Case Reports

Scedosporium apiospermum catheter-related soft-tissue infection: a case report and review of the literature

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We report a case of catheter-related Scedosporium apiospermum soft-tissue infection. This ubiquitous filamentous fungus can cause human infection after traumatic subcutaneous implantation of its conidia or their inhalation in near-drowning cases. It has also been reported as an etiological agent in a growing number of hospital-acquired infections.

Keywords nosocomial, Scedosporium apiospermum, soft-tissue mycoses, voriconazole, catheter-related infection

Introduction

Scedosporium apiospermum (the anamorph of Pseudallescheria apiosperma) [1] is a hyaline filamentous fungus that can cause human infection after traumatic subcutaneous implantation of its conidia or their inhalation in near-drowning cases [2]. In immunocompetent hosts it usually produces localized diseases, such as fungal mycetoma. In immunosuppressed patients, S. apiospermum can cause invasive infections which can hematogenously spread to cause disseminated disease [2]. We describe a case of catheter-related skin and soft-tissue infection caused by S. apiospermum.

Case report

A 65-year-old French man, with a history of severe COPD, was admitted to our emergency department for abdominal pain. He was diagnosed with l ithiasic obstructive pyelonephritis. Drainage was performed using Double-J ureteral stents (Boston Scientific) and the patient received parenteral antibiotics for 14 d. Because of exacerbation of COPD, his corticosteroid regimen was increased up to 1 mg/kg/d. Eleven days after admission he developed several purple nodules and slight desquamation at the previous insertion site of an intravenous catheter on the back of his left hand (Fig. 1A). The patient had no fever or chills and the rest of his clinical examination was normal. A skin biopsy performed at the periphery of the nodules showed active, but nonspecific inflammation of the dermis. Periodic acid-Schiff and Grocott stains of the biopsy tissue were negative. The pus drawn from one ulcerated nodule inoculated onto Sabouraud’s dextrose agar with chloramphenicol and gentamicin resulted in the growth, in pure culture, of a filamentous fungus which was identified on the basis of its morphologic characteristics as being affiliated with the genus Pseudallescheria. The species was established as Pseudallescheria apiosperma (Scedosporium apiospermum) by an analysis of the DNA sequences of both the rRNA ITS regions (GenBank accession No JN872195) and the partial Beta-tubulin gene (GenBank accession No. JN872195). The strain was deposited in the BCCM/IHEM collection under the number IHEM 25182.

The in vitro susceptibility of the isolate was determined by the Etest (AB Biodisk) method to be > 32 mg/l for both amphotericin B and 5-fluorocytosine, 0.094 mg/l for voriconazole, and 1 mg/l for posaconazole.

The cultures of samples of the patient’s blood remained negative, as were those inoculated with sputum samples. We performed an environmental colonization studies of our
and the urology wards but air \((n = 4)\), and surface samples \((n = 4)\) from the nurses’ stations were negative. Air samples \((n = 2)\), and surface samples \((n = 2)\) from the patient’s room were also negative for *S. apiospermum*. Due to the progression of the multiple nodulars, erythematous, and painful subcutaneous lesions on the dorsum of his upper arm (Fig. 1B), surgical resection was considered. Computed tomography (CT) scan showed diffuse subcutaneous infiltration of the left upper arm, but no signs of osteomyelitis or arthritis. The chest CT scan was without pathological findings.

Voriconazole, 4 mg/kg twice daily with no loading dose, was started and corticosteroids were rapidly tapered. After seven days of parenteral therapy which resulted in improvement of the skin lesions, we switched to oral voriconazole. Serum levels of voriconazole were monitored (maximum 5.2 \(\mu g/ml\); normal range 1–4 \(\mu g/ml\)). No drug-related toxicity was noted during the treatment. After six weeks, the skin lesions had completely resolved and voriconazole was stopped.

**Discussion**

Filamentous fungi affiliated to the genus *Pseudallescheria* (*Scedosporium*) have been reported from broad-spectrum clinical diseases and are emerging etiologic agents of life-threatening infections [2]. The major types of diseases caused by members of this genus are allergic bronchopneumonitis, subcutaneous infections (e.g., madura foot), central nervous system (CNS) abscesses after near drowning, and disseminated infections often associated with CNS manifestations in immunocompromised patients [2]. Soft-tissue infections are usually present as non-draining abscesses, sporotrichoid nodules, tuberculoma-like infiltrative erythema, or lymphocutaneous syndrome [2]. These fungi have a worldwide distribution in soils, polluted water, and sewage. Skin infections are frequently linked to traumatic inoculations caused by contamination of the affected areas with soils or plant debris. In some cases, the infection results after medical intervention and thus may represent a significant source of nosocomial diseases [3]. An atypical feature about this case is that *Scedosporium* was isolated from the insertion site of a catheter. However, since no water sampling was performed, we cannot exclude a *Scedosporium* contamination of hospital water.

*S. apiospermum* has been involved in four cases of surgical-wound infections [4–6] and it has been the most frequently recovered fungal opportunist pathogen from potted plants in a hospital setting [7]. Eight cases were found through searches of the MEDLINE database for published reports of *S. apiospermum* skin infections (Table 1) [8–15]. All involved immunocompromised patients and for three patients corticosteroid treatment was the only factor contributing to immunosuppression. Five cases seemed to be linked to the previous locations of intravenous catheters, injections, or collection of blood sample [8,12–15]. One case occurred after the patient bruised his foot on his intravenous medication stand [9]. The two other cases occurred in the hospital, but no site of inoculation was identified [10,11]. As data on the recovery of *Scedosporium* in hospital environments are very limited, further studies on hospital indoor samplings are needed to identify potential nosocomial origins of infections.

