PROSTHETIC VALVE ENDOCARDITIS CAUSED BY SCEDOSPORIUM APIOSPERMUM

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Abstract

Scedosporium apiospermum, the asexual state of Pseudallescheria boydii, is increasingly recognized as an opportunistic pathogen. We report a case of prosthetic valve endocarditis caused by this organism that developed in a patient following cardiac surgery.

Key words: Scedosporium apiospermum, prosthetic valve endocarditis

Scedosporium apiospermum is the asexual form of Pseudallescheria boydii which was first described as a human pathogen in 1911 by Saccardo in an Italian patient with mycetoma.1 Either forms can be isolated from cultures from clinical specimens. In recent years, an increasing number of infections caused by S. apiospermum is being encountered.

Case Report

A 43 year old, euglycaemic, normotensive male was admitted with Class II to III symptoms of failure and had a mitral valve replacement with a Chitra valve on 4th March, 2004, for mitral regurgitation and ruptured chordae tendinae. He had an uneventful recovery and was discharged on the 10th day with stable haemodynamics.

He was readmitted after seven weeks with complaints of high grade fever and pain and numbness radiating from the right upper limb. A doppler study revealed a thrombus occluding the proximal brachial artery. Embolectomy was performed and the embolus was sent for culture and sensitivity. His haemoglobin was 9.8 gm/dL, total count was 9100/cmm with a neutrophil count of 82%, lymphocyte count of 14% and eosinophil count of 4 %. The blood sugar was 122 mg/dL, urea was 106 mg/dL and creatinine was 2 mg/dL. Five sets of blood cultures on multiple media did not show growth at the end of two weeks. The Widal test was negative and the ESR was 142 mm at the end of an hour. The prothrombin time was 30.0 seconds and INR (Internal Normalized Ratio) was 3.09 (normal value 1.24).

The embolectomy specimen was cultured on multiple media, such as blood agar, MacConkey agar, Sabouraud dextrose agar, thioglycollate broth, nutrient broth, and Sabouraud dextrose broth. The fungal media were incubated at 37°C and at room temperature. Culture grew a septate mycelial fungus which grew on all media with in 24 hours. There was no isolation of any bacteria on any of the culture media. Echo cardiography (ECHO) did not reveal any vegetation, but TEE (trans oesophageal echo cardiography) performed showed a small vegetation on the mitral prosthesis, thickened aortic valve and a mobile vegetation on the non coronary cusp, restricting the movement of the cusp with severe aortic regurgitation.

He was treated with injection amphotericin B with gradually increasing doses. Amphotericin B was first administered at a dose of 0.5 mg/kg/day and gradually increased to 0.75 mg/kg/day and later to 1mg/kg/day. The dose of the drug was monitored by regularly checking the urea and creatinine levels. He underwent a repeat surgery on 10th May, 2004 with an EKIS valve (25 mm mechanical valve), after receiving 230mgs of amphotericin B. Following surgery the amphotericin B was continued and he received a total of 1300 mgs of the drug. He was discharged on 2nd June, 2004 with stable haemodynamics. ECHO done at the time of discharge showed no valvular or paravalvular leak. He was discharged on oral itraconazole 200mg twice daily to be continued for 6 months. He was readmitted within 2 days with acute pulmonary oedema, when ECHO revealed a fluffy shadow on the atrial aspect of the mitral prosthesis, showing a recurrence of fungal endocarditis. He was restarted on amphotericin B, but succumbed to the infection on 16th June, 2004.

Discussion

S. apiospermum is a ubiquitous saprophytic ascomycetous fungus found in soil, sewage and contaminated water and manure of farm animals. In recent years it has been shown to be pathogenic for both immunocompetent and immunosuppressed patients. The genus Scedosporium contains two species; S. apiospermum and S. prolificans. Pseudallescheria boydii is the telemorph (sexual stage) of S. apiospermum. No sexual form (telemorph) is known for S. prolificans.

