

# *Rhodotorula* species from CAPD fluid

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## ABSTRACT

*Rhodotorula* is a pigmented yeast, a part of phylum Basidiomycota, that is quite easily identifiable by distinctive orange/red colonies when grown on Sabourauds Dextrose Agar. While being considered as a common contaminant, *Rhodotorula* may infect individuals with predisposing risk factors like patients with acquired immunodeficiency syndrome (AIDS), endocarditis, central venous catheter infections, fungaemia and sepsis. We report a case in which the *Rhodotorula* species was isolated from the peritoneal dialysis fluid of a 7-year-old child with the prune belly syndrome. The child was given systemic anti-fungals, and peritoneal dialysis (PD) catheter was removed after which the child became asymptomatic.

**Key words:** Peritoneal dialysis fluid, Prune-belly syndrome, *Rhodotorula*

## INTRODUCTION

Invasive fungal infections pose a serious threat to hospitalised patients worldwide.<sup>[1]</sup> *Rhodotorula* is a pigmented yeast, part of phylum Basidiomycota. It is a common ubiquitous fungus with a terrestrial and marine worldwide distribution, and has been known to cause fungaemia, meningitis, ventriculitis, peritonitis, endocarditis and infections caused by devices such as catheters and contact lenses.<sup>[2]</sup> Furthermore, it has been collected as a saprophyte from dermal, vaginal and respiratory specimens, as well as a colonising organism from haemodialysis machines and fiberoptic bronchoscopes.<sup>[3]</sup> *Rhodotorula* species have the ability to form biofilms of which *Rhodotorula mucilaginosa* (*R. mucilaginosa*) and *Rhodotorula minuta* (*R. minuta*) are the best biofilm-producing species and their clinical isolates are better at forming biofilms.<sup>[4]</sup> There are at least eight species of which *Rhodotorula rubra* (*R. rubra*), *Rhodotorula glutinis* (*R. glutinis*) and *R. minuta* are encountered in clinical specimens.

As with other genera, the most commonly described infection due to *Rhodotorula* is fungaemia. The risk factors for the development of infection include immunosuppression, neutropenia, broad-spectrum antibacterials, hyperalimentation, burns, surgery and endocarditis. The clinical presentation of *Rhodotorula* fungaemia is non-specific. This includes findings that may

be observed in bloodstream infections namely fever, chills, tachycardia and hypotension.<sup>[3]</sup>

## CASE REPORT

A 7-year-old boy who was a known case of the prune belly syndrome, chronic interstitial nephritis and stage IV chronic kidney disease, with recurrent urinary tract infection, anaemia, growth retardation, renal osteodystrophy and dyslipidemia presented with straw-coloured peritoneal dialysis fluid in July 2013. He was on continuous ambulatory peritoneal dialysis (CAPD), parenteral iron and erythropoietin since January 2013. He had peritonitis at the time of presentation. We received a sample of peritoneal dialysis (PD) fluid for culture and sensitivity.

The PD fluid was turbid. Pus cells were absent, and budding yeast cells were present on wet film examination. Gram stain showed Gram-positive budding yeast cells. Bacteriological and fungal cultures were done. Both aerobic and anaerobic bacteriological cultures were sterile after 48 hours of incubation. The specimen was inoculated on Sabouraud's Dextrose Agar and incubated both at 22°C and at 37°C.

On the fifth day, coral red, moist, smooth to mucoid, glistening colonies grew on SDA kept at 22°C [Figure 1]. Growth was obtained at 37°C only after 10 days. Lactophenol cotton blue mount of the growth showed budding yeast cells. Gram staining showed Gram-positive ovoid yeast cells with multiple budding. Pseudohyphae were absent [Figure 2]. India ink staining demonstrated capsule. Germ tube test inositol assimilation were negative.

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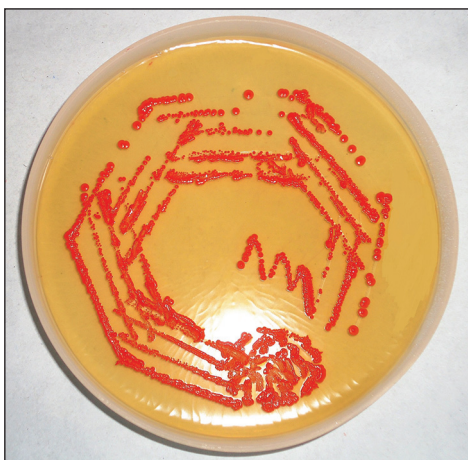
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**Figure 1:** Orange colonies of *Rhodotorula* on SDA

Nitrate was not reduced to nitrite. Fermentation tests were negative for glucose, sucrose, lactose, galactose, maltose and trehalose. Hydrolysis of urea was positive. The isolate was identified as *Rhodotorula* species. The child was given amphotericin B, and PD catheter was removed. He recovered and is now on twice weekly haemodialysis.

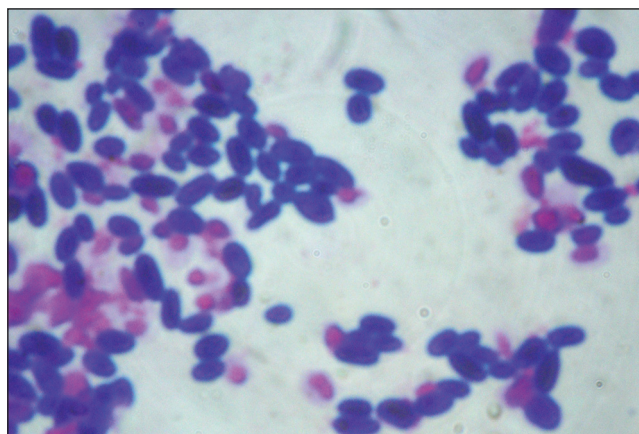
## DISCUSSION

*Rhodotorula* species are being increasingly recognised as an emerging pathogen in immunocompromised and debilitated host since the past decade, along with *Trichosporon* and *Geotrichum* species. This was described in an AIDS patient by Lui AY *et al.*<sup>[5]</sup> Fungal peritonitis is a relatively uncommon complication of peritoneal dialysis. Although it accounts for less than 5% of all peritonitis episodes in patients on CAPD, it contributes significantly to morbidity, drop out from CAPD program and mortality, as described by Bren A.<sup>[6]</sup> Contamination of the dialysis catheter with these ubiquitous organisms from the environment serves as a portal of entry, as reported by Navarro JT.<sup>[7]</sup>

The identifying features of *Rhodotorula* species include

1. presence of carotenoid pigments
2. multiple budding
3. rudimentary/absent pseudomycelia
4. inability to assimilate inositol
5. lack of fermentation.

*R. rubra* is documented in several fatal infections of lung, kidney and central nervous system (CNS) and is a known cause of fungal peritonitis in patients on CAPD. *Rhodotorula* fungaemia is due to colonised catheter, contaminated intravenous (IV) fluids, blood bank apparatus, etc. Removal of the source of contamination usually leads to clearing of symptoms.<sup>[8]</sup>



**Figure 2:** Gram stain of *Rhodotorula* species

Treatment of fungaemia includes systemic antifungal therapy [amphotericin B at the dose of 0.7 mg/kg/day] and/or removal of the central venous catheter. Intravenous amphotericin B is preferable to intraperitoneal amphotericin B.<sup>[9]</sup> In this case, the child was immunosuppressed. The organism might have colonised the PD catheter. Hence, its removal helped the child to overcome the infection.

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