

Nutritional Therapy & Metabolism Gallery

Unusual images in Clinical Nutrition

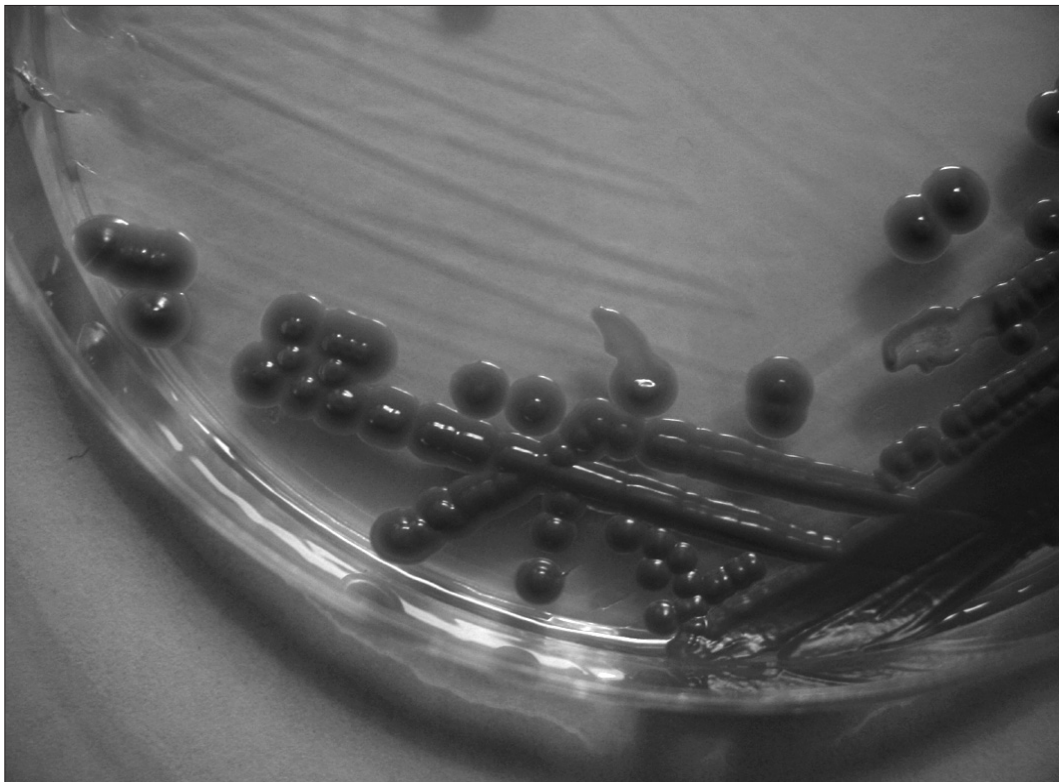


Fig. 1 - *Rhodotorula mucilaginosa*. Macroscopic view of Sabouraud's dextrose agar with chloramphenicol after 1 week of incubation at 37°C.

Rhodotorula mucilaginosa fungemia in a child on long-term parenteral nutrition

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INTRODUCTION

Rhodotorula species, which belong to the *Cryptococcaceae* family, are ubiquitous yeasts that are found in soil, water, plant materials and other environmental resources. *Rhodotorula* has also been isolated from the skin, nails, conjunctivae, and the respiratory, gastrointestinal, and urinary tracts in humans (1). In the past, they were considered as non-virulent saprophytes and common contaminant microorganisms (2). However, during the last 2 decades, they have emerged as opportunistic pathogens, particularly in immunocompromised patients (3) and in those with foreign-body devices, such as central indwelling vascular catheters (4, 5), probably due to the strong affinity to plastics of these yeasts.

The genus *Rhodotorula* contains 8 species and *Rhodotorula mucilaginosa*, previously known as *Rhodotorula rubra*, is the most frequently isolated from clinical specimens (6). To date, there have been only a few reports of *Rhodotorula* fungemia in children (3) and in patients receiving total parenteral nutrition (TPN) through a central venous catheter (CVC) (7).

The treatment for *Rhodotorula* fungemia remains controversial because of its low pathogenicity. However, the risk of a fungemia suggests the need for systemic antifungal therapy and, probably, removal of the catheter (8).

