

Primary Subcutaneous Sporotrichoid Fusarium Infection in Patient with a First HIV Diagnosis: A Case Report

Supakkan Nichpanit MD, Oraya Kwangsukstid MD, Sutsarun Prunglumpoo MD.

Institute of Dermatology, Department of Medical Services, Ministry of Public Health, Bangkok, Thailand.

ABSTRACT:

Fusarium species are responsible for various human infections, ranging from superficial to locally invasive and disseminated infections. We reported A 29-year-old Thai male with a primary subcutaneous sporotrichoid fusarium infection on his left arm and forearm, which developed after a stray cat scratch. Histopathology showed dense granulomatous infiltration in the dermis, no microorganism. Tissue culture revealed white colony. Microscopic morphology with Lactophenol cotton blue solution revealed hyaline hyphae with macroconidia. Tissue culture nucleotide BLAST sequencing revealed *Fusarium solani*. Hemoculture for fungus was negative. An additional assessment confirmed that the patient had HIV infection. The infection complete resolution 3 months after treatment with voriconazole

Key words: Fusarium infection, Primary subcutaneous fusarium infection, Sporotrichoid pattern, Cat related disease

Introduction

Fusarium species are responsible for various human infections, ranging from superficial to locally invasive and disseminated infections. The clinical presentation of fusariosis depends on immune status and the entry site. Immunocompetent individuals typically

experience superficial or localized infections, whereas immunocompromised individuals are more susceptible to invasive and widespread infections. We reported a 29-year-old Thai male with a primary subcutaneous sporotrichoid fusarium infection on his left arm and forearm, successfully treated with voriconazole.

Case report

A 29-year-old Thai male presented with multiple discrete erythematous nodules with necrosis on his left arm and forearm for 2 months. The lesion developed after a stray cat scratch. He denied fever, loss of appetite, or significant weight loss. He was taking amoxicillin and clavulanic acid, but his clinical condition did not improve. Thus, he came to the hospital for diagnosis and investigation.

A general examination revealed stable vital signs without fever. Dermatological examination showed multiple discrete ill-defined non tender erythematous nodule with necrosis on the left arm and forearm arrange in sporotrichosis pattern (Figure 1). No palpable lymphadenopathy was note. Other physical examinations were unremarkable. Complete

blood count, creatinine and liver function test were within normal limit. Histopathology showed dense caseating granulomatous inflammation with Langhans giant cell infiltration in the dermis, no microorganism (Figure 2-A &B). The Periodic acid-Schiff (PAS), Gomori methenamine-Silver (GMS), Acid fast bacilli (AFB) and modified acid-fast bacilli (mAFB) strain no microorganism. Tissue culture revealed white colony (Figure 3-A). Microscopic examination of the fungal colony stained with Lactophenol cotton blue solution from slide culture revealed hyaline hyphae with fusiform-shaped macroconidia. (Figure 3-B). Electrophoretic pattern identified *Fusarium solani*. (Figure 3-C) which was further confirmed by nucleotide BLAST sequencing. Hemoculture for fungus was no growth.

