

**FUNGAL CONTAMINATION OF A HYDROGEL LENS**

**Authors**

**Karen Y. Foerch**

**James E. Paramore, O.D.**

## FUNGAL CONTAMINATION OF A HYDROGEL LENS

**Abstract** - A fifteen year old female was fitted with hydrogel lenses and placed on a biguanide disinfection system. She discontinued lens wear due to discomfort and large deposits were observed on the back surface of the lenses. Culture of the lenses and original solutions dispensed revealed a fungal contamination of the lenses only. The patient reported compliance but evidence showed noncompliance. Proper lens care is important in reducing microbial contamination of contact lenses. In this case, many factors could have lead to the contamination including the ineffectivity of biguanides against fungi.

## FUNGAL CONTAMINATION OF A HYDROGEL LENS

**History** - A fifteen year old female came to the clinic for a general vision examination and contact lens fitting on 6-4-91. She was fitted with daily wear Cibasoft lenses and at the dispensing date of 6-18-91 was placed on Alcon's Opti-Free as the care system. At the one week follow-up visit, she reported that vision and comfort were good. Objective findings indicated that the lenses were fitting well and that ocular physiology was normal. She was scheduled to return in one month for routine follow-up but did not keep that appointment.

The patient returned to the clinic on 9-25-91, having discontinued contact lens wear due to decreased comfort of the lenses. She complained of itching and watery eyes when she wore the lenses.

**Diagnostic Data** - Biomicroscopic exam at the 9-25-91 visit showed normal physiology with no evidence of infection but revealed the presence of large deposits on the lenses. The lenses were then placed under a 4X stereo microscope. Deposits were seen on the back surface only of both lenses. They appeared white with what seemed to be hyphae branching out from the main body of each deposit. A tentative diagnosis of fungal contamination was made due to the suspicious appearance of the deposits. The question of compliance was addressed many times with the patient during this follow-up, but she insisted that she was meeting the assigned requirements of daily cleaning and disinfecting and weekly enzyme cleaning of the lenses.

**Diagnosis** - The lenses were placed between two clear microscope slides and were observed with 20X and 40X magnification. Spores and definite hyphae were seen at these magnifications and at this point, a definite diagnosis of fungal contamination was made. The lenses were cultured

and the original solutions dispensed were returned for culture also. The lenses cultured positive for fungus while the solutions cultured negative.

To answer the question of compliance, we measured the amount of solutions used. An Alcon starter kit similar to the one dispensed with the lenses contains a 4oz. bottle of Opti-Free disinfecting solution which equals 118ml. The returned bottle had 38ml of solution remaining. In other words, it was estimated that the patient had used only 80ml of disinfecting solution since the dispensing date. The Alcon soaking case has a capacity of 1.4ml per well or 2.8ml for both wells. The number of soak times (days) possible for the entire 4oz. bottle with soaking only was determined by dividing 118ml by 2.8ml. This was approximately 42 times (days). The fact that she had used only 80ml of solution indicated that the lenses were soaked approximately 29 times (days), again, assuming the disinfection solution was used for soaking only.

By a similar method, it was also determined that the amount of Opti-Free daily cleaner used was 86 drops. Assuming that two drops were used per lens, four drops should have been used per day. Based on the amount of cleaner used, she cleaned the lenses approximately 22 times.

The period of time from the dispensing date (6-18-91) to the follow-up visit on 9-25-91 represents 100 days. This is 3-4 times the number of days it was estimated she had cleaned and disinfected her lenses.

**Treatment and follow-up** - New lenses were ordered and dispensed and the care system was changed to AoSept because of its greater effectiveness.

hygiene against fungi. The patient was reinstructed, stressing hygiene and lens care and digital cleaning of both surfaces of the lenses. A videotape on patient compliance was also shown to her.

**Discussion** - Proper lens care is routinely taught to all contact lens patients when new lenses are dispensed through our clinic. At follow-up visits, a review of the lens care regimen is discussed with the patient. In this case, lens care was reviewed many times and the patient was reporting compliance. With our estimations, the probability exists that she was noncompliant, thus showing that even though a patient is shown proper lens care and hygiene and reports compliance, we cannot be certain whether he/she is in fact compliant.

The colonies were shown to be adhering only to the back surface of the lenses. This was assumed to be due to the cleaning technique the patient used. If a lens is placed on the index finger with the anterior surface exposed and rubbed against the palm of the opposite hand, adequate cleaning will occur only on the anterior surface. For this reason, digital cleaning of both surfaces of the lenses should be stressed.

Hart and Shih<sup>1</sup> state that patient handling is a major cause of lens microbial contamination. The contaminant numbers increase significantly with long-term lens storage, noncompliance with the lens care regimen, and poor patient hygiene. Studies show that the cleaning and rinsing steps of a contact lens care regimen can remove more than 99.9% of the microbial contaminants from the lenses prior to the disinfection step<sup>4,5</sup>. This case also emphasizes that determining the amount of contact lens solutions used by the patient, especially the daily cleaning solution, is the best objective measure of compliance.

Many studies have been conducted comparing antimicrobial disinfecting activities of soft contact lens storage solutions. Certain studies have shown a cold disinfection system containing primarily a biguanide to exhibit virtually no antifungal activity, even under long-term lens storage (14 to 28 days)<sup>2,3</sup>. Both the Opti-Free and the ReNu systems contain biguanides as the primary disinfecting agent. The safety of any system however, may be questionable when patients do not comply with the thorough cleaning and rinsing required in the regimen.

Lastly, individual cases of fungal keratitis associated with contact lens wear have been reported<sup>6,7</sup>. Had we not determined the deposits to be fungal, replacement lenses would have been ordered and the lenses most likely would have been recontaminated, thus increasing the chances of a fungal eye infection. The importance of making accurate diagnoses of contact lens complications cannot be overstated!

**Acknowledgement** - The authors would like to thank Mr. Frank Hartley, FSU Lab Technologist, for the photographs and cultures.

## References

1. Hart DE, Shih KL: Surface interactions on hydrogel extended wear contact lenses: Microflora and microfauna. *Am J Optom Physiol Opt* 1987;64:739-748.
2. Littlefield S, Bao N, Kreutzer P: Comparative antimicrobial capacity of soft contact lens storage solutions. *ICLC* 1990; 17:272-275.
3. Shih KL, et al: Disinfecting activities of non-peroxide soft contact lens cold disinfection solutions. *CLAO*; July 1991; Vol.17:3:165-168.
4. Houlsby RD, Ghajar M, Chavez G: Microbiological evaluation of soft contact lens disinfecting solutions. *J Am Optom Assoc* 1984; 55:205-211.
5. Sibley MJ, Shih KL, Hu JC: The microbiological benefit of cleaning and rinsing contact lenses. *ICLC* 1985;12:235-242.
6. Ring CP: Lessons from problems of fungal keratitis. *Aust J Ophth* 1984;12:219-225.
7. Thalasselis A, Taie GF, Cabanne GR, et al: Mycotic conjunctivitis: An overview. *J Am Optom Assoc* 1985;56:498-500.