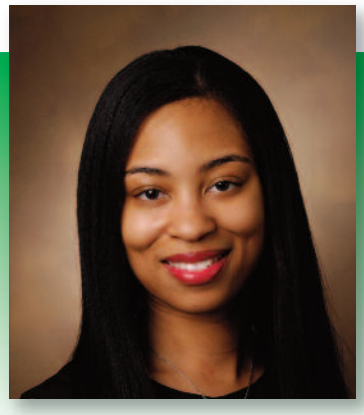
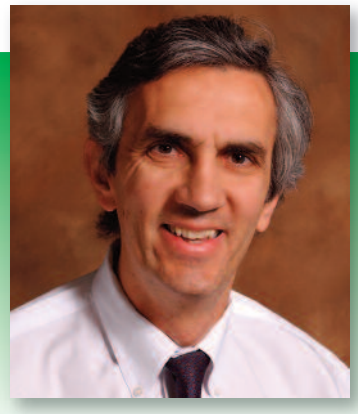
Cataract/IOL complications: Moran CPC reports

A case of postoperative opacification of a hydrophilic acrylic IOL

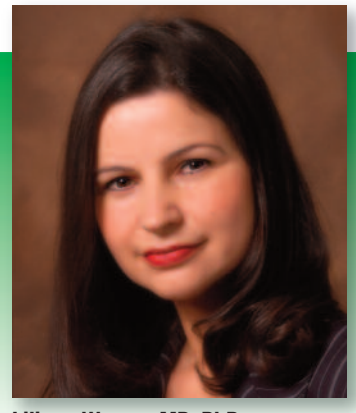
by Shannon Stallings, MD, Liliana Werner, MD, PhD, Nick Mamalis, MD



Shannon Stallings, MD



Nick Mamalis, MD



Liliana Werner, MD, PhD

The complication described in this article still leads to the explantation of a significant number of lenses analyzed in our laboratory. It is related to a particular class of intraocular lens (IOL) materials.

Case report

Seventeen months after uneventful cataract surgery with in-the-bag implantation of a Hydroview H60M (Bausch + Lomb, Rochester, N.Y.) hydrophilic acrylic IOL in 1998, a 70-year-old female patient with a history of Fuchs' corneal dystrophy presented with a progressive decrease in visual acuity, glare, and "cloudiness" in the right eye. She underwent Nd:YAG laser posterior capsulotomy, without significant improvement, and the lens was eventually explanted/exchanged in 2000 due to increasing optic haze observed at slit lamp examination (Figure 1). Although visual acuity only improved from 20/60 to 20/50 after IOL exchange, glare and "cloudiness" disappeared and the patient was satisfied with the results.

Laboratorial analyses and results

Gross examination showed a foldable posterior chamber hydrophilic acrylic IOL, with grafted blue-colored PMMA haptics. Small deposits were seen on the optic corresponding to the IOL haze/opacification described clinically. Microscopic examination of the lens revealed a layer of irregular granular deposits almost completely covering both the anterior and posterior surfaces of the optic, but not the haptics. The deposits consisted of multiple fine, translucent spherical-ovoid granules. Additionally, small pits consistent with Nd:YAG laser treatment were observed on the posterior IOL surface. The lens was subsequently stained with 1% alizarin red, and a sagittal section of the optic was stained using the von Kossa method (histochemical stains for calcium). The granular deposits on the optic stained positive with alizarin red and dark brown using von Kossa's method confirming the presence of calcium.

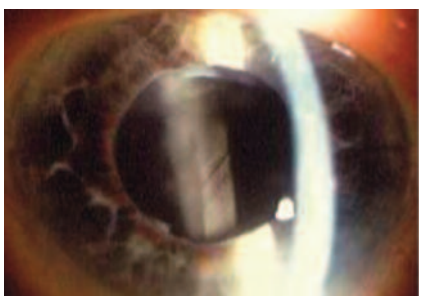


Figure 1: Slit lamp photograph of the opacified hydrophilic acrylic lens (Hydroview)

Case of Arne Öhrström, MD, Sweden

Comments

Postoperative optic opacification of hydrophilic acrylic IOL designs has been a significant complication leading to IOL explantation since 1999.[1] Different studies using histopathological, histochemical, electron microscopic, as well as elemental or molecular surface analytical techniques demonstrated that the opacification was related to calcium/phosphate precipitation on the surface/subsurface and/or within the optic substance of the lenses (Figures 2 and 3).[2,3] The four major designs manufactured in the U.S. involved in the problem were the Hydroview, the MemoryLens (Ciba Vision, Duluth, Ga.), the SC60B-OUV (Medical Developmental Research, Clearwater, Fla.), and the AquaSense (Ophthalmic Innovations International, Ontario, Calif.). The first two designs were commercially available in the U.S. and the other two designs, while manufactured in the U.S, where not approved for use in the U.S. Although in many cases it was difficult to determine the time optic opacification was first observed, the lenses involved in the problem were on average explanted during the second year post-implantation. The opacification was not associated with an anterior segment inflammatory reaction, and Nd:YAG laser was ineffective in removing the calcified deposits from the lenses.[1-3] Although it is now relatively rare to receive lenses from the four above-mentioned designs in our laboratory, we still receive sporadic cases of hydrophilic acrylic lenses of other designs manufactured in the U.S. or abroad that were explanted because of optic calcification.

