



A saprophytic fungus (*Sepedonium*) associated with fatal pneumonia in a patient undergoing stem cell transplantation

José Arellano-Galindo¹, Vázquez-Meraz Eugenio², Jiménez-Hernández Elva³, Reséndiz-Sánchez Jesús⁴, Martínez-Rivera María de los Ángeles⁵, Jiménez-Juárez Rodolfo Norberto⁴, Xicohtencatl-Cortés Juan⁶, Ochoa Sara A.⁶ and Cruz-Córdoba Ariadna⁶

Abstract

Sepedonium sp. is a saprophytic fungus that inhabits soil and plant material. Few cases of infection with this fungus have been reported. We describe a case of a child who received haploidentical stem cell transplantation. The patient developed *Sepedonium* sp. infection after graft failure accompanied by cytomegalovirus infection. This was associated with two genotypes corresponding to a gB1 and gB3 mixture, which suggested involvement of two strains. Throughout the clinical course, immunosuppression and subsequent development of the fungal infection was observed. Our findings add to the available evidence regarding the potential for acquisition of fungal infection from the environment in patients at high risk because of immunosuppression. To the best of our knowledge, this is the first case of *Sepedonium* sp. infection following graft failure accompanied by previous cytomegalovirus infection in a patient with hematopoietic stem cell transplantation.

¹Área de Virología, Laboratorio de Infectología, Hospital Infantil de México Federico Gómez, Ciudad de México, México

²Banco de Sangre, Hospital Las Américas de Ecatepec, Ecatepec Estado de México, México

³UMAE Centro Médico Nacional La Raza IMSS, Ciudad de México, México

⁴Departamento de Infectología, Hospital Infantil de México Federico Gómez, México

⁵Laboratorio de Micología, Departamento de Microbiología, Escuela Nacional de Ciencias Biológicas del Instituto Politécnico Nacional, México

⁶Laboratorio de Investigación en Bacteriología Intestinal, Hospital Infantil de México Federico Gómez, México

Corresponding author:

José Arellano-Galindo, Area de Virología, Laboratorio de Infectología, Hospital Infantil de México Federico Gómez, Dr. Márquez No. 162, Col Doctores, del Cuauhtémoc Ciudad de México, México.

Email: jose.arellano@salud.gob.mx



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Introduction

Sepedonium sp. is a saprophytic fungus that inhabits soil and plant material. Few cases of human infection with this fungus have been reported. This fungal infection was described in a patient with AIDS who developed an infection that was resolved with itraconazole.¹ Appearance of this type of infection suggests that patients who are immunosuppressed because of AIDS or after transplantation have a high risk of colonization and infection by various microorganisms. By contrast, involvement of cytomegalovirus has been described in cases of rejected hematopoietic stem cell grafts accompanied by immunosuppression that can lead to sepsis.² We report here a case of a child who received hematopoietic stem cell transplantation (HSCT), but developed *Sepedonium* sp. infection after graft failure accompanied by previous cytomegalovirus infection.

Case report

The patient was a 14-year-old boy who had received haploidentical stem cell transplantation (dosage of 12×10^6 /kg of CD34+ cells). The Cytomegalovirus (CMV) serostatus was IgG D+/R+. The regimen of conditioning was described previously by our group.³ Prophylaxis against graft-versus-host was not administered. Prophylaxis therapy against infection included fluconazole 6 mg/kg from day -5, ciprofloxacin 30 mg/kg daily, acyclovir 1500 mg/kg daily, trimethoprim and sulfamethoxazole 10 mg/kg daily, and immunoglobulin 400 mg/kg.

Blood was collected in EDTA tubes for monitoring CMV reactivation. This was

performed using qualitative PCR with primers that were specific for the fourth exon coding for the immediate-early antigen. PCR was used for fungal monitoring using universal primers to the 18 S RNA sequence in blood and biopsy cultures, as well as for hybridization with specific probes for *Candida* and *Aspergillus*.⁴ PCR was used only to detect the presence of a fungal infection, and the fungus was grown on Sabouraud dextrose agar. The patient received an allogenic bone marrow transplantation. CMV DNAemia was detected up to post-HSCT day +28. The genotype was identified as a gB1 and gB3 mixture on day +41 (Figure 1).

