Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/mjafi

Case Report

Sporotrichum pruniosum causing a rare invasive infection in an immunocompromised patient

Col Partha Roy ^{a,*}, Brig A.K. Sahni ^b, Lt Col Raghu Sriram ^c,
Gp Capt Shankar Subramanian ^d

^a Professor, Dept of Microbiology, Armed Forces Medical College, Pune 411040, India

^b Commandant, 174 Military Hospital, C/O 56 APO, India

^c Assistant Professor, Dept of Microbiology, Armed Forces Medical College, Pune 411040, India

^d Senior Advisor (Medicine), Command Hospital (Air Force), Bangalore, India

ARTICLE INFO

Article history:

Received 17 July 2014

Accepted 25 November 2014

Available online 11 February 2015

Keywords:

Sporotrichum pruniosum

Aleuriconidia

Annular frills

Disjunct cells

Dimorphic fungus

Clamp connections

Herein, we present a case report of invasive cutaneous infection by *S. pruniosum* in an advanced HIV infected case with concurrent tuberculosis. The compliance to antiretroviral as well as antituberculous medication was poor.

Case report

A 44 year old female patient with advanced HIV infection and concurrent tuberculosis was admitted to a tertiary care hospital with severe anemia and cachexia. Her body weight was 32 kg. She was poorly compliant to both antiretroviral therapy (ART) and antitubercular treatment (ATT). CD4+ T helper cell count was less than 50/cmm. Multiple (8–10) superficial skin nodules measuring approximately 1–3 cm were seen on the arms, legs and face at different stages of excoriation, ulceration and suppuration. Frank pus was aspirated from one of the pustules and submitted for detailed microbiological examination. Despite prompt initiation of aggressive management, she expired within 4 days of hospitalization due to severe sepsis leading to multi organ failure.

Gram stain of the pus smear exhibited numerous foamy debris laden macrophages with intracellular yeast cells showing multiple budding and measuring 2–3 μ m each (Fig. 1). Ziehl Neelsen (ZN) stain showed numerous acid fast bacilli.

The sample was inoculated in Sabouraud's dextrose agar with and without antibiotics and incubated at 25 °C and 37 °C. Growth was obtained within 3 days. Microscopic features of the fungus in both the tubes were similar. Initially, the

Introduction

Patients with advanced HIV infection are often susceptible to invasive infection by saprophytic fungi. These fungi usually present as mere colonizers in immunocompetent individuals or as culture contaminants. *Sporotrichum pruniosum* is one such dimorphic fungus whose etiological role in causing invasive infections has been much debated and histopathological confirmations have been elusive. Studies suggest that this fungus may colonize the bronchopulmonary tree.¹

* Corresponding author. Tel.: +91 9637805666.

E-mail address: drparthoroyafmc@hotmail.com (P. Roy).

<http://dx.doi.org/10.1016/j.mjafi.2014.11.011>

0377-1237/© 2014, Armed Forces Medical Services (AFMS). All rights reserved.

colonies were fine and powdery but developed cottony aerial mycelium by the 5th day and yellowish brown tan on the obverse side (Fig. 2). Tease mounts carried out on the 3rd day revealed thin hyaline and septate hyphal forms with arthroconidia that were alternating with empty disjunctor cells. At few places clamp connections (bridges) were seen in the septa (Fig. 3). This picture was initially suggestive of a dimorphic fungus akin to the *Coccidioides* species. On further maturation of the culture, microscopy revealed numerous conidiophores bearing aleuriconidia. These aleuriconidia ($5\text{--}6 \times 10 \mu\text{m}$) were typically unicellular, oval to ellipsoidal in shape with truncated base and yellowish golden in colour. Some were seen in clusters and exhibited 'annular frills' (Fig. 4). Arthroconidia and significant numbers of thick walled chlamydospores were seen measuring $40\text{--}60 \mu\text{m}$ in diameter (Fig. 5). No spherules could be demonstrated.

