CASE REPORT

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A Case of Cutaneous *Purpureocillium lilacinum* Infection Looking like Psoriasis

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Purpureocillium lilacinum is a saprophytic fungus with a ubiquitous environmental distribution, and it can be detected in soil samples and decaying materials worldwide. It has been reported as an emerging pathogen in both immunocompromised and immunocompetent patients, showing various cutaneous presentations. Herein, we report a case of a patient with a localized cutaneous *P. lilacinum* infection, which resembles the skin lesions of psoriasis. A 72-year-old female was presented with a peripherally spreading, well-demarcated, asymptomatic, scaly, erythematous patch on her forehead for several months. Histopathological examination showed pinkish septated fungal elements and mixed inflammatory and granulomatous infiltrates in the dermis. Furthermore, a fungal culture on potato dextrose agar showed gray, velvety colonies with light yellow background after being subcultured. Phialides with chains of oval conidia were observed on lactophenol cotton blue staining. The ITS region of rRNA gene sequence obtained from the colony was identical to that of *Purpureocillium lilacinum*. The lesion was resolved with oral itraconazole (200 mg/day) after four months of treatment.

Key Words: Cutaneous infection, Psoriasis, *Purpureocillium lilacinum*

INTRODUCTION

Purpureocillium lilacinum, which was previously known as *Paecilomyces lilacinus*, is a ubiquitous, saprobic filamentous fungus commonly isolated from soil, decaying vegetation, insects, nematodes, and laboratory air (as a contaminant)[1]. In recent studies, it has been reported as an emerging pathogen in both immunocompetent and immunocompromised patients[2], commonly causing ocular and subcutaneous infections[3]. Cutaneous *P. lilacinum* infections have various clinical manifestations, such as small erythematous papules, plaques with central umbilication, or hemorrhagic vesicles or ulcerations[4]. However, no standard antifungal treatment regimen has been established, so several systemic antifungal agents and surgical excision are used[5,6]. Herein, we encountered a rare case of cutaneous *P. lilacinum* infection, which resembles the skin lesions of psoriasis in a healthy immunocompetent patient.

CASE REPORT

A 72-year-old female was presented with a peripherally

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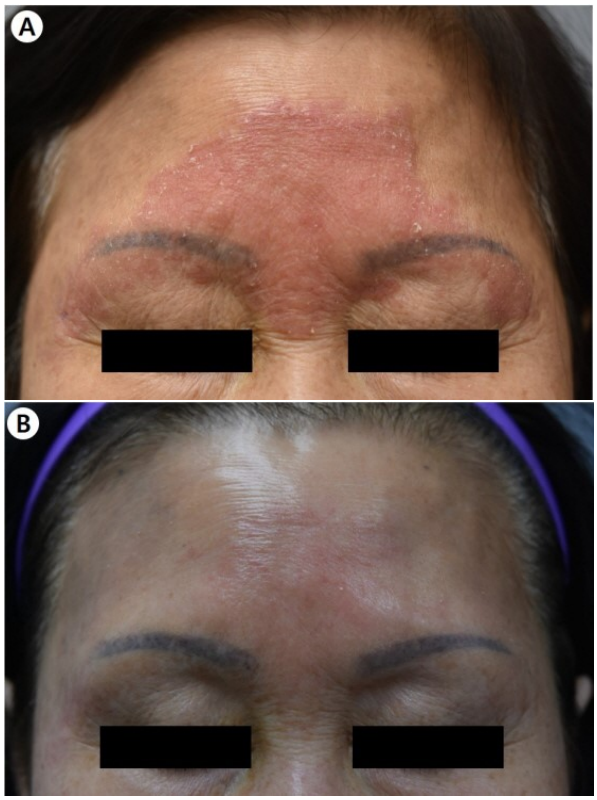

Fig. 1. (A) Well-demarcated erythematous scaly patch on the forehead (B) The lesion was almost resolved after 16 weeks of treatment.