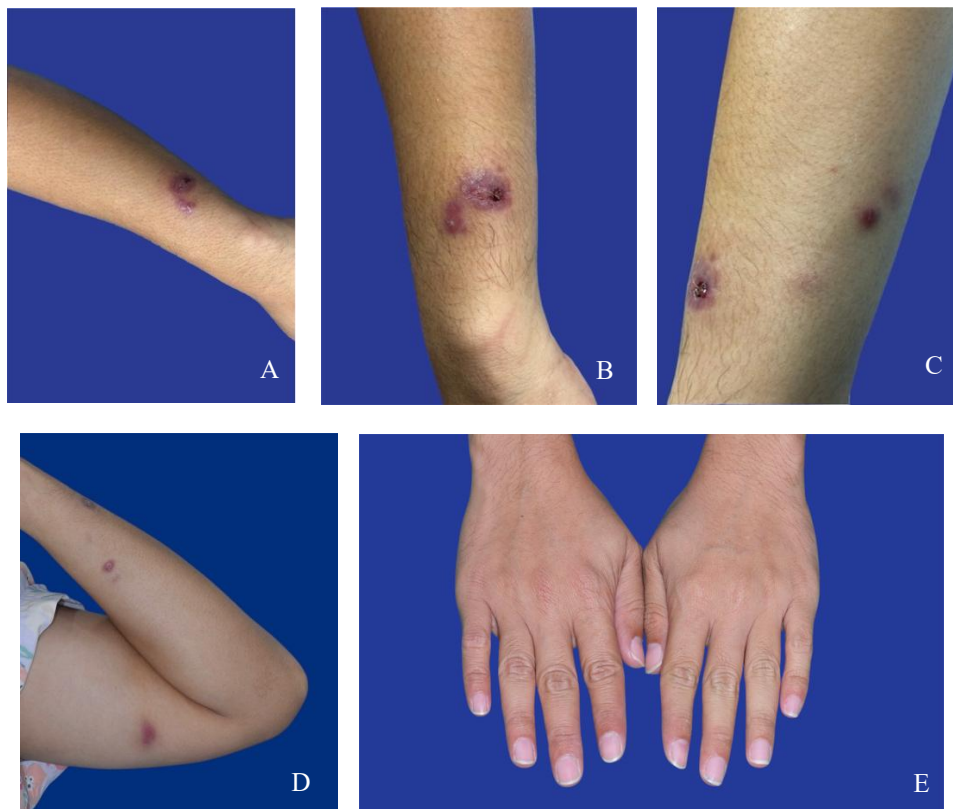


Figure 1 (A-D) Multiple discrete ill-defined erythematous nodules with necrosis on left arm and forearm in sporotrichoid pattern (E) No onychomycosis

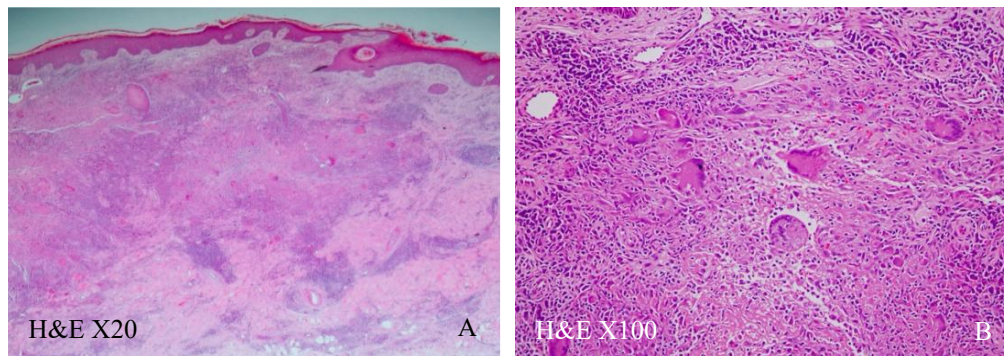


Figure 2 Incisional biopsy from left forearm

A: Dense caseating granulomatous infiltration in the dermis, no microorganism

B: Langerhans giant cell in the dermis

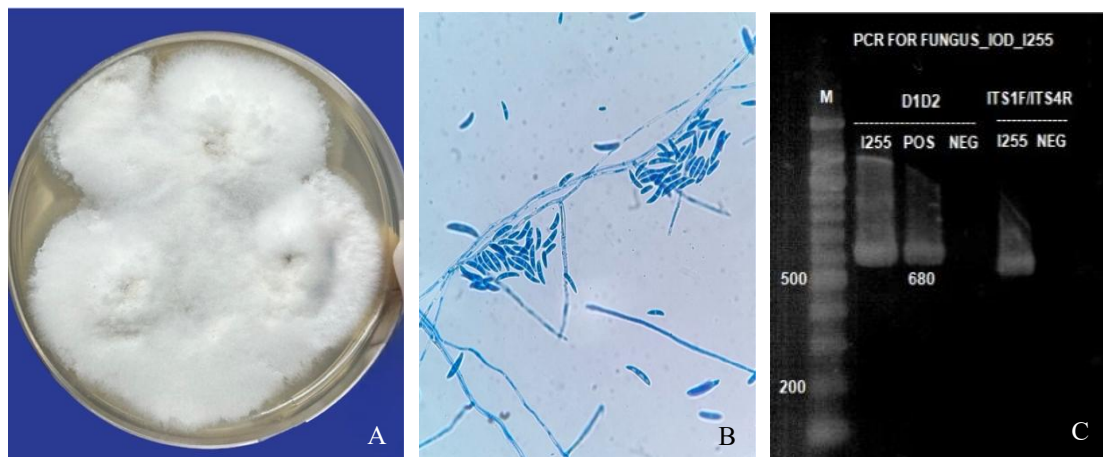


Figure 3

A: Tissue culture revealed white colony

B: Microscopic morphology in Lactophenol cotton blue solution revealed hyaline hyphae with macroconidia (fusiform shape)

C: Electrophoretic pattern PCR of *Fusarium solani*

According to clinical and laboratory results, Additional assessments were performed and anti-HIV showed reactive CD4 74 cell/mm³, and viral load 46,300 copies/ml. He was diagnosed with primary subcutaneous sporotrichoid fusarium infection, and he was treated with intravenous voriconazole for 7 days and then switched to oral voriconazole. Lesions were completely clear after 3 months of oral treatment.

Discussion

Our patient exhibits multiple discrete erythematous nodules with central necrosis on the left arm and forearm in a sporotrichoid pattern. Sporotrichoid or lymphocutaneous lesions, characterized by nodules or ulcers following lymphatic channels, may result from various infectious and non-infectious causes. Infectious etiologies include fungal pathogens such as *Sporothrix schenckii*, dimorphic fungi, and opportunistic molds including *Fusarium*

species; mycobacteria such as *M. marinum* and *M. chelonae*; bacteria such as *Nocardia*, *Francisella tularensis*, *Bartonella henselae*, and *Burkholderia mallei*; and protozoal or viral infections such as *Leishmania* or cowpox virus. Non-infectious causes include foreign body granulomas, neoplasms, and inflammatory disorders such as sarcoidosis. Because of the wide differential diagnosis, accurate microbiological and histopathological examinations are essential. In the present case, *Fusarium solani* was identified as the causative organism, highlighting the importance of considering uncommon fungal infections in sporotrichoid lesions, even among patients without known immunodeficiency.

