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Contamination of Soft Contact Lenses and Their Storage Cases with Fungi: A Problem Which Causes Fungal Keratitis

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Abstract: Contact lens weares with suspected fungal keratitis were referred to laboratory. The soft contact lenses and their storage cases were cultured successfully on Sabouraud dextrose agar medium. A heavy growth of suspected fungal colonies was obtained. These colonies were investigated further by physiological methods and slide culture. After macroscopic and microscopic examination the fungi was identified as *Paecilomyces* sp. and *Exophiala jeanselmi*.

Key words: *Exophiala jeanselmi*, *Paicilomyces* sp., contamination, soft contact lenses, fungal keratitis

INTRODUCTION

There are approximately 25 million contact lens wearers in the USA (Schein, 1993). Use of contact lenses for cosmetic and aphakic reasons is increasing. More than 80% of contact lens wearers use soft contact lens. Microbial keratitis is a serious complication of contact lens wear. In certain communities in the USA, contact lens wear was found to be the most significant risk factor for developing ulcerative keratitis. Contact lens and also contact lens cases are reported as the major sources for corneal infections in contact lenses weares (http://www.lineone.net/~magdvnofal/external).

In one report, *Pseudomonas aeruginosa* was the most frequent isolated pathogen (Mela *et al*., 2003) and the fungal, viral and *Acanthamoeba keratitis* were rare in another study (Sharma *et al*., 2003).

Current soft contact lenses vary in water content from 37 to 80%. Common sense of contact lens care is daily cleaning with detergent and water to rid the surface of lens of environmental debris, tear proteins and microorganisms, followed by soaking in a disinfecting solution for 4-12 h . If it is not done, fungal conidia that have adhered to the soft lens surface may germinate, give rise to hyphal penetration of the lens and subsequent mycelial growth within the soft lens matrix (Wilson and Ajello, 1999).

Studies on matrix penetration and growth of filamentous fungi in hydrogel lens suggest that higher water lenses, such as with extended-wear devices, are more susceptible to contamination and the lens plastic may itself act as a substrate for hyphal growth (Yamagushi *et al*., 1984; Simmons *et al*., 1986).

Such contamination is a significant cause of hydrogel lens spoilation, particularly in tropical regions (Magran and Hurtado, 1989; Hurtado *et al*., 1995). Although fungal spoilation of the hydrogel lens, without serious ocular sequeleae, is a more common event, an occasional case of keratomycosis associated with the wearing of such a contaminated lens has been reported. On lenses intended for cosmetic or aphakic wear, hyphomycetes are more commonly noted as agents of spoilation and *Curvularia lunata*, *Fusarium* spp. and Paecilomyces lilacinus are documented isolates from corneal infection related to soft lenses contaminated by fungi (Wilson and Ahran, 1986; Starr, 1987; Strelow *et al*., 1992; Choi *et al*., 2001).

MATERIALS AND METHODS

The causal agents of suspected contamination of three soft contact lenses and their cases were investigated by sampling of soft contact lenses and their cases in medical mycology laboratory of Shaheed Beheshti University of Medical Sciences, Tehran, Iran, in 2005 (Fig. 1-3).

Fig. 1: Contact lens (No.1)

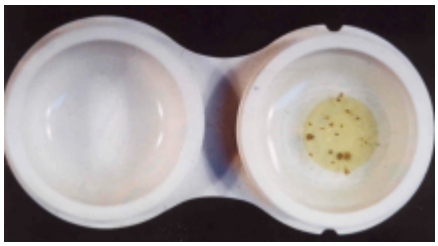

Fig. 2: Contact lens and its storage case (No.1)

Fig. 3: Contact lens and its storage case (No.2)

Fig. 4: *Paecilomyces* sp.

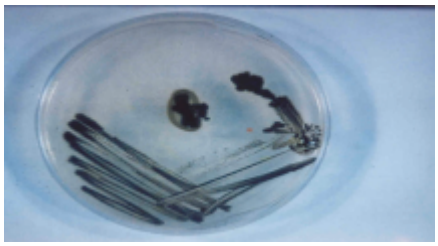

Fig. 5: *Exophiala jeanselmi*

We attempted to identify the cause of this suspected contamination. Samples were cultured on both Sabouraud dextrose agar (S) plates containing chloramphenicol (SC) and on S medium only and incubated at 22°C. All plates were examined at regular intervals for developing colonies.

RESULTS

From three samples investigated in this study, in two samples numerous pure colonies were obtained. These colonies were investigated further by physiological methods and slide culture. After macroscopic and microscopic examination the fungi was identified as *Paecilomyces* sp. (Fig. 4) and *Exophiala jeanselmi* (Fig. 5). In the third sample, fungal colony was not observed. This is the first report of specified fungal contamination of soft contact lenses in Iran.

CONCLUSIONS

Microbial contamination which originate from various environmental sources is the considerable predisposing factor in contact lens associated microbial Keratitis (Bowden *et al*., 1989). Many contact lens users who fail to follow lens hygienic practices develop contact lens associated microbial keratitis (Donizis *et al*., 1987). Hence, it is necessary to take precautionary measures to minimize the risk of such complications. Since the isolated fungi in this study are the same agents of fungal keratitis in previous reported article (Wilson and Ajello, 1999), contact lenses and storage cases hygienic maintenance is of great importance.

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