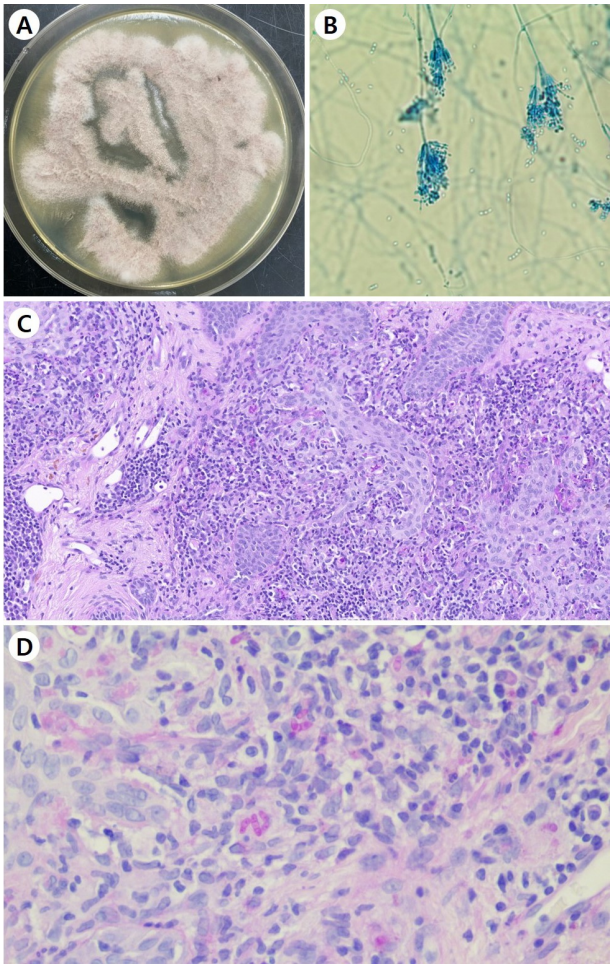

Fig. 2. (A) Gray, velvety colonies with a light yellow background (B) Phialides with chains of oval conidia (lactophenol cotton blue staining, ×400) (C, D) Histopathologic findings show septated fungal elements and mixed inflammatory and granulomatous infiltrates in the dermis (D-PAS, ×200, ×400).

spreading, well-demarcated, asymptomatic, scaly, erythematous patch on her forehead for several months (Fig. 1A). The patient was not immunocompromised, and laboratory test results, including complete blood count and blood chemistry, were within the normal range. She was diagnosed with psoriasis and tinea faciei on her first hospital visit. Although she was treated with oral steroid and anti-histamine medication and topical steroid for three weeks for psoriasis, her skin lesions did not improve. Fungal culture, lactophenol cotton blue staining, skin biopsy, and ribosomal RNA (rRNA) sequencing were done. The fungal culture on potato dextrose agar showed gray, velvety colonies with light yellow background after being subcultured (Fig. 2A). Phialides with chains of oval conidia were observed on lactophenol cotton blue staining (Fig. 2B). Periodic acid-Schiff with diastase (D-PAS) staining revealed pinkish septated fungal elements and mixed inflammatory and granulomatous infiltrate in the dermis (Fig. 2C). Based on sequence analysis of the internal transcribed spacer region of rRNA gene, *P. lilacinum* (Table 1) was identified using the GenBank Basic Local Alignment Search Tool (BLAST). The GenBank BLAST search revealed 100% (963/963 bp) similarity with 126 *P. lilacinum* strains. Therefore, the final diagnosis was cutaneous *P. lilacinum* infection. The patient was treated with oral itraconazole (200 mg/day) for four months. Most of the skin lesions were improved after 16 weeks of treatment (Fig. 1B).

DISCUSSION

P. lilacinum is a fungal pathogen found in soil and decaying vegetation. Although *P. lilacinum* infections primarily occur in immunocompromised patients, it is considered an emerging

Table 1. Internal transcribed spacer (ITS) sequence of the rRNA gene used to identify *Purpureocillium lilacinum*

ITS sequence
ATCATTACCGAGTTATACAACTCCCAAACCCACTGTGAACCTTACCTCA-GTTGCCTCGGCGGGGAACGCCCCGGCCGCCTGCCCC CGCGCCGGCGCCGGACCCAGGCGCCCGCCGCAGGGACCCCAAACTCTCTTGCA-TTACGCCCAGCGGGCGGAATTTCTTCTCT GAGTTGCACAAGCAAAAACAAATGAATCAAAACTTTCAACAACGGATCTCTTGGTTCTGGCATCGATGAAGAACGCAGCGAAA TGCGATAAGTAATGTGAATTGCAGAATTCAGTGAATCATCGAATCTTTGAACGCACATTGCGCCCGCCAGCATTCTGGCGGGCAT GCCTGTTCGAGCGTCATTTCAACCCTCGAGCCCCCCCGGGGGCCTCGGTGTTGGGGGACGGCACACCAGCCGCCCCCGAAAT GCAGTGGCGACCCCGCCGCAGCCTCCCCTGCGTAGTAGCACACACCTCGCACCGGAGCGCGGAGGCGGTCACGCCGTAAAA CGCCCAACTTTCTTAGAGTTGACC.