Human infection has been most commonly reported...
following subcutaneous traumatic or surgical implantation.\textsuperscript{2,3} \textit{Pseudoallescheria} is among the causative agents of white grain mycetoma. Clinically, cutaneous infections may present as solitary ulcers, infiltrative erythematous plaques and nodules, or suppurative nodules and ulcers in a sporotrichoid (lymphangitic) pattern.\textsuperscript{4} Keratitis caused by \textit{S. apiospermum} has been reported in a farmer, that had successfully responded to treatment with amphotericin B.\textsuperscript{5}

In tissue sections the organism is morphologically similar to \textit{Aspergillus} species with branching septate hyphae which often leads to errors in the identification and subsequent delay in initiating therapy.

The second most common route of infection is inhalation.\textsuperscript{6} There are very few reports of infections caused by this pathogen from India. Bashir \textit{et al}\textsuperscript{7} have reported a case of invasive pulmonary pseudallescheriasis in an immunocompetent patient with healed pulmonary tuberculosis and with a persisting lung cavity. Bronchopulmonary colonization or invasive pulmonary disease is not uncommon following cutaneous infection. \textit{S. apiospermum} and \textit{S. proliferans} tend to invade blood vessels and cause thrombosis\textsuperscript{8} and invade perineural areas and invade along the nerve sheath.

Our patient, presented two months after valve replacement surgery and was admitted to the cardiothoracic intensive care unit with acute bracheal embolization. Culture of the embolus revealed a pure growth of a filamentous fungus. Blood cultures (five sets) using multiple media, such as, brain heart infusion broth, biphasic infusion medium, thioglycollate broth, Sabouraud dextrose broth were consistently negative after four weeks of culture.

There was no growth of aerobes or anaerobes in the multiple cultures from the embolus. Since the branched septate non pigmented hyphae resembled \textit{Aspergillus} species, the patient was started on amphotericin B. When it sporulated in the laboratory, the spores resembled the blastospores of \textit{Blastomyces dermatitidis}. The culture was sent to Dr Swinne, Prince Leopold Institute of Tropical Medicine, Belgium, for identification where it was identified as \textit{Scedosporium apiospermum}.

Colonies of \textit{Scedosporium} grew rapidly at 37°C and at room temperature within 24 hours. They were mature within 5 days (Fig. 1). The colonies were white initially but became light brown to grey after a few days incubation. The reverse was white to grey.

Microscopically it had septate hyaline hyphae. The conidia were unicellular, oval. They were single or formed clusters at the apices of anelids. The conidia had a slightly narrowed or truncated base (Fig. 2).

This fungus is often known to be resistant to amphotericin B. Although voriconazole is considered as first line treatment by some,\textsuperscript{9} several reports have shown itraconazole, an imidazole derivative, to be effective in the treatment.\textsuperscript{3} The latter is currently the drug of choice against this organism. Miconazole, itraconazole, voriconazole, posaconazole, ravuconazole, UR-9825 echinocandins, such as caspofungin and sordarins are active \textit{in vitro} against \textit{S. apiospermum}.

In addition to mycetoma, \textit{Pseudallescheria boydii} is known to rarely cause infections in various organs and systems of the body. These include cutaneous infections, sinusitis, keratitis,\textsuperscript{3} lymphadenitis, endophthalmitis, meningoencephalitis, brain abscess, endocarditis and pneumonia. O’Bryan \textit{et al}\textsuperscript{9} have reported a case of endocarditis which occurred on a native valve that developed in an elderly patient following prolonged hospitalization.

Our patient probably acquired the infection at the time of surgery. Fungal spores are known to cause infections of prosthetic valves when inoculated accidentally during surgery. He was treated with amphotericin B as we had first identified the fungus to be \textit{Aspergillus} species, and amphotericin B is known to be the drug of choice in invasive aspergillosis.

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{Scedosporium_apiospermum.png}
\caption{\textit{Scedosporium apiospermum} culture on Sabouraud dextrose agar x 5 days}
\end{figure}

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{Hyphae.png}
\caption{Hyphae are septate with simple long or short conidiophores bearing conidia singly or in small groups. The conidia are unicellular, oval, and appear cut off at the truncate bases (x 400)}
\end{figure}
Acknowledgements

We gratefully acknowledge the help of Dr D Swinne and C Wuytack of the Prince Leopold Institute of Tropical Medicine, Nationalestraat 155, B-2000 Antwerp, Belgium, for identifying the fungus.

References