Despite antifungal therapy, mortality associated with *Scedosporium* infections is as high as 50–70% [16]. One patient treated with fluconazole had a favorable outcome (Table 1) in spite of the fungus’s intrinsic resistance to

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**Fig. 1** *Scedosporium apiospermum* catheter-related soft-tissue infection. (A) Erythematous plaque with microabscesses on the dorsal surface of the left wrist, around the site of previous catheter insertion. (B) Subcutaneous erythematous tender nodules on the left forearm, 1–2 cm diameter, in a linear distribution; some had ulcerated, discharging a light honey-colored and gelatinous exudate.
Table 1  Summary of demographic characteristics, treatments, and outcomes in patients with hospital-acquired Scedosporium apiospermum skin infections, listed in chronological order of publication.

<table>
<thead>
<tr>
<th>Case no. (reference)</th>
<th>Age</th>
<th>Gender</th>
<th>Underlying condition</th>
<th>Infection location</th>
<th>Type of inoculation</th>
<th>Antifungal</th>
<th>Duration of treatment</th>
<th>Surgical treatment</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 [8]</td>
<td>32 M</td>
<td></td>
<td>AML, chemotherapy</td>
<td>Chest</td>
<td>Catheter-insertion site</td>
<td>AMB</td>
<td>ND</td>
<td>N</td>
<td>Death (DI)</td>
</tr>
<tr>
<td>2 [9]</td>
<td>63 M</td>
<td></td>
<td>AML, chemotherapy</td>
<td>Foot</td>
<td>Foot bruised on IV Medicine stand</td>
<td>ITC</td>
<td>3 weeks</td>
<td>N</td>
<td>Cured</td>
</tr>
<tr>
<td>5 [10]</td>
<td>67 M</td>
<td></td>
<td>Corticosteroids 1g/day (asthma)</td>
<td>Hand</td>
<td>Not known/ hospitalized</td>
<td>FLC</td>
<td>5 weeks</td>
<td>Y</td>
<td>Cured</td>
</tr>
<tr>
<td>4 [12]</td>
<td>69 M</td>
<td></td>
<td>Corticosteroids (polymyositis)</td>
<td>Hand</td>
<td>Site of repeated IV injection</td>
<td>Topical antifungal</td>
<td>ND</td>
<td>N</td>
<td>Death (DIVC)</td>
</tr>
<tr>
<td>6 [13]</td>
<td>69 F</td>
<td></td>
<td>Corticosteroids 10 mg/ day (RA), Sjögren, chronic hepatitis C</td>
<td>Hand</td>
<td>Catheter-insertion site</td>
<td>ITC</td>
<td>ND</td>
<td>Y</td>
<td>Cured</td>
</tr>
<tr>
<td>7 [14]</td>
<td>59 M</td>
<td></td>
<td>Renal transplant</td>
<td>Hand</td>
<td>Catheter-insertion site</td>
<td>VRC</td>
<td>10 days IV total: 6 weeks</td>
<td>N</td>
<td>Cured</td>
</tr>
<tr>
<td>8 [15]</td>
<td>53 F</td>
<td></td>
<td>AML, chemotherapy</td>
<td>Forearm</td>
<td>Blood-sample site</td>
<td>VRC, CSP</td>
<td>56 days bitherapy 7 days IV total: 6 weeks</td>
<td>N</td>
<td>Cured</td>
</tr>
<tr>
<td>9 [our case]</td>
<td>65 M</td>
<td></td>
<td>Corticosteroids 1mg/kg/day (COPD)</td>
<td>Hand</td>
<td>Catheter-insertion site</td>
<td>VRC</td>
<td></td>
<td>N</td>
<td>Cured</td>
</tr>
</tbody>
</table>

* M, male; F, female.  
* AML, acute myelogenous leukemia; COPD, chronic obstructive pulmonary disease; RA, rheumatoid arthritis.  
* AMB, amphotericin B; FLC, fluconazole; ITC, itraconazole; VRC, voriconazole; CSP, caspofungin.  
* IV, intravenous; ND, not described.  
* DI, disseminated infection; GIB, gastrointestinal bleeding; DIVC, disseminated intravascular coagulation.

amphotericin B and fluconazole, as described in the literature [2]. Itraconazole has successfully been used in the treatment of two cases of S. apiospermum infections [9,13], although the in vitro activity of itraconazole against Scedosporium is very limited [17]. Voriconazole, which has been used with three patients, is considered as the first-line antifungal drug. A previous study analyzed the efficacy of voriconazole in 107 patients with Scedosporium infections [16]. The authors showed that patients with skin or soft-tissue infections had the best therapeutic response (91%), and that patients with infections caused by S. apiospermum had longer survival times than those associated with S. prolificans. The duration of treatment has not been determined, but all but one of the 61 patients reported by Troke et al. [16] who had successful therapeutic responses received 28 d or more of voriconazole therapy. However, the timing of transition from intravenous to oral therapy has not been clearly defined, as a worsening infection has been described in one patient after a switch to oral therapy at the standard recommended doses [18]. This observation also stresses the need to monitor serum levels of voriconazole to ensure adequate drug exposure in patients with invasive mycoses. Surgical excision has been used to treat S. apiospermum soft-tissues infections, but is often mutilating and relapses can occur [2]. Intrallesional injection of voriconazole, combined with surgical debridement, has been successfully used in one patient presenting with a hepatic contraindication for voriconazole [19].

Practitioners should be aware of the emergence of catheter-related S. apiospermum infection, as early diagnosis is the key to successful treatment.

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References


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