of *Fusarium* in hematoxylin and eosin (H&E). Further staining with methenamine silver and periodic acid-Schiff (PAS) stain showed septate dichomatous branching hyphae, and spores suggestive of fungal organism (Figure 4A-F).

Laboratory analysis was normal. Screening for human immunodeficiency virus was negative. Oral itraconazole 400 mg/day was administered along with local wound care, debridement, and wound covers with hydrogel with calcium alginate. Microbiological examination at the first month of therapy proved to be negative and oral itraconazole treatment was completed after 2 months (Figures 1B and 2B). All lesions healed after 3 months.

Skin findings of *Fusarium* are rarely seen in dermatological practice and the infection can be seen as an outcome of skin breakdown, like burns and injuries, trauma, or foreign body.¹⁻³

Fusarium solani, *Fusarium oxysporum*, and *Fusarium moniliforme* are widely shown among *Fusarium* species in human infections.¹ *Fusarium* species are commonly spread in soil, subterranean, and aerial plant areas, and exist in water worldwide.³

Types of skin lesions are ecthyma-like, targetoid ulcers, and multiple subcutaneous nodules. Ulceration and eschar formation are indicators of thrombosis in dermal vessels, extravasation of erythrocytes and focal dermal necrosis triggered by fungal hyphae.^{4,5} The most prominent features of the lesions were densely adhered crusts and severe pain. The eschar was firmly adjacent to the ulcer.^{3,5}

Localized skin lesions in immunocompromised individuals require special care.^{3,6} We observed the importance of surgical debridement in our case. Oral itraconazole in addition to debridement appears to be a good option before proceeding to other systemic antifungal agents.^{2,3,6}