CASE REPORT

A 6-year-old girl with idiopathic chronic intestinal pseudo-obstruction diagnosed at birth, currently on HPN, presented in the emergency room (08/11/2007) with high fever. HPN was infused through a Hickman catheter placed 8 months previously. At that time, she developed fever (temperature up to 39°C) during the infusion of the TPN without any other symptoms. Physical examination was unremarkable and the skin surrounding the catheter site was normal, without tenderness or erythema. White blood cell count was 5900/mm³ (56% neutrophils, 33% lymphocytes); biochemical para-

meters were also normal, including C-reactive protein (0.74 mg/dL). Urine culture was positive for *E. coli*, so antibiotic therapy with amoxicillin-clavulanic acid was started. One week later (15/11/2007), *Rhodotorula mucilaginosa* was isolated in a blood culture from a sample drawn on the day the patient was first seen in the emergency room. The patient was asymptomatic but in 2 new blood cultures (from peripheral venous and Hickman catheters) *Rhodotorula mucilaginosa* was grown again. A 12-day course of liposomal amphotericin B was started (Tab. I) and the catheter was removed on the seventh day of antifungal therapy (22/11/2007). The tip of the removed catheter did not grow the fungus. A search for abscesses (echocardiography, fundus exam, and abdominal and pelvic ultrasound) was done with no remarkable findings. The patient stayed asymptomatic and a new Hickman catheter was placed after confirmation of negative blood cultures. Currently she is doing well with no further complications.

DISCUSSION

In the last years, human infections caused by yeasts have been gaining interest. Fungemias and the emergence of new pathogens are the reasons for this increasing interest. These emerging pathogens appear to be related to the immunocompromised status of the patients

TABLE I - MIC VALUES FOR *RHODOTORULA MUCILAGINOSA*

	µg/mL
Amphotericin B	0.5
Fluconazole	256
Itraconazole	1
Ketoconazole	0.06
Fluorocytosine	0.03
Voriconazole	4
Caspofungin	64

MIC values were obtained with Sensititre YeastOne® (Trek Diagnostic Systems Ltd, West Sussex, UK). The control used was the *Candida albicans* strain ATCC 90028.

and the more aggressive diagnostic and therapeutic procedures. Although the first report of *Rhodotorula spp* infection dates back to the 1960s (9-11), yeasts belonging to this genus were not considered emerging pathogens until the end of the 1980s (12). Cases of *R. mucilaginosa* infection in children are exceptionally rare, especially if the infection occurs in an immunocompetent patient, as in our report.

Rhodotorula species produce red glistening mucoid colonies. The carotenoid pigment torularhodin gives their colonies a salmon-pink to coral-red appearance on most mycologic agar media (Fig. 1) (5, 13).

Perniola et al (14) reported 4 neonates with *R. mucilaginosa* fungemia and searched for the most important risk factors. Length of TPN, antibiotic therapy, presence of a CVC and duration of enteral nutrition were the statistically significant risk factors. Our patient had carried an indwelling CVC for several years (the current one lasting for 8 months) and was receiving HPN 5 days a week. She had not received antibiotic treatment recently. Jiménez-Mejías et al (7) reported 3 patients with TPN who developed a *Rhodotorula* fungemia, but all of them had some defects in the immune response.

Kiehn et al (1) reported 23 cases of *Rhodotorula* fungemia from 1985 to 1989, and the major risk factor was the use of indwelling catheters. *Rhodotorula* remains in the lumen of the catheter, and peripheral blood cultures are often negative. Immunological compromise can allow the yeast to disseminate following the insertion of a central catheter. Lunardi et al (15) reported 7 cases of *Rhodotorula* fungemia in a tertiary care hospital in Brazil from 2002 to 2005 that did not grow the

yeast in the central venous catheters, and he considered translocation from the gastrointestinal tract to be the origin. This was also a possibility in our patient, as a severe motility disorder was the underlying disease. Our patient had 2 well-known risk factors: CVC and TPN.

The management of catheter-related *Rhodotorula* infections remains controversial. Some investigators suggest that catheter removal is enough (7). Others have demonstrated that antifungal therapy without removal of the catheter can be curative (3). Finally, several authors have advocated removal of the indwelling catheter with antifungal therapy (16) since *Rhodotorula* fungemia can cause life-threatening complications. In vitro *R. mucilaginosa* has low MIC values for amphotericin B and 5-fluorocytosine (MICs ≤ 1 mg/L), showing high MIC values for fluconazole (MIC ≥ 64 mg/L) (6, 17).

In summary, long incubation of blood cultures in HPN patients is necessary since organisms such as *Rhodotorula spp* are slow growers. Currently the epidemiology of *Rhodotorula mucilaginosa* is poorly understood. Studies of skin and/or gastrointestinal tract carriage are needed.

Conflict of interest: none declared.

Financial support: none.

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