Rhodotorula mucilaginosa Keratitis: A rare fungus from Eastern India

Suman Saha1,3, Jayangshu Sengupta2, Debapriya Chatterjee2, Debdal Banerjee3

Rhodotorula mucilaginosa rarely cause keratitis in immunocompromised individuals. A 30 year old male with history of minor trauma presented with cotton wool like stromal infiltration and hypopyon in left eye. Microbiological examination of corneal scraping showed fungal hyphae and yeast cells in direct smear. Molecular identification of the organism was performed which showed 100% homology with Rhodotorula mucilaginosa. Management of these cases is difficult often necessitating surgical procedures. However further reports are necessary to understand the disease and establish a treatment protocol.

Key words: Keratitis, Rhodotorula sp, Polymerase chain reaction

Rhodotorula sp. is a pigmented yeast belonging to the Sporidiobolaceae family of Basidiomycota phylum. It is a common environmental inhabitant found in soil, water, and air.[1] The genus Rhodotorula includes three active species; Rhodotorula glutinis, Rhodotorula minuta, and Rhodotorula mucilaginosa. This yeast fulfills the criteria of an emerging pathogen with few incidences of systemic and ocular infection being reported in literature over the last two decades.[1] Rhodotorula mucilaginosa and Rhodotorula glutinis were occasionally reported as causative agents for corneal ulcer.[2,4]

We hereby report a case of infective keratitis caused by Rhodotorula mucilaginosa from a tertiary-level eye care centre in eastern India.

Case Report

A 30 years old male, painter by occupation, presented with a history of pain, redness and watering in the left eye of 1-month duration following fall of paint 14 days prior to the onset of symptoms. He was treated with fortified cefazolin and fortified tobramycin before referral. At presentation, the best-corrected visual acuity in his left eye was perception of light with accurate projection of rays in all quadrants. Slit lamp examination revealed a central corneal infiltrate measuring 9.8x8.2 mm in size. The infiltrate was whitish in colour with a cotton wool texture involving the entire stromal thickness extending up to the temporal limbus [Fig. 1]. Hypopyon was present measuring 2.8 mm. An area of thinning was noted in the central portion of the infiltrate. No pigmentation or vascularisation was noted. Right eye examination was within normal limit.

Standard microbiological workup was performed. 10% Potassium hydroxide (KOH) and Gram’s staining showed mould hyphae and yeast [Fig. 2]. Topical treatment with Amphotericin B and natamycin 5% was started hourly along with atropine 1% eye drops used thrice a day. Systemic therapy consisted of oral itraconazole 100 mg twice daily. On medical therapy, there was progression of infiltrate necessitating a therapeutic keratoplasty with a 10 mm donor corneal button at 7 days from initial presentation. The excised corneal button was also subjected to microbiological and histopathological examination.

After 12 days of incubation orange pigmented glistening yeast like colonies were grown on SDA and PDA [Fig. 3]. Unicellular blastoconidia and elongated globose forms were seen in Grams staining from culture. Lactophenol cotton blue mount from the colonies showed capsulated yeast cells without hyphae [Fig. 4]. The yeast was initially identified as Rhodotorula sp. Histopathological sections also showed the presence of yeast like cells [Fig. 5]. Antifungal sensitivity testing by disc diffusion method (CLSI document M44-A2) showed maximum sensitivity to Voriconazole; Amphotericin B and Natamycin showed intermediate activity while it was resistant to Itaconazole and Fluconazole. Recurrence of infection in the graft was noted as reappearance of hypopyon (3mm) along with a temporal full thickness stromal infiltration (3.2 mm x 2.8mm) involving the graft-host junction, after 18 days with isolation of same organism. Medical therapy with topical voriconazole (2%) was initiated along with voriconazole lavage of the graft. Topical treatment with Natamycin showed intermediate activity while it was resistant to Itaconazole and Fluconazole. Recurrence of infection in the anterior chamber, which led to resolution of the infection and subsequently to graft failure at the end of 3 months.

Species confirmation was carried out at the Xcleris Genomic Centre, Ahmedabad, India by using D1/D2 region of LSU (Large SubUnit: 28SrDNA) based on PCR technique. PCR amplified a band with a sequence that was 100% homologous with Rhodotorula mucilaginosa (strain IMUFRJ 52028/ Gen Bank Accession Number: FN428899.1) [Fig. 6].

Discussion

Though the first case of Rhodotorula keratitis was reported by Romano et al.[3] way back in 1973, the pathogenicity of the organism was questionable. This case draws attention primarily because of the rarity of its occurrence and adds to our understanding of the disease process in the eye.

Eye infections constitute the second common group preceded by fungaemia (79% of the Rhodotorula infections). Until date, keratitis (6 cases) is reportedly more frequent than endophthalmitis (3 cases).[2,10] or dacryocystitis.[11] Immunosuppression and indwelling catheters have been the most common risk factor for systemic and ocular infections.[6-10]

Manuscript received: 18.10.10; Revision accepted: 16.06.11
The case in this report involves a young immunocompetent individual with no identifiable risk factors other than the fall of paint into the eye prior to the incidence.

Identification of Rhodotorula sp was made in culture characterized by typical colony morphology and appearance of blastoconidium. Though these organisms are not classically...
dimorphic, occasional budding yeast cells may become elongated and be mistaken as pseudohyphae. The clinical appearance along with the confounding dimorphic appearance on direct smear can be mistaken for Candida infection initially. Confirmation of *Rhodotorula mucilaginosa* was done by PCR based DNA sequencing. This species has been the most common organism identified in keratitis (3 cases) in previous reports.[2-4] Additionally, there is one report of isolation of *Rhodotorula glutinis*[5] and two reports where the specific organism was not identified.[7,8]

Evaluation of sensitivity pattern for this organism was performed which showed *in vitro* activity of voriconazole only. This has an important bearing on the management of the case, which showed lack of response to topical therapy with Amphotericin B and Natamycin. Reports show Amphotericin B to be the drug of choice for *Rhodotorula* infection with the lowest MICs (MIC90, 0.5 μg/ml) followed by itraconazole and voriconazole.[12,13] Similarly, failure of medical therapy in Rhodotorula keratitis is reported by Lifshitz et al.[3] and Casolari et al.[5]

Though there ought to be differences in the severity of initial presentation amongst these cases, failure of medical therapy as well as the sensitivity pattern of this isolate brings forward the inherent difficulties in treatment compared to systemic infections. While the sensitivity data available in literature mostly centers on systemic infections, drug penetration and toxicity are additional factors determining outcome in ocular infection. In addition, the sensitivity data obtained in this case may reflect a pattern for the particular isolated strain only. Though recurrence of infection was controlled with topical voriconazole therapy, it is difficult to comment upon the role of voriconazole in *Rhodotorula mucilaginosa* keratitis from a single case report. However, voriconazole has reportedly shown good intraocular penetration and *in vitro* activity against *Rhodotorula* sp. This may become the mainstay therapy in future with accumulation of further evidence and establishment of appropriate therapeutic principles.

**Conclusion**

*Rhodotorula mucilaginosa* is a rare cause of fungal keratitis. Management of these cases is difficult often necessitating surgical procedures probably because of our unpreparedness in dealing with these organisms. Topical treatment with voriconazole may be considered in non responsive cases. Further reports are necessary to understand the disease as well as the organism to establish a treatment protocol.

**Reference**