

## A Case of Deep Cutaneous Mycosis Caused by *Purpureocillium lilacinum*

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*Purpureocillium lilacinum*, previously known as *Paecilomyces lilacinus*, is a saprophytic fungus typically found in soil and decaying vegetation. Although it is infrequently pathogenic to humans, recent reports of *P. lilacinum* infections, primarily affecting the skin and eyes, have shown an increase. This report details a cutaneous infection caused by *P. lilacinum* in an 89-year-old woman. She presented with a 3-month history of an erythematous patch and nodule on her right forearm. A skin biopsy revealed inflammation, granuloma, and fungal organisms in the dermis. Periodic acid-Schiff (PAS) staining confirmed the presence of fungal elements. The fungal culture of the medium produced colonies with a velvety pink and brown hue. PCR testing on these cultured samples identified *P. lilacinum*. The patient received a 2-week course of oral itraconazole (200 mg/day), which improved her symptoms. However, ongoing antifungal treatment was necessary. Additionally, due to a recent myocardial infarction, the patient required a statin. A MIC test was conducted to identify an antifungal drug compatible with statin therapy.

**Key Words:** Itraconazole, *Purpureocillium lilacinum*, Statin interaction

### INTRODUCTION

*Purpureocillium lilacinum*, formerly *Paecilomyces lilacinus*, is a saprophytic fungus commonly found in soil and decaying plants<sup>1</sup>. Although it is rarely pathogenic to humans, there have been a recent increases in reported cases of *P. lilacinum* infections<sup>1</sup>. This describes a case of deep cutaneous mycosis caused by *P. lilacinum* in a farmer. The intent of this work is to raise awareness about such infections, especially among immunocompetent patients, and aid in selecting appropriate antifungal agents.

### CASE REPORT

An 89-year-old woman, who worked as a farmer in a rural area, presented with a 3-month history of an erythematous patch and crusted nodule on her right forearm (Fig. 1) that developed after she was injured by a bamboo thorn. Initial treatment with steroids for allergic contact dermatitis worsened her symptoms. A 10% potassium hydroxide smear of a cutaneous scraping was negative. A right lower arm biopsy revealed diffuse inflammatory cell infiltration, granulomatous lesions, and fungus-like organisms with H&E

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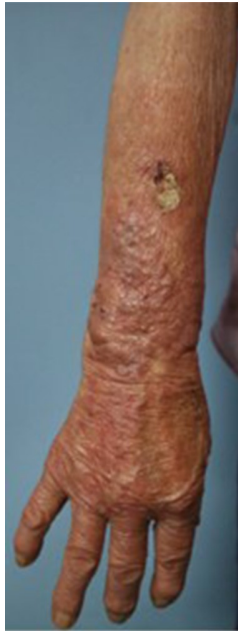


Fig. 1. The skin lesion consisted of erythematous patch with surface nodularity and yellowish crust on right forearm.

Table 1. MIC test result

Anti-fungal agent	Minimum inhibitory concentration
Amphotericin B	>16
Anidulafungin	>4
Caspofungin	>4
Flucytosine	>64
Fluconazole	>64
Itraconazole	>16
Micafungin	>4
Posaconazole	>16
Voriconazole	>0.5

staining (Fig. 2-A). PAS staining was positive (Fig. 2-B), while AFB staining was negative. Gram staining, bacterial culture, and AFB culture all returned negative results.

Fungal culture on Sabouraud's medium for 1 week showed light velvet pink and white colonies (Fig. 2-C), with the reverse side brown and darker at the center (Fig. 2-D). The Department of Laboratory Medicine confirmed these findings. Fungal PCR testing using the MALDI-TOF MS method

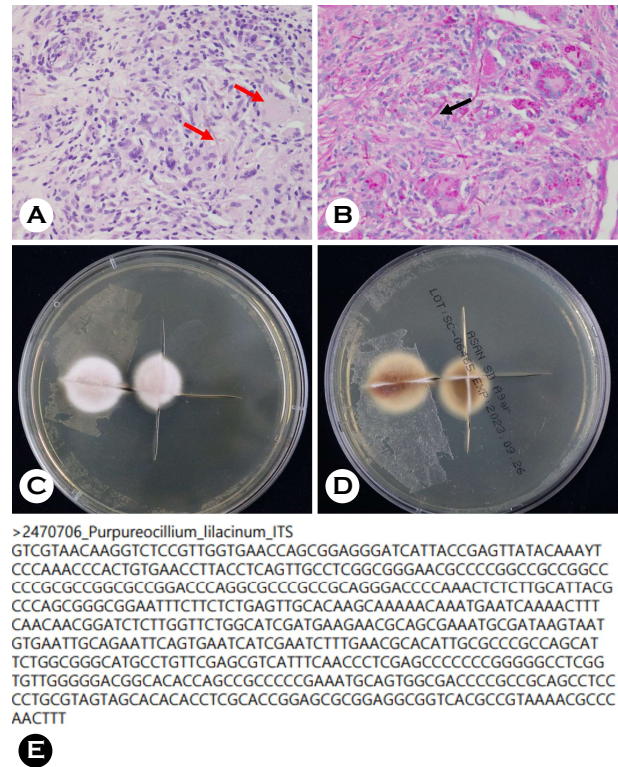


Fig. 2. (A) Granulomatous changes (right arrow) and fungus-like organisms (left arrow) were seen in the dermis (H&E, ×400). (B) Fungal hyphae were found among the inflammatory cells upon periodic acid-Schiff staining (×400). (C) Light velvet pink and white colonies grew after a week of incubation on Sabouraud's media. (D) The reverse was dark brown. (E) Internal transcribed spacer (ITS) sequence of the rRNA gene was used to identify *Purpureocillium lilacinum*.

identified the organism as *P. lilacinum* (Fig. 2-E), ultimately diagnosing deep cutaneous mycosis caused by *P. lilacinum*. Oral itraconazole (200 mg/day for two weeks) was prescribed.

