Pulmonary Infection by *Chrysosporium* Species in a Preexisting Tuberculous Cavity

Abstract

We report a case of pulmonary disease due to *Chrysosporium* species in a preexisting tuberculous cavity in an immunocompromised male patient. The fungus was isolated from broncheoalveolar lavage fluid. The fungus was repeatedly isolated in culture, and the patient recovered with anti-tuberculosis treatment. Although the members of the genus *Chrysosporium* are common soil saprobes, they can occasionally cause systemic infections.

Keywords: *Chrysosporium, pulmonary colonization, tuberculous cavity*

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Introduction

Fungal infections of the lung are less common than bacterial and viral infections and are very difficult for diagnosis and treatment purposes. Their virulence varies from causing no symptoms to death. Out of more than 1 lakh species, only a few fungi cause human infection and the most vulnerable organs are the skin and lungs. It is a major cause of morbidity and mortality in immunocompromised patients. The incidence of many fungal lung infections has increased over the past few decades due to the widespread use of immunosuppressive chemotherapy and the increasing incidence of HIV infection.

Members of the genus *Chrysosporium* are common soil saprobes, many of which are keratinophilic fungi involved in the breakdown of shed keratinous substrates. It belongs to the Phylum *Ascomycota*, Order *Onygenales,* and Family Onygenaceae. The genus *Chrysosporium* contains several species. The most common ones are *Chrysosporium keratinophilum*, *Chrysosporium tropicum*, *Chrysosporium medarium*, *Chrysosporium inops*, *Chrysosporium queenslandicum* and *Chrysosporium zonatum*. Another species of special interest classified as *Emmonsia parva* on the ecological basis is occasionally named as *Chrysosporium parvum* as well. *Chrysosporium* species may cause skin infections and onychomycosis in humans. In addition to these superficial infections, *Chrysosporium* species have occasionally been isolated from systemic infections in bone marrow transplant recipients and patients with chronic granulomatous disease (CGD). The high mortality rate of systemic *Chrysosporium* infections is noteworthy. These fungi are encountered occasionally in the diagnostic laboratory predominantly as contaminants of cutaneous or respiratory specimens. They mimic true dermatophytes or the dimorphic pathogens. In humans, there are only rare reports of deep infection caused by the species of *Chrysosporium*. We report a case of pulmonary infection of *Chrysosporium* species.

Case Report

A 61-year-old male patient presented with complaints of cough with expectoration for the past 6 months and intermittent fever for 20 days. The patient was a known diabetic, smoker, and alcoholic. Initial chest X-ray revealed segmental consolidation in the right lower zone. The patient failed to respond to ceftriaxone, clindamycin, and ofloxacin. Chest X-ray repeated after 1 week showed bilateral consolidation. Computed tomography scan revealed a thick walled cavity in the apical segment of the right lower lobe [Figure 1]. Although the Mantoux test was positive, sputum smear for acid-fast bacillus (AFB) was negative. Bronchoscopy was done, and bronchial wash was taken from the right lower lobe – anterior, posterior, lateral, and

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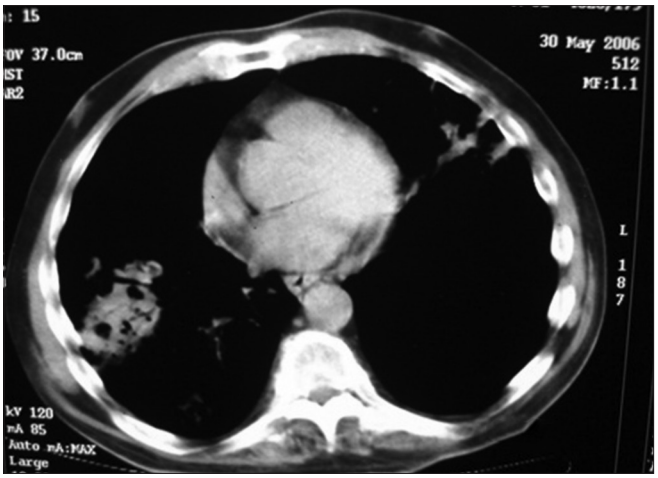

Figure 1: Computed tomography scan chest showing cavity in the apical segment of the right lower lobe