Based on the cultural and phenotypic characteristics, the fungus was identified as *S. pruniosum*. The identity of the fungus was confirmed by the Centre of Advance Research in Medical Mycology and WHO Collaborating Centre Department of Medical Microbiology, Postgraduate Institute of Medical Education and Research Chandigarh, India.

The sample was also inoculated in Blood agar, MacConkey's agar and Lowenstein Jensen's (LJ) medium but no bacterial growth could be obtained. Though numerous AFB was seen in the direct sample, in absence of a growth in LJ medium, we failed to further identify the Mycobacterial species.

Discussion

S. pruniosum is a filamentous saprophytic fungus widely distributed in decaying wood and soil. Genus *Sporotrichum* belong to the Phylum *Basidiomycota*; Class *Hymenomycetes*; Order *Stereales* and Family *Corticaceae*. The only active species included in the genus *Sporotrichum* is *S. pruniosum*. *Phanerochaete chrysosporium* is the teleomorph of *S. pruniosum*. It is usually considered to be a contaminant.

Fig. 1 – Gram stain of fine needle aspirate of the nodule (1000 $\times$) showing intracellular yeast cells with multiple budding inside foamy and debris laden macrophage.

Fig. 2 – Sabouraud's dextrose agar plate showing cottony aerial mycelium with yellowish brown pigmentation of the medium.

The phenotypic identification of this fungus is based on its typical cultural and microscopic characteristics. Rapid growth on SDA, clamp connections in hyphae, unicellular and thick walled aleuriconidia with annular frill, arthrospores and thick walled chlamydospores help in clinching the diagnosis. *S. pruniosum* needs to be differentiated from other similar fungi like *Beauveria*, *Chrysosporium*, *Emmonsia parva*, *Rhinocladiella* and *Sporothrix*, *Geomyces* and *Blastomyces*.^{1–3}

S. pruniosum produce (adialspore-like) chlamydospores not only at 37°C but also at 25°C that differentiates it from *Emmonsia parva* and from *Geomyces* by lacking branched, fertile hyphae on erect conidiophores. Unlike *S. pruniosum*, *Sporothrix* is dimorphic.³

S. pruniosum is a coccidioides look alike but has not been implicated in direct causation of human disease. The pathogenic potential of this fungus has been debated for long. It has

Fig. 3 – Lactophenol cotton blue mount of the isolate (400 $\times$): Thin hyaline and septate hyphae with arthroconidia alternating with (a) empty disjunctor cells and (b) clamp connections (bridges). Hyphae are typically seen at right angles (c).

Fig. 4 – Lactophenol cotton blue mount of the isolate (400×): showing (a) oval to ellipsoidal aleuriconidia, (b) arthroconidia and (c) chlamydospores.

been isolated from bronchial secretions of a patient with a presumptive diagnosis of tuberculosis but the probable etiologic association has not been established due to absence of histopathological evidence.⁴

In a series of three case studies reported by Khan et al,⁵ the occurrence of *S. pruniosum* was demonstrated by direct microscopy and culture. This was coupled with the presence of immediate, type I, cutaneous hypersensitivity against *S. pruniosum* in two of the patients. Concurrently, the ability of the fungus to incite lesions in experimentally infected mice was demonstrated. The authors concluded an etiologic relationship between the fungus and the patients' symptoms (cough expectoration of sputum, dyspnoea and occasional pyrexia). However, there was no histopathological evidence in this series. These findings suggested colonization of the

Fig. 5 – Lactophenol cotton blue mount of the isolate (400×) showing thick walled spherical chlamydospores measuring 40–60 µm in diameter in cultures grown at 25 and 37 °C.

bronchopulmonary tree with *S. pruniosum*. This fungus is closely related to the veterinary practice and persons who are in close proximity to livestock may be accidentally affected.

We made extensive search of the literature that link *S. pruniosum* as the etiological agent of human disease but were unable to find cases where the pathogenicity of *S. pruniosum* has been histopathologically established beyond doubt.