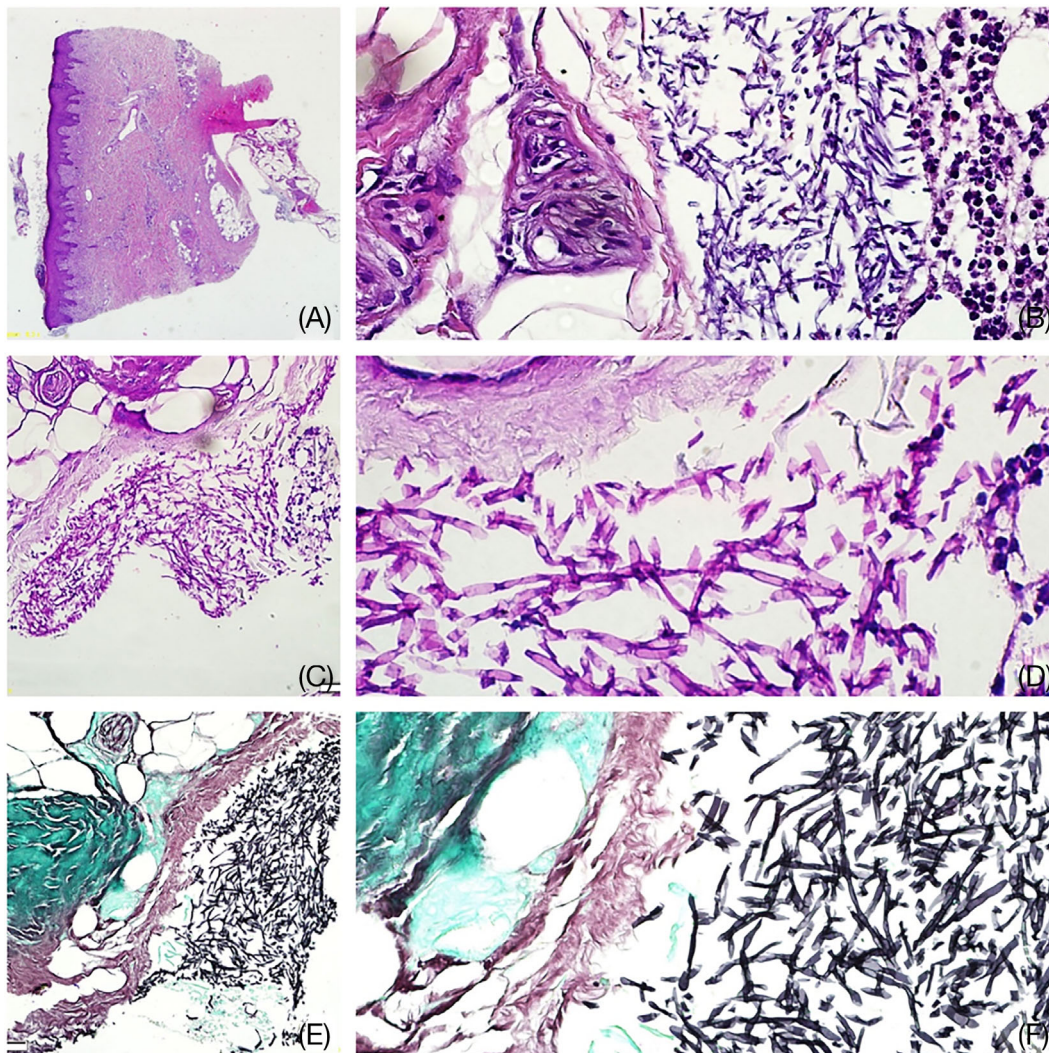


FIGURE 4 Examination of H&E-stained sections revealed branching septate hyphae of *Fusarium* were seen (A, H&E $\times 20$; B, H&E $\times 600$; C, PAS $\times 200$; D, PAS $\times 600$; E, Grcott methenamine silver $\times 200$; F, Grcott methenamine silver $\times 400$). H&E, hematoxylin and eosin; PAS, periodic acid-Schiff

Dermatologists are recommended to realize that other pathogens like fungi may lead to clinically indistinguishable lesions. Immune status of the patient is the key factor for the therapeutic choice.

CONFLICT OF INTEREST

The authors declare no potential conflict of interest.

AUTHOR CONTRIBUTIONS

Ayşe Serap Karadağ: primary physician of concerning patient, supervisor of process, created the idea, designed the process, analyzed outcome, writing and preparation of manuscript. Filiz Cebeci: took part in patient care, deciding treatment, follow-up, photography, data collection, reviewed the article. Melek Aslan Kayıran: took part in diagnosis, in clinical follow-up, creation of idea, and reviewed the article. Fatma Özakkaş: took part in diagnosis and investigation of microbiologic materials, reviewed the article. Bengü Çobanoğlu: took part in diagnosis and investigation of pathologic materials, reviewed the article. Zeynep Arslan: took part in in clinical follow-up, data collection, literature review, reviewed the article. Burçe Can Kuru: took part in clinical follow-up, reviewed the article. Mehmet Salih Gürel: took part in diagnosis, deciding treatment, reviewed the article.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available to privacy or ethical restrictions.

Ayşe Serap Karadağ¹ 

Filiz Cebeci¹ 

Melek Aslan Kayıran¹ 

Fatma Özakkaş²

Bengü Çobanoğlu³

Burçe Can Kuru⁴

Zeynep Arslan¹

Mehmet Salih Gürel¹

¹Department of Dermatology, School of Medicine, Göztepe Training and Research Hospital, İstanbul Medeniyet University, İstanbul, Turkey

²Department of Microbiology, Fatih Sultan Mehmet Eğitim ve Araştırma Hastanesi, İstanbul, Turkey

³Department of Pathology, School of Medicine, Göztepe Training and Research Hospital, İstanbul Medeniyet University, İstanbul, Turkey

⁴Department of Dermatology, Bakırköy Research and Training Hospital, Health Science University, İstanbul, Turkey

Correspondence

Ayşe Serap Karadağ, Department of Dermatology, School of Medicine, Göztepe Training and Research Hospital, İstanbul Medeniyet University, İstanbul, Turkey.
Email: karadagserap@gmail.com

ORCID

Ayşe Serap Karadağ  <https://orcid.org/0000-0003-4333-8274>

Filiz Cebeci  <https://orcid.org/0000-0002-9109-3892>

Melek Aslan Kayıran  <https://orcid.org/0000-0003-4347-3134>

REFERENCES

1. Dignani MC, Anaissie E. Human fusariosis. *Clin Microbiol Infect.* 2004; 10:67-75.
2. Hayashida MZ, Seque CA, Enokihara MMSES, Porro AM. Disseminated fusariosis with cutaneous involvement in hematologic malignancies: report of six cases with high mortality rate. *An Bras Dermatol.* 2018;93: 726-729.
3. Nucci M, Anaissie E. *Fusarium* infections in immunocompromised patients. *Clin Microbiol Rev.* 2007;20:695-704.
4. Bodey GP, Boktour M, Mays S, et al. Skin lesions associated with *Fusarium* infection. *J Am Acad Dermatol.* 2002;47:659-666.
5. Molgó MN, Arriagada CE, Salomone CB, et al. Skin necrosis: report of eleven cases. *Rev Med Chil.* 2014;142:118-124.
6. Bissan AT, Iken M, Doumbia M, Ou-Khedda N, El Alaoui M, Lmimouni B. Fusarioses to *Fusarium solani* in an immunocompetent and immunocompromised diagnosed in military hospital of Rabat. *J Mycol Med.* 2017;27:382-386.