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

Author	Age/ Sex	Cutaneous presentation	Location	Immune status	Predisposing factor	Treatment
Cho et al.[9]	19/M	Erythematous patch	Cheek	Immunocompetent	None	Griseofulvin, Ketoconazole
Shin et al.[10]	46/M	Erythematous nodules	Forearm	Immunocompromised	Renal transplantation	Excision
Ko et al.[11]	83/M	Erythematous plaque	Wrist	Immunocompetent	None	Itraconazole
Hwang et al.[12]	81/M	Erythematous plaque and pustules	Hand	Immunocompetent	None	Itraconazole
Jung et al.[13]	72/M	Erythematous plaque	Shoulder	Immunocompetent	None	Itraconazole, Voriconazole
Kwak et al.[14]	81/M	Erythematous pustular plaque	Dorsal hand	Immunocompetent	None	Itraconazole
Kim et al.[15]	85/F	Erythematous plaque	Forearm, dorsal hand	Immunocompetent	None	Itraconazole, Terbinafine
Jung et al.[16]	84/M	Erythematous papules and patch	Forearm	Immunocompetent	Injury from hoe	Itraconazole
Present case	72/F	Erythematous patch	Forehead	Immunocompetent	None	Itraconazole

disease in immunocompetent patients as well[8]. Skin infections caused by *P. lilacinum* are very rare, and only eight cases have been reported in Korean literature (Table 2)[9-16]. The present case was a case of cutaneous *P. lilacinum* infection in an immunocompetent patient who was initially diagnosed with psoriasis and tinea faciei.

The predisposing factors of cutaneous *P. lilacinum* infections are malignancy, solid and bone marrow transplantation, long-term glucocorticoid use, and other immunosuppressed conditions[4]; however, several cases occurring in immunocompetent patients have also been reported. Among the 42 reported cases of cutaneous and subcutaneous *P. lilacinum* infections reported in Korean journals from 1977 to 2004, eight cases (18.6%) had no predisposing factors[8]. Furthermore, six of the eight (75.0%) patients showed no risk factors for infection, and seven of the eight (87.5%) patients were immunocompetent. Interestingly, the average age of the eight patients was 69.2±22.4 years old, and six of the eight (75.0%) patients were older than 70 years old, which implies that old age possibly has a significant relationship with cutaneous *P. lilacinum* infections. In this case, the patient was a 72-year-old healthy woman who had no underlying diseases and medication history that would suggest an immunocompetent status.

Cutaneous *P. lilacinum* infections could manifest clinically as various skin lesions, such as patches, plaques, vesicles, pustules, nodules, and crusts[7]. This infection primarily involves exposed areas, such as the face, arms, and legs[14]. Among the

eight patients reported in Korean journals, seven cases had lesions in the upper extremities, including the hand, forearm, and shoulder, and one experienced a clear preceding trauma. Only one out of the eight cases had a lesion involving the face. Our patient showed a well-demarcated erythematous scaly patch on the forehead, and this cutaneous finding led to the initial diagnosis of psoriasis and tinea faciei. After the treatment failure for these diagnoses, fungal cultures, histologic studies, and rRNA gene sequencing were conducted, and the diagnosis of cutaneous *P. lilacinum* infection was confirmed.

The standard treatment for cutaneous *P. lilacinum* infections is not yet established, and the treatment is often challenging[8]. This fungus is highly resistant to conventional antifungal agents, including amphotericin B, fluconazole, and flucytosine, and the results of its *in vitro* susceptibility tests to itraconazole are conflicting[17,18]. In contrast, terbinafine or triazole antifungal agents, such as voriconazole, ravuconazole, and posaconazole, broadly showed a low level of minimum inhibitory concentration based on their *in vitro* susceptibility tests[14]. In the cases reviewed here, including the present case, five patients were successfully treated with itraconazole monotherapy and improved clinically, whereas two patients who showed resistance to this treatment required a combination therapy with voriconazole and terbinafine, respectively[11-16]. One patient was treated with ketoconazole combined with griseofulvin[9], and one patient was treated with skin lesion excision[10].

Briefly, we report a case of a localized cutaneous *P. lilacinum* infection in a healthy patient with no underlying diseases and with clinical manifestations similar to psoriasis. Thus, it is important to suspect this atypical and rare fungal infection when a patient shows a poor treatment response. This study also provides a literature review of cutaneous fungal infections caused by *P. lilacinum* in Korea.

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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 publication and use of her images.

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