ORIGINAL RESEARCH PAPER
Volume - 13 | Issue - 04 | April - 2024 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

"PURPUREOCILLIUM LILACINUM UNMASKED: THE ELUSIVE FUNGUS BEHIND SKIN MYSTERIES IN HEALTHY WARRIORS!"

Clinical Microbiology

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ABSTRACT

Purpureocillium lilacinum, formerly *Paecilomyces lilacinus*, is an ubiquitous hyaline hyphomycete frequently found in soil, decaying vegetation but is considered as an emerging human pathogen. It mainly affects immunocompromised or those who have undergone surgical procedures. Clinical cases caused by *P. lilacinum* are often difficult to treat because of the intrinsic resistance of the fungus to conventional antifungal agents and its variable susceptibility to novel triazoles. In immunocompetent hosts, infections caused by this fungus are very unusual and mainly involve skin. Here in we present a case series of cutaneous infection due to *P. lilacinum* in an apparently immunocompetent patients with no co-morbidities.

KEYWORDS

Immunocompromised, Fungal Infections, Cutaneous Infection

INTRODUCTION

Purpureocillium lilacinum, formerly known as *Paecilomyces lilacinus*(1) is not often highlighted as a potential source of fungal infections on the skin. It primarily affects people who are immunocompromised, or have recently undergone surgery, where it can lead to a variety of illnesses (2). As *P.lilacinum* is intrinsically resistant to traditional antifungal drugs and has a varied response to new triazoles, treating clinical cases caused by this fungus can be challenging(2,3).

There have been documented outbreaks of infections linked to skin lotions and sterilised sodium bicarbonate solution because this fungus may be resistant to sterilising procedures. In both immunocompetent and immunocompromised patients, *P. lilacinum* can cause a wide range of clinical symptoms, from superficial mycoses to potentially fatal systemic infections(4).

Treatment can be difficult, especially for people with impaired immune systems, and diagnosis is often misleading(5). *Paecilomyces variotii and Paecilomyces lilacinus* are the two species most commonly linked to human illness (6).Other species reported to infect humans occasionally are *Paecilomyces marquandii* (7,8) and *Paecilomyces javanicus*(9).

We describe three instances of immunocompetent patients, with a history of trauma, with skin and subcutaneous tissue involvement.

1) First Case

A thirty-three-year-old serving soldier, known case of hypothyroidism for four years (on medication) presented with complaints of red raised lesions over right forearm for 2 months associated with mild itching, oozing, crusting of fluid filled **(Figure 1).** He had no history of fever, redness of eyes, nasal stuffiness, drug intake prior to appearance of lesion.

Dermatological examination revealed involvement of right forearm in form of well defined, discrete, erythematous plaque, largest measuring – 5*5 cm over forearm. The plaque was hypoesthetic to touch, pain, temperature. Histological examination of investigation of lesion (left) thumb revealed granulomatous dermatitis **(Figure 2).** Direct examination of KOH mount revealed numerous, hyaline and septate hyphae. At 25°C and 37°C, a Sabouraud dextrose agar medium was used to cultivate fungi from a skin biopsy sample. It showed suede like, floccose, lilac- colored colonies obtained after 12 days **(Figure 3).** Microscopic examination of lactophenol cotton blue mounts of portions of the colonies showed hyaline, slender, septate hyphae with branching. Long conidiophores bearing branches with densely clustered phialides was seen **(Figure 4).** The growth after 12 days was subjected to Matrix assisted laser desorption ionization- time of flight mass spectrometry (MALDI- TOF MS) and was identified as *Paecilomyces lilacinum* with 99.9% accuracy within fifteen minutes. Patient was started on oral voriconazole and responded well to treatment **(Figure 5).**

Figure-1- Red raised lesion with crusting and oozing of fluid filled

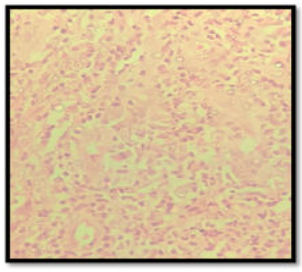

Figure-2- Granulomatous Dermatitis

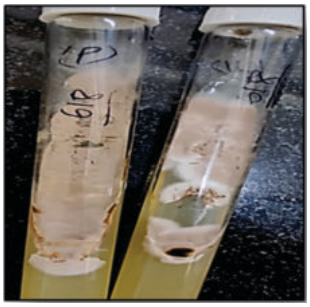

Figure-3- Suede like, floccose, lilac-colored colonies.

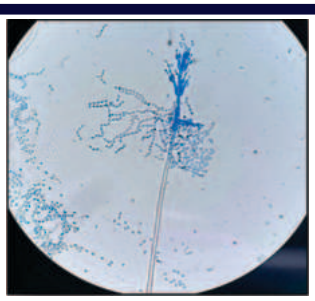

Figure- 4- Hyaline, slender, septate hyphae with branching. Long conidiophores bearing branches with densely clustered phialides.