In our case the invasive nature of *S. pruniosum* is histologically demonstrated by the presence of budding yeast cells inside the macrophages (Fig. 1). The early cottony growth on SDA raised the suspicion of *Coccidioides*, a dimorphic agent since our patient was grossly immune suppressed. Early tease mount was similar to *Coccidioides spp* as demonstrated by the presence of thin hyaline and septate hyphal forms with arthroconidia alternating with empty disjunct cells. However, the microscopic character assumed a different picture on maturation of the culture. Finally, we were able to identify the organism as *S. pruniosum* based on the presence of typical aleuriconidia, chlamydospores and arthroconidia and typical 'annular frills' (retained portion of the conidiophores).

The clinical condition of our patient was extremely poor on admission. Based on AIDS defining criteria, this case could be classified as clinical condition C3.⁶ Compliance to prescribed ART and ATT too was poor. She expired within 4 days of hospitalization due to severe sepsis leading to multi organ failure. Severe immune suppression coupled with cachexia and prolonged neglect in treatment probably led to infection with this fungus.

Although mere colonization in an immunocompetent person may not lead to active infection but constant vigilance is preferred in case of co-morbidities. Herein, we agree with Khan et al that the presence of *S. pruniosum* in bronchopulmonary secretions in patients with established tuberculosis or other respiratory symptoms should not be neglected. Various etiological causes of immune suppression must be excluded before commenting on the fungus being a contaminant or a colonizer. In our case, advanced AIDS syndrome and concurrent NTM infection appears to have caused invasive infection by *S. pruniosum*.

Chowdhury et al have recently reported a case of fungus ball in the lungs in a male patient with uncontrolled diabetes and irregularly treated pulmonary tuberculosis. A species of *Perenniporia*, a basidiomycete was isolated highlighting invasive fungal infection by a hitherto lesser known basidiomycete similar to our case in patients with immune suppression.⁷

We also wish to emphasize that in the initial stages fungi with dimorphic behaviour (*Coccidioides* look alike) may cause confusion in phenotypic identification because of similar histological patterns and growth on culture media as was demonstrated in our case.

Although we did find AFB on ZN stain, the same could not be grown on culture. Due to the early death of the patient, we failed to identify the Mycobacterial species. It may be pertinent to emphasize that various Mycobacterial species including non tuberculous Mycobacteria (NTMs) are emerging as an important hospital associated pathogens. Furthermore, irregularly treated tuberculosis and HIV infection in this patient also raises a serious social issue of probable stigma and definite neglect.

Conflicts of interest

All authors have none to declare.

Acknowledgements

We acknowledge the contribution of Sub/LA BD Rao for his excellent technical work.

REFERENCES

1. St-Germain G, Summerbell R. *Identifying Filamentous Fungi – a Clinical Laboratory Handbook*. 1st ed. Belmont, California: Star Publishing Company; 1996.
2. Larone DH. *Medically Important Fungi – a Guide to Identification*. 3rd ed. Washington D.C: ASM Press; 1995.
3. Sutton DA, Fothergill AW, Rinaldi MG, eds. *Guide to Clinically Significant Fungi*. 1st ed. Baltimore: Williams & Wilkins; 1998.
4. Singh SM, Singh M, Mukherjee S. Pathogenicity of *Sporotrichum pruinosum* and *Cladosporium oxysporum*, isolated from the bronchial secretions of a patient, for laboratory mice. *Mycopathologia*. 1992 Mar;117:145–152.
5. Khan ZU, Randhawa HS, Kowshik T, Gaur SN, de Vries GA. The pathogenic potential of *Sporotrichum pruinosum* isolated from the human respiratory tract. *J Med Vet Mycol*. 1988 Jun;26:145–151.
6. 1993 Revised Classification System for HIV infection and Expanded Surveillance case Definition for AIDS among Adolescents and Adults [CDC, Atlanta, December 18, 1992/41(RR-17)].
7. Chowdhary A, Agarwal K, Kathuria S, et al. First human case of pulmonary fungal ball due to a *Perenniporia* species (a basidiomycete). *J Clin Microbiol*. November 2012;50:3786–3791.