

Sergio Henrique Loss¹, Ana Carolina Peçanha Antonio², Cíntia Roehrig², Priscylla Souza Castro², Juçara Gasparetto Maccari²

Meningitis and infective endocarditis caused by *Rhodotorula mucilaginosa* in an immunocompetent patient

Meningite e endocardite infecciosa causada por Rhodotorula mucilaginosa em paciente imunocompetente

1. Hospital Moinhos de Vento, Porto Alegre (RS), Brazil.

2. Intensive Care Unit, Hospital Moinhos de Vento, Porto Alegre (RS), Brazil.

ABSTRACT

The authors report the case of an immunocompetent man who presented with acute impairment of the neurological system, hypertensive crisis and renal failure. The patient was eventually diagnosed with *Rhodotorula mucilaginosa* meningitis and infective endocarditis. To the best of our

knowledge, this is the first description of simultaneous infection of the meninges and endothelium caused by *Rhodotorula* in a non-immunocompromised patient.

Keywords: *Rhodotorula*/complications; Endocarditis/etiology; Meningitis, fungal/etiology; Coma; Renal insufficiency; Hypertension; Case reports

INTRODUCTION

Rhodotorula mucilaginosa is a basidiomycetous yeast in the fungal family *Sporidiobolaceae* (Phylum *Basidiomycota*) that is present worldwide in nature.⁽¹⁾ It can be found in aquatic and terrestrial environments and on surfaces and mucous membranes of animals, including human beings.⁽²⁻⁴⁾ Although previously considered a nonpathogenic microorganism, the agent has now been recognized to be potentially harmful to health, especially in immunosuppressed patients,⁽⁵⁾ and is often directly associated with catheters,⁽⁶⁾ prostheses and grafts,^(4,7) endocarditis,⁽⁸⁾ peritonitis,⁽⁹⁾ and meningitis.⁽¹⁰⁾ More recently it has been recognized as a causal agent of onychomycosis.⁽¹¹⁾

A systematic review of 128 patients with proven *Rhodotorula* infection⁽¹²⁾ showed that the mucilaginosa species was the one involved most commonly, accounting for 74% of the infections. This finding also indicated that immunosuppressed individuals and the elderly, especially those undergoing an invasive procedure (access to deep venous circulation, peritoneal dialysis catheter implantation and surgical prostheses), were the preferable targets. The mortality rate was 12%. *Rhodotorula* yeasts are usually resistant to fluconazole, itraconazole, and voriconazole. Therefore, the most effective antimicrobial treatment is amphotericin B.^(12,13)

CASE REPORT

A 58-year-old patient, AMB, was admitted to the intensive care unit (ICU) at Hospital Moinhos de Vento for serious mental deterioration. On admission, hypertensive crisis and renal failure were observed. A peripheral blood smear revealed substantial leukocytosis with band

This study was conducted at the Intensive Care Unit, Hospital Moinhos de Vento - Porto Alegre (RS), Brazil.

Conflicts of interest: None.

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Corresponding author:

Ana Carolina Peçanha Antonio
Rua Ramiro Barcelos, 910 - 3º andar
Zip Code: 90035-001 - Porto Alegre (RS), Brazil.
E-mail: ana.carolina.antonio@gmail.com