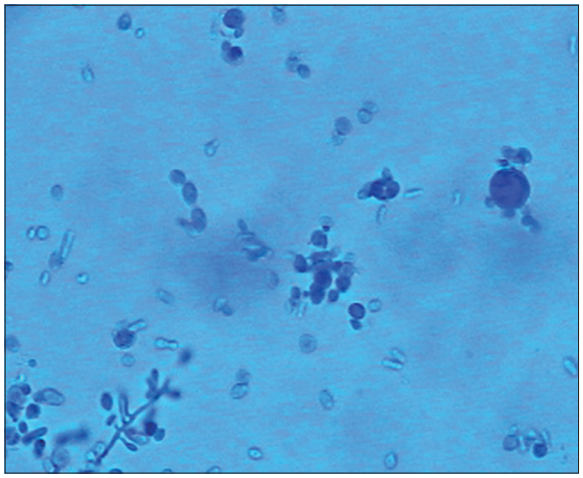

Figure 2: Microscopic appearance of *Chrysosporium* (case isolate) in a slide culture preparation. Original magnification, ×400

Figure 3: Colony of *Chrysosporium* (case isolate) on Sabouraud dextrose agar after 2 days at 30°C. Original magnification, ×1.0

medial segments. The bronchoalveolar lavage fluid was sent for microbiological analysis. The patient was started on empirical anti-tuberculosis (TB) treatment (ATT). Microscopic observation of KOH amount revealed hyphal elements [Figure 2]. The samples were cultured on blood agar at 37°C for 2 days and Sabouraud dextrose agar (SDA) at 30°C for 7 days. On SDA plate, a white granular mold grew after 48 h [Figure 3]. Microscopic morphology was examined in a slide culture preparation. Single-celled hyaline conidia were seen on the sides of vegetative hyphae. Club-shaped aleuroconida born at the ends of the short typically curved stalk was noted. The culture was sent to Christian Medical College, Vellore, and confirmed as *Chrysosporium* species. The same fungus was isolated from the same site on repeat specimen. The patient recovered with ATT and intravenous amphotericin B. Hence, we conclude that this could be a case of pulmonary infection of *Chrysosporium* in a pre-existing TB cavity.

Discussion

Recently, with the number of transplant patients rising and the increased prevalence of immunosuppressive diseases such as HIV, the number of reported cases of fungal infection of the lungs has risen exponentially. However, most of the fungal infections in the lungs reported are the usual suspects being *Aspergillus*, *Candida*, *Pneumocystis jiroveci* and *Cryptococcus*. However, in the case of TB patients, according to a study by Najeeb and Nagmoti, the prevalence of opportunistic fungal infection was 58% among the active pulmonary TB (PTB) cases and 52% in posttreated cases of PTB. *Candida* species (40%) were the most common isolates in active PTB cases and in posttreated PTB cases, *Aspergillus* spp. (34%) were more common.[1]

Reports of environmental fungi such as *Chrysosporium* species causing invasive disease or sinusitis in the immunocompromised and immunocompetent host are rare. These species are recognized by their fast growth at 37°C, thermotolerance, and by colonies that darken from yellowish white to buff.

C. zonatum has been recently identified as the cause of disseminated infection accompanied by CGD in a Greek patient who developed lobar pneumonia and tibial osteomyelitis.[2] It has also been identified as a pulmonary colonizer secondary to TB in two Japanese patients.[3-5] *C. parvum* has also been identified as a causative agent for keratomycosis.[4] First described in 1989 in Kuwait, this species is now known to occur in North America, Europe, Asia, and the Middle east.[6]

In India also, there are few reports of keratinophilic *Chrysosporium* isolation from the soil.[7,8] *C. keratinophilum* was the second common fungal isolate next to dermatophytes from hair scalp infection of primary schoolchildren in Visakhapatnam, India. The contaminated soil in the school environment was considered to be the risk factor.[9] In Tamil Nadu, *C. keratinophilum* fungal species found in the soil samples of poultry forms from Namakkal

and feather-dumping sites from Chennai suggest their role as potential pathogens in birds and other animals.[10]

In this case, the patient with pulmonary cavity was started on empirical ATT because he failed to respond to several antibiotics and smear for AFB was negative. The patient improved with ATT and antifungals. We report this as a rare case of pulmonary infection by *Chrysosporium* species secondary to TB.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that his name and initials will not be published, and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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