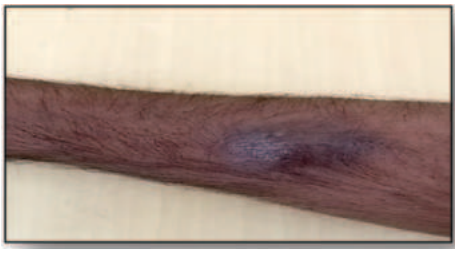

Figure- 5- Healed lesion

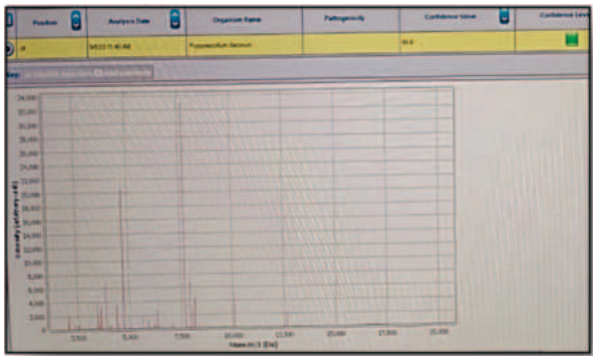

Figure- 6- Paecilomyces lilacinum with 99.9% accuracy on MALDI-TOF MSF

2) Second Case

A twenty-six-year-old serving soldier, with no co-morbidities presented with complaint of red scaly lesion over right forearm for 3 months with history of suspicion of insect bite/injury while cutting grass. He developed itchy scaly papule, which increased locally to 3-4 in number over a period of six months. He had no history of fever, night sweats, cough and weight loss. Histological examination of skin biopsy revealed features of Tuberculosis Verrucosa cutis, however, Zn stain was negative. On fungal culture growth was obtained after 02 weeks of incubation at temperature of 25°C yielded suede like, floccose, lilac- colored colonies obtained. LPCB showed the features of *Paecilomyces*, which was confirmed by MALDI-TOF MS **(Figure 6).** Patient was managed with oral voriconazole and responded well to the treatment.

3) Third Case

A sixty-four-year-old lady presented with a two-week history of erythematous plaques with surface nodularity and eczematoid whitish crusts on her left forearm and dorsal hand. She is a farmer by occupation. There was no history of fever, trauma, travel or any contact with animals. Histological examination of skin biopsy revealed granulomatous changes, including neutrophils, histiocytes, plasma cells and giant cells in the dermis.

On fungal culture growth was obtained after twelve days of incubation at 27°C which yielded suede like, floccose, lilac- colored colonies. LPCB showed features of *Paecilomyces*, which was confirmed by MALDI-TOF MS. Patient was treated with oral voriconazole and responded well to the treatment.

DISCUSSION

Purpureocillium lilacinus is a hyaline hyphomycete that is often present in soil and air worldwide and can infect people with both weakened and healthy immune systems. *P. lilacinus* infections frequently result in keratitis, subcutaneous tissue infections, and onychomycosis, particularly in patients with impaired immune systems(10). This case series demonstrates how this fungus and traumatic events are related. There aren't any studies related to this fungus which shows trauma as a risk factor.

Phialides, which have long chains of ovoid conidia branching freely into a brush-like structure and are inflated toward the base but taper toward the tip, are the main microscopic feature that characterises the genus(11).On histologic sections, *Paecilomyces* can be mistaken for *Fusarium, Pseudallescheria*, or even *Aspergillus*(12). Clinical significance arises from the need to distinguish between *Paecilomyces* species because of their varying susceptibilities to antifungal medications(13). In contrast to the fungistatic effects of amphotericin B and itraconazole, voriconazole was recently demonstrated to exhibit fungicidal action against *P. lilacinus*(14).

CONCLUSION

Infections by this fungus are still extremely uncommon in immunocompetent hosts, despite *P. lilacinum* being recognised as an important pathogen. For cutaneous *P. lilacinum* infections, there is no established antifungal treatment protocol, voriconazole, however, proved to be the remedy for our patients. *Paecilomyces* infections may need to be treated with several rounds of antifungal medication, frequently combined with surgical debridement. Due to the fact that it resembled *Penicillium* and was challenging to differentiate between the two without specific understanding of fungal taxonomy, advanced modality like MALDI-TOF MS can be utilized for diagnosis.

Our case series has a history of trauma, which may have served as a conduit for infection. Our intention is to increase knowledge about this organism and outline the difficulties in managing it.

Consent

The consent was taken from the patients before taking the clinical data.

Funding

This study did not receive funding from third parties.

Conflicts of interest

The authors declare no conflict of interest.

Ethical Approval

The study was approved by Institutional Ethics Committee

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