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***Purpureocillium lilacinum* Tattoo-Related Skin Infection in a Kidney Transplant Recipient**

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Abstract

Purpureocillium lilacinum is an emerging pathogenic mold among immunocompromised hosts that causes cutaneous infections related to skin-breakdown. We present the first reported case of *P. lilacinum* tattoo-related skin infection. A kidney transplant recipient recently treated for acute cellular rejection presented with skin papules overlying a tattoo. Diagnosis was confirmed on culture, histology, and 18s ribosomal RNA PCR. The morphological features on culture characteristic of *P. lilacinum* included violet colonies on malt extract agar, long tapering brush-like phialides, and elliptical conidia attached in chains. *P. lilacinum* has intrinsic resistance to many antifungal agents including amphotericin B, but voriconazole and posaconazole have good in-vitro activity. The patient was treated with voriconazole with subsequent resolution of the papules after three months of therapy.

Keywords

Purpureocillium; *Paecilomyces*; solid organ transplant; tattoo

Case Report

A 33-year-old male presented with an eruption of papules overlying a tattoo on his left forearm. The patient had a history of end-stage renal disease from polycystic kidney disease and underwent kidney transplantation a year prior to presentation. Seven months after transplant, he was treated for acute cellular rejection with plasmapheresis, rituximab, and bortezomib. He received the tattoo two months after his rejection episode and the papules appeared three months later. There was no pain, pruritus, or purulence associated with the papules. Over the course of a month, the papules spread from his tattoo to his right ankle and left shin.

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Given the rash's progression, the patient presented to dermatology for further evaluation. He denied any fevers, chills, drenching sweats, cough, shortness of breath, headaches, or vision changes. On examination, temperature was 97.1°F, pulse rate 70 beats per minute, blood pressure 130/72, and respiratory rate 18 breaths per minute. On skin examination, the patient had several 5 mm dome-shaped pink papules clustered over his tattoo (Figure 1). Similar lesions were found on his right ankle and left shin. Laboratory results included a white blood cell count of 3,400 cells/ μ L with a differential count of 73% polymorphs, 15% lymphocytes, and 9% monocytes. His creatinine was at his baseline level of 1.49 mg/dL. A magnetic resonance imaging of the brain and a computed tomography of the chest, abdomen, and pelvis were normal.

Skin biopsies of the left forearm, right ankle, and left shin were performed. The hematoxylin and eosin stain showed a granulomatous infiltrate with neutrophils. Fungal hyphae were identified on the Grocott's methenamine silver stain (Figure 2). Wooly colonies with a faint violet color grew on brain heart infusion agar supplemented with blood (Figure 3). A lactophenol cotton blue stain demonstrated septate hyphae with delicate brush-like phialides attached to chains of conidia (Figure 4). Based on the violet colonies and the conidiophore morphology, the patient was diagnosed with a *Purpureocillium lilacinum* tattoo-related cutaneous infection. The diagnosis was confirmed with 18S ribosomal RNA testing of the tissue culture performed in house. He was treated with voriconazole and his skin papules resolved after three months of therapy (Figure 5).

Discussion

Purpureocillium lilacinum, formally known as *Paecilomyces lilacinus*, is an emerging pathogenic mold found worldwide in soil and decaying vegetation [1–3]. The most common portals of entry include skin breakdown, inhalation, and medical instrumentation [2, 3]. Multiple hospital-acquired *P. lilacinum* infections have been traced to contaminated medical supplies, including lotions and catheters [4–7]. In our patient, it is assumed the tattoo needle or ink was contaminated, leading to the direct inoculation of *P. lilacinum* into the dermis. This is the first report of a *P. lilacinum* tattoo-related skin infection reported in the literature.

P. lilacinum can cause severe disease in both immunocompetent and immunocompromised hosts. Among immunocompetent hosts, the most common clinical presentations are ocular infections (keratitis and endophthalmitis) related to ophthalmic surgery and non-surgical trauma [2, 3]. In immunocompromised hosts, cutaneous and subcutaneous infections are the most common clinical manifestations [2, 3]. *P. lilacinum* cutaneous infections can present as macules, vesicles, pustules, nodules, and necrotic lesions [2, 3]. Other types of *P. lilacinum* infections include sinusitis, otitis media, pneumonia, endocarditis, catheter-related fungemia, osteomyelitis, and vaginitis [2, 3]. Our patient was at risk of acquiring a *P. lilacinum* infection secondary to his immunocompromised state related to his kidney transplant and recent treatment for acute cellular rejection.

Diagnosis depends on the identification of *P. lilacinum* on tissue culture and histology [2, 3]. *P. lilacinum* is an anamorphic fungus with septate, non-pigmented hyphae when visualized in tissue [2]. Other hyalohyphomycosis agents include *Fusarium*, *Pseudoallescheria*, and

Scedosporium [2]. A distinguishing feature of *P. lilacinum* is its ability to produce violet colonies on malt extract agar (the origin of its name) [2, 3]. On microscopic evaluation, the conidiophore has delicate phialides with long tapering necks arranged like a paintbrush and elliptical conidia attached in chains at the ends [2, 3]. Since *P. lilacinum* can sporulate in tissue, a feature called “adventitious sporulation,” a diagnosis can be made if the characteristic phialides and conidia are identified on histology [3]. In our patient, the fungal infection likely spread from the tattoo to the lower extremities via adventitious sporulation. *P. lilacinum* can also be identified using molecular techniques including real time PCR and species-specific primers [8].

For the treatment of *P. lilacinum* infections, an important feature to consider is its intrinsic resistance to many antifungal agents. Amphotericin B, echinocandins, and itraconazole have MICs greater than 16 mg/L against many *P. lilacinum* isolates [9]. In contrast, voriconazole and posaconazole have good in-vitro activity with MICs ranging from 0.12–8 mg/L and 0.03–1 mg/L, respectively [9]. All case reports on the successful treatment of *P. lilacinum* cutaneous infection have used voriconazole, but it is likely posaconazole would also be effective given its low MICs in-vitro [10].

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Figure 1.
Skin papules overlying tattoo.

Figure 2.
(a) Hematoxylin and eosin stain of skin biopsy. (b) Grocott's methenamine silver stain of skin biopsy.

Figure 3. Crustose colonies with faint violet color on brain heart infusion agar supplemented with blood.

Figure 4.
Lactophenol cotton blue stain of culture.

Figure 5.
Resolution of papules after three months of voriconazole.