Fusarium species are important human pathogens responsible for a broad spectrum of infections, ranging from localized cutaneous lesions to disseminated, life-threatening diseases. Although they primarily affect immunocompromised hosts, infections have also been reported in immunocompetent individuals following direct inoculation¹. These filamentous fungi are ubiquitous in soil, plants, air, and various animals such as the ears of cats, claws of dogs, and lobsters^{2,3}. In Thailand, *Fusarium* species account for approximately 12% of pathogenic molds and are the second most common fungal pathogens isolated from immunocompromised patients⁴. Among them, *Fusarium solani* is most frequently implicated in human disease⁵, while *F. proliferatum* has been associated with granulomatous pododermatitis in cats⁶.

Fusariosis can be divided into four clinical forms: superficial infection, keratitis and ocular involvement, deep localized infection, and disseminated infection. Cutaneous involvement is one of the most common manifestations and may represent either primary inoculation or secondary, hematogenous spread. In immunocompetent individuals, lesions usually result from trauma or contact with contaminated material, whereas in immunocompromised

hosts, they often arise from dissemination of the pathogen. Bodey et al. described characteristic cutaneous lesions as erythematous or grayish papules and macules that may progress to necrotic ulcers or ecthyma-like lesions due to vascular invasion. Although our patient was immunocompromised, the infection remained localized, suggesting that the route of entry and degree of local invasion were limited⁷.

Watsky et al. first described disseminated cutaneous fusariosis presenting with sporotrichoid nodules in a patient with leukemia and severe neutropenia, suggesting lymphatic or embolic spread as the mechanism⁸. In our HIV-infected patient, the nodular lesions also followed lymphatic pathways, supporting this route of dissemination. This finding indicates that lymphatic spread of *Fusarium* infection can occur not only in neutropenic patients but also in those with advanced HIV-related immunosuppression. Cutaneous lesions often provide an early clue to the diagnosis of fusariosis, as they are reported as the initial manifestation in approximately 55% of cases⁵. Culture confirmation is required because histopathological findings are often indistinguishable from those of other hyaline molds. In our case, *F. solani* was detected in tissue samples from two separate biopsies and clinical improvement after antifungal therapy supported the diagnosis of true infection rather than contamination.

Interestingly, this infection led to the diagnosis of previously unrecognized HIV infection. *Fusarium* infection is rare in patients with HIV compared to other opportunistic mycoses, such as cryptococcosis or histoplasmosis. Most cases present as cutaneous disease, while disseminated infections occur mainly in those with severe immunosuppression (CD4 <100 cells/ μ L) or concomitant neutropenia. The clinical course is often indolent in localized disease but rapidly progressive in disseminated disease. Immune

recovery with antiretroviral therapy is essential for favorable outcomes⁹.

According to the 2021 Global Guidelines for the Diagnosis and Management of Rare Mold Infections, early diagnosis and prompt antifungal therapy are crucial. Early treatment prevents the dissemination of localized infections. Voriconazole or lipid-based amphotericin B is recommended as first-line treatment, while amphotericin B deoxycholate should be avoided due to nephrotoxicity and poorer outcomes. Amphotericin B remains effective, whereas voriconazole has shown comparable efficacy and better tolerability. Combination therapy may be considered in severe cases, along with surgical debridement and reversal of immunosuppression, when possible. Posaconazole may be used as salvage therapy in refractory cases^{10,11}. The prognosis of fusariosis depends largely on immune status; persistent immunosuppression is associated with high mortality¹⁰. Similarly, a previously reported case from Thailand described a 22-year-old man underlying acute lymphoblastic leukemia who presented with high-grade fever and an ulcer on the right foot then developed of multiple ill-defined erythematous to purpuric indurated nodules on trunk and extremities, with central necrosis with sporotrichoid pattern. In contrast, disseminated fusariosis reported in a patient was associated with a poor outcome despite voriconazole therapy during profound neutropenia pattern¹². However, our case emphasizes the importance of immune recovery as a key determinant of successful treatment outcomes^{5,13}.

In this patient, intravenous voriconazole (6 mg/kg/day) was administered for 7 days, followed by oral voriconazole 400 mg/day. The lesions resolved completely after 3 months of oral therapy. Secondary antifungal prophylaxis is recommended for patients at risk of recurrence, such as those with ongoing or prolonged immunosuppression. Voriconazole is preferred because of its broad-spectrum

antifungal activity and good oral bioavailability. The duration of prophylaxis should be individualized and continued until immune recovery is achieved.

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