The patient developed a fever on post-HSCT day +31, and ganciclovir therapy was started with a good response. On post-HSCT day +36, the patient began to show signs of acute rejection. This was diagnosed by analysis of the bone marrow, which showed hypoplasia, and non-donor chimeric cells were detected with the Variable Number of Tandem Repeats (VNTR) technique. On post-HSCT day +43, the patient began to show symptoms of pneumonitis. On day +50, a fungal infection was detected in blood by PCR-ELISA, but the agent could not be identified because the amplification product did not show hybridization with *Candida* or *Aspergillus* probes. Sequencing was not possible because the required technology was not available in our laboratory. On day +60, a fungus was isolated in a culture of blood and it was identified by macro- and micromorphological characteristics as *Sepedonium* sp. The patient was administered antimicrobial therapy comprising ceftazidime (2 g every 8 h) plus teicoplanin (400 mg every 8 h on day 1 and 400 mg every day thereafter) for

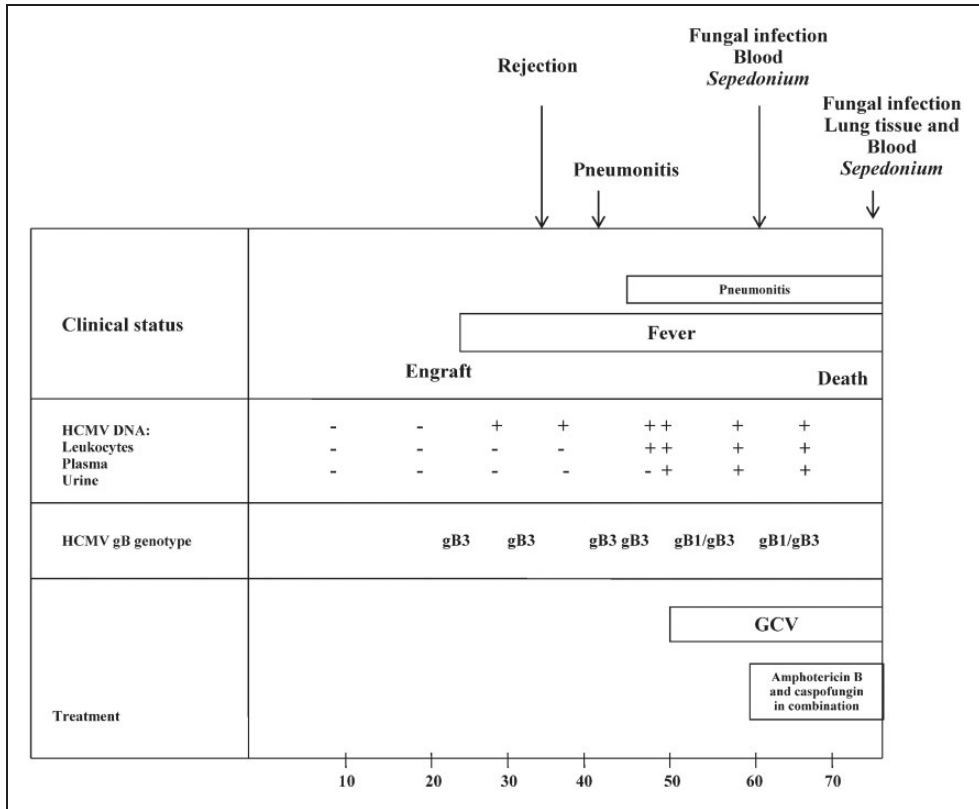


Figure 1. Follow-up of the patient after transplantation.

microbial infection and amphotericin 4 mg/kg daily and caspofungin 50 mg daily. However, despite this treatment, the patient developed sepsis and severe lung lesions, which required ventilatory therapy. The patient died on post-HSCT day +75. *Sepedonium* sp. was isolated in Sabouraud Dextrose Agar (SDA) culture from a lung biopsy and blood (Figures 1 and 2a). In both of these cultures, possible contamination from our laboratory was ruled out because septate and hyaline hyphae were also observed in a lung biopsy. Radiography of the thorax showed bilateral mixed infiltrates (Figure 2b) and axial computed tomography also showed mixed infiltrates (Figure 2c and 2d).

Discussion

HSCT is an alternative of treatment for patients with haematological disorders. However, regeneration of the immune system after HSCT is a slow and prolonged process, and complications can increase the risk of developing microbial infections.

In CMV infection, we found two genotypes that corresponded to a gB1 and gB3 mixture, which suggested that two strains were involved in the infection. A previous report showed that gB3 is the most common genotype involved in immunosuppression.⁵

Immunosuppression is a critical state in patients with a bone marrow transplant. In