Subsequently, the patient was lost to follow-up but later admitted to the cardiology department due to NSTEMI. While her skin lesion showed significant improvement, continued antifungal treatment was necessary. Itraconazole, contraindicated with statins and potentially leading to heart failure in some cases, necessitated MIC tests for alternative drugs. Voriconazole had the lowest MIC score (Table 1). However, as azole antifungals are contraindicated with statins, echinocandins like caspofungin or micafungin were considered suitable alternatives, pending *P. lilacinum* detection; however, the patient was lost to follow-up.

**Table 2.** Clinical features of cutaneous *Purpureocillium lilacinum* infection in Korean literature

Authors	Age/Sex	Symptoms	Risk factors	Treatment
Cho et al. <sup>5</sup>	19/M	Cheek: Erythematous patch	–	Griseofulvin, Ketoconazole
Shin et al. <sup>6</sup>	46/M	Forearm: Erythematous nodules	Renal transplantation	Excision
Ko et al. <sup>7</sup>	83/M	Wrist: Erythematous plaque	Farmer	Itraconazole
Hwang et al. <sup>8</sup>	81/M	Hand: Erythematous plaque and pustules	–	Itraconazole
Jung et al. <sup>9</sup>	72/M	Shoulder: Erythematous plaque	–	Itraconazole → Voriconazole
Kwak et al. <sup>10</sup>	81/M	Hand: Erythematous pustular plaque	Farmer	Itraconazole
Ha et al. <sup>11</sup>	72/F	Forehead: Erythematous and scaly patch	–	Itraconazole
Jung et al. <sup>3</sup>	84/M	Forearm: Erythematous papules and patch	Injury from farming tool Farmer	Itraconazole
Jin et al. <sup>12</sup>	72/F	Forehead: Erythematous and scaly patch	–	Itraconazole → Posaconazole
Present case	89/F	Forearm: Erythematous patch and nodule	Injury from bamboo thorn Farmer	Itraconazole

## DISCUSSION

*P. lilacinum*, a saprophytic fungus typically found in soil and decaying plants, is rarely pathogenic to humans. However, there has been a recent uptick in *P. lilacinum* infections, predominantly affecting the skin and eyes. Skin infections manifest as patches, plaques, vesicles, pustules, nodules, and crusts, often accompanied by pain, pruritus, and tenderness. These lesions frequently occur in exposed areas like the face, arms, and legs, typically linked to trauma.

Immunosuppressive conditions such as diabetes mellitus, transplantation, malignancy, and the use of immunosuppressive drugs are known risk factors for *P. lilacinum* infection. However, soil exposure, trauma, and an agricultural lifestyle can also be risk factors in immunocompetent hosts. Several cases among farmers have been reported in Korea<sup>2,3</sup>.

Diagnosis of *P. lilacinum* considers the patient's history, symptoms, clinical features, and occupational background. Diagnosis is primarily confirmed through culture results and microscopic findings. When cultured on Sabouraud's dextrose agar, *P. lilacinum* colonies grow rapidly within 14 days. While they initially appear white, over time they turn to shades of white to vinaceous or velvet pink with shallow wrinkles. The reverse side may display a vinaceous color but can also be brown or dark brown. To rule out contamination, recom-

mendations are to culture samples in at least two media and comparing the results. Common biopsy findings include inflammation, granuloma, and fungal organisms. Molecular approaches, such as small subunit ribosomal sequence analysis, aid in more accurate fungal identification.

There is no consensus on empirical antifungal drugs for *P. lilacinum* infection; therefore, conducting a MIC test is advisable. Treatments include surgical debridement and systemic antifungal agents. However, the lack of established treatment guidelines underscores the importance of relevant case reports (Table 2). In many cases, Amphotericin B, flucytosine, and fluconazole have shown high resistance<sup>4</sup>. Itraconazole, despite its varied MIC values is commonly administered, and most patients improve clinically. Azole antifungals were initially used in this case, leading to clinical improvement; however, her recovery was incomplete. Due to drug-drug interactions with statins, echinocandin therapy, such as caspofungin or micafungin, was considered. Despite being lost to follow-up; this case provides valuable insights for future treatment of *P. lilacinum* infections in patients with cardiovascular conditions. Posaconazole and voriconazole—showing the lowest MIC in many cases—should be considered for cases unresponsive to itraconazole. There have been successful reports of treating *P. lilacinum* skin infections with voriconazole<sup>9,13</sup>.

## CONCLUSION

Korean cases of *P. lilacinum* included lesions concentrated on exposed areas such as the face and arms, and there have been many infections in farmers<sup>2,5</sup>. Similar to this case, there were many cases of treatment starting with itraconazole and being ultimately curative<sup>14</sup>. However, there was a case in which voriconazole resulted in clinical improvement after none had been seen over 14 weeks of itraconazole administration<sup>9</sup>. In conclusion, the initial treatment should be itraconazole in patients with confirmed *P. lilacinum* infections. If the treatment response is unclear, it is necessary to consider switching the drug according to the MIC test. Therefore, if the MIC test is impossible, take Posaconazole or Voriconazole empirically.

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## CONFLICT OF INTEREST

In relation to this article, we declare that there is no conflict of interest.

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## PATIENT CONSENT STATEMENT

The patient provided written informed consent for the publication and the use of her images.

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