neutrophil predominance. The patient underwent a lumbar puncture to collect cerebrospinal fluid (CSF), which showed increased cellularity (179.0/ μ L), lymphocyte predominance (98%) with elevated protein levels (130 mg/dL) and a ratio of CSF to serum glucose of 0.53. Gram and fungal stain examination of CSF were negative. The patient was initially and empirically treated with acyclovir and intravenous sodium nitroprusside. Regarding his medical history, the patient experienced an episode of acute coronary syndrome, and a stent was placed in the left main coronary artery in 2006. Since that procedure, the patient was on clopidogrel and atenolol. After forty-eight hours, the polymerase chain reaction (PCR - *Kit AmpliTaq[®] DNA Polymerase LD*) detected *Rhodotorula mucilaginosa* in the patient's CSF sample. The antibiotic treatment was then changed to intravenous liposomal amphotericin B. The results of CSF cultures for bacteria and fungi, latex agglutination for *Cryptococcus neoformans* antigen and PCR tests for viruses (*Herpes virus 1, 2, 6, 7 and 8, Varicella zoster, Cytomegalovirus, Epstein-Barr and Adenovirus*) and *Mycobacterium tuberculosis* were also negative. The patient was clinically stable ninety-six hours after admission. Blood pressure was controlled with oral antihypertensive drugs, and the patient was neurologically asymptomatic. In the ICU, the medical staff evaluated and excluded the possibility of immunodeficiency. The patient was discharged on the fifth day, clinically stable, with normal peripheral blood count and creatinine levels that fluctuated between 2 and 3 mg/dL. On the seventh day of evolution, the patient developed bacteremia. The lab results revealed new leukocytosis (no increase in band neutrophils), an elevated erythrocyte sedimentation rate (ESR) and quantitative C-reactive protein (CRP). At this time, a new CSF sample revealed elevated protein levels. A heart murmur in the aortic valve was detected, and transthoracic Doppler echocardiography was performed (normal examination). The next day, transesophageal echocardiography revealed small nodules of unknown nature in the coronary leaflet aortic valve that were suggestive of bacterial endocarditis. This diagnosis was also supported by the decrease in complement (C3 and C4) that was observed one day after the bacteremia developed. The treatment with amphotericin B was maintained, even in the setting of reduced renal function. The dose load was adjusted and renal function and electrolytes were monitored. The patient underwent two hemodialysis

sessions at the end of the treatment (day 25 until day 30). A renal biopsy puncture demonstrated acute tubular necrosis. The patient was discharged in a clinically stable condition with improved renal function. A week later, the patient underwent another transesophageal echocardiography, which detected minimal changes in the coronary leaflet of the aortic valve suggestive of degeneration.

DISCUSSION

Rhodotorula is now recognized as a cause of infection in immunosuppressed individuals, especially those undergoing invasive procedures. The advent of PCR and other molecular biology techniques has facilitated the diagnosis of unusual infections, including those caused by *Rhodotorula mucilaginosa*.⁽¹⁴⁾ Immunocompetent individuals are also at risk of infection by this fungus, but with very low prevalence. In this context, *Rhodotorula mucilaginosa* is described as the cause of skin infections (e.g., onychomycosis⁽¹¹⁾) or, even less commonly, of more serious infections such as the one described in this report. Meningitis in patients without immunosuppression or structural nervous system lesions was described in a report that included 128 patients with *Rhodotorula* infections.⁽¹²⁾ A search of MEDLINE, PubMed, SciELO and LILACS for meningitis or endocarditis caused by *Rhodotorula* (terms used: "fungal meningitis", "*Rhodotorula* meningitis", "fungal endocarditis" and "*Rhodotorula* endocarditis") yielded reports of 17 cases in immunosuppressed patients (AIDS, malignancies, or chemotherapy). This would represent the first case of meningitis and endocarditis caused by *Rhodotorula mucilaginosa* in a patient without obvious immunodeficiency.

CONCLUSION

This paper described the case of an immunocompetent patient with meningitis and endocarditis caused by *Rhodotorula mucilaginosa*. Infections caused by this microorganism are rare and usually occur in immunocompromised patients, usually in association with the use of intracavitary and intravenous catheters, grafts or prostheses. This patient did not have any prostheses or evident immunosuppressive conditions (AIDS, cancer, immunosuppressive drugs, collagen-related deficiencies or vasculitis). The diagnosis was confirmed by molecular biology and treated with amphotericin B, with good outcomes.

RESUMO

Os autores relatam o caso de um homem imunocompetente admitido com comprometimento agudo do sistema nervoso, crise hipertensiva e insuficiência renal, vindo a receber diagnóstico de meningite e endocardite infecciosa por *Rhodotorula mucilaginosa*. Até onde sabemos, esta é a

primeira descrição de infecção simultânea das meninges e do endotélio causada por *Rhodotorula* em um paciente sem comprometimento imunológico.

Descritores: *Rhodotorula*/complicações; Endocardite/etiologia; Meningite fúngica/etiologia; Coma; Insuficiência renal; Hipertensão; Relatos de casos

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