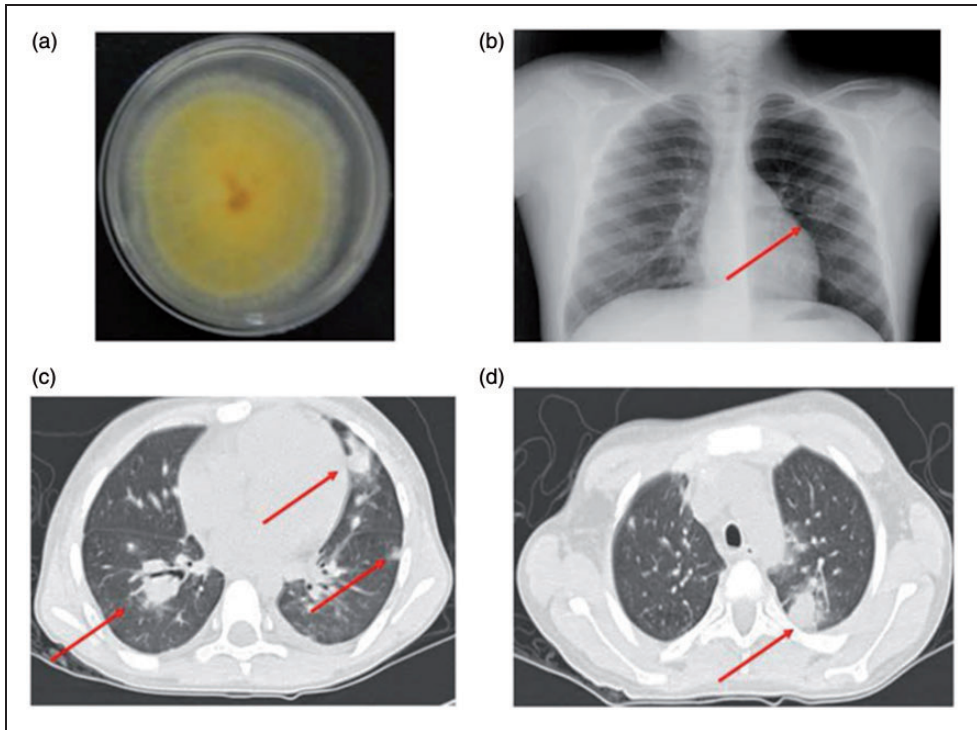


Figure 2. Culture of *Sepedonium* sp., and lung radiology and computed tomography

(a) Culture of the fungus from a sample of lung tissue. The morphology of *Sepedonium* on Sabouraud dextrose agar at 25°C during 4 days was initially white and membranous, and then became powdery, reverse is tan, and was sometimes light yellow. (b) Anteroposterior radiograph showing bilateral mixed infiltrates with a rounded parahilar region (left, red arrow). (c) Computed tomography showing three zones of consolidation (red arrows). One zone appears as a rounded parahilar region on the left and another is shown on the right. (d) Computed tomography showing a macronodule with a halo sign in the posterior right region (red arrow).

our case, the patient's immune system had not recovered completely because of graft failure and the consequent severe immunosuppression allowed microbial infection to develop. The patient's complications began when he developed pneumonitis, and a rare fungal infection was identified in lung tissue. The fungus *Sepedonium* sp. is acquired from the environment, with only a few cases reported in the past several years. *Sepedonium* sp. is occasionally reported as an infectious agent located in the skin and lymph nodules. However, reports of this fungal infection do not describe the immune status of the patients or note that

the patients are immunocompetent. The effects of fungal isolates in animal models have been described as lesions in the lung, spleen, adrenals, and liver.⁶ We isolated the fungus from the patient's lung tissue. *Sepedonium* sp. has also been reported in skin lesions of an adult patient with AIDS.¹ Therefore, it should be suggest that this genus of fungus and due to the lack of immune response, in immunosuppressed patients could develop disseminated infection and the patient died. *Sepedonium* was recently identified in the peritoneal dialysate from a 60-year-old man with poorly controlled type I diabetes mellitus.⁷

Our findings add to the evidence regarding the potential for acquisition of fungal infection from the environment in patients at high risk because of immunosuppression. To the best of our knowledge, this is the first case of *Sepedonium* sp. infection following graft failure accompanied by previous CMV infection in a patient with HSCT.

Declaration of conflicting interest

The authors declare that there is no conflict of interest.

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References

1. Peng K, Soo-Hoo T, Na S, et al. *Sepedonium* Species: an Emerging opportunistic Fungal Infection in a Patient with AIDS. *Clin Microbiol Newslett* 2003; 25: 20–22.
2. Castagnola E, Cappelli B, Erba D, et al. Cytomegalovirus Infection after Bone Marrow Transplantation in Children. *Hum Immunol* 2004; 65: 416–422.
3. Vázquez-Meraz JE, Arellano-Galindo J, Mendoza-García E, et al. Haploidentical bone marrow transplantation in Mexico. *Pediatr Blood Cancer* 2012; 59: 950–952.
4. Löffler J, Hebart H, Sepe S, et al. Detection of PCR-amplified fungal DNA by using a PCR-ELISA system. *Med Mycol* 1998; 36: 275–279.
5. Torok-Storb B, Boeckh M, Hoy C, et al. Association of specific cytomegalovirus genotypes with death from myelosuppression after marrow transplantation. *Blood* 2002; 90: 2097–2102.
6. Hanssman G and Schenken J. A unique infection in man caused by a new yeast-like organism, a pathogenic member of the genus *Sepedonium*. *Am J Pathol* 1934; 10: 731–738.
7. Yogo N, Shapiro L and Erlandson K. *Sepedonium* intra-abdominal infection: a case report and review of an emerging fungal infection. *J Antimicro Chemoth* 2014; 69: 2583–2585.