Calcification of hydrophilic acrylic lenses appears to be a multifactorial problem, and factors related to IOL manufacture, IOL packaging (containing silicone components, which was the case with the explanted calcified Hydroview lenses), surgical techniques and adjuvants, as well as patient metabolic conditions, among others, may be implicated. As the exact combination of factors and sequence of events ulti-

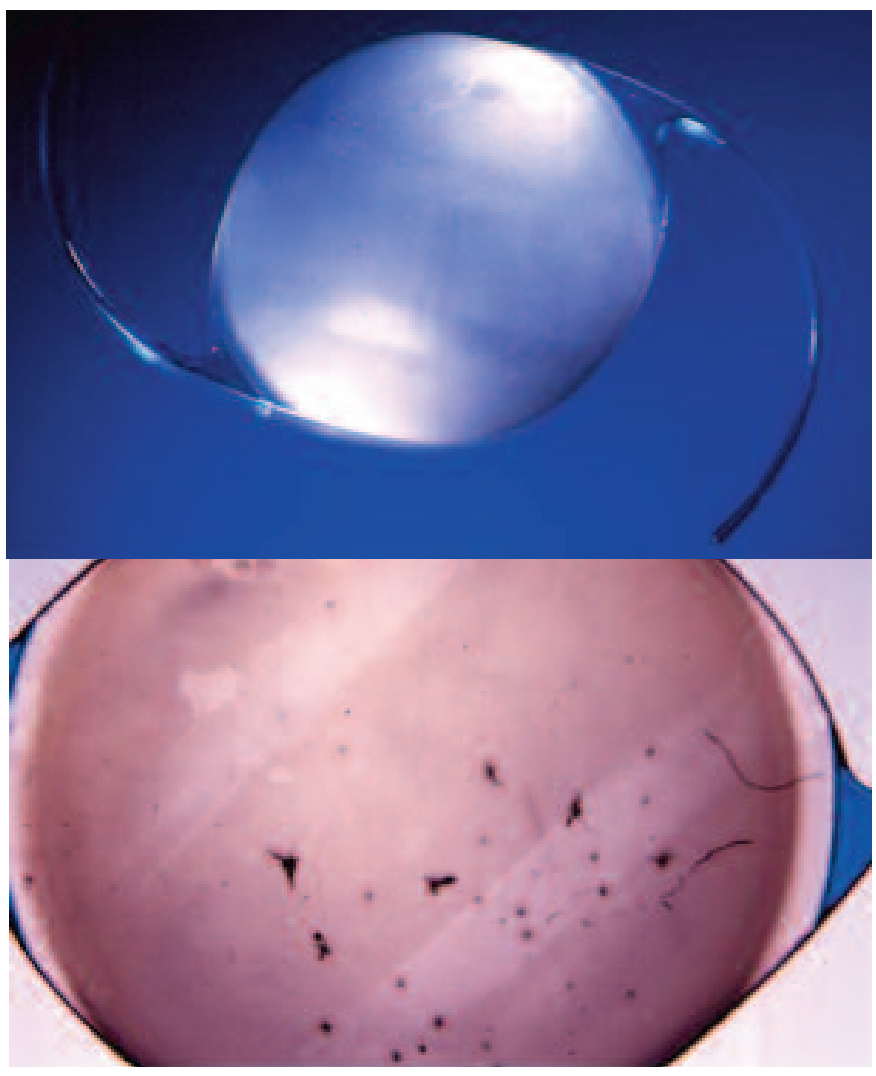


Figure 2: Gross and light microscopic photographs of explanted calcified hydrophilic acrylic lenses (Hydroview). Many Nd:YAG laser pits can be seen in the light photomicrograph.

Source: Mamalis/Werner laboratory, John A. Moran Eye Center,

mately leading to calcification of the lenses are still unknown, continuous research on this complication is warranted.[2] Surgeons must be able to recognize this condition during clinical examination. Not recognizing it can lead to potentially avoidable procedures (e.g., Nd:YAG laser posterior capsulotomy because of a misdiagnosis of posterior capsule opacification, which will make explantation more complicated and jeopardize implantation of a new lens inside of the capsular bag) and increased risk of complications after repeated interventions.[4] Explantation/exchange of the opacified/calcified IOL is to date the only possible treatment.

Differential diagnosis

1. Posterior capsule opacification is caused by migration and proliferation of residual lens epithelial cells behind the IOL optic. It can be treated successfully with Nd:YAG laser capsulotomy.
2. Snowflake degeneration is a slowly progressive opacification associated with lenses made of polymethyl methacrylate (PMMA), resulting from long-term exposure to ultraviolet light. The snowflake lesions are typically found within the anterior third of the optic substance. They are generally not observed in the periphery (due to protection from the iris), and do not disappear in the dry state. This type of degeneration has been observed mostly in lenses implanted between the early 1980s and mid 1990s.
3. Glistenings are fluid-filled microvacuoles, most often associated with hydrophobic acrylic lenses. They can typically be found within the entire optic substance of the lens, and unlike the lesions involved in snowflake degeneration, glistenings disappear when the lens is dry.
4. Cell deposits may be observed on the IOL surface after cataract surgery, and usually are composed of giant cells, macrophages, and fibroblast-like cells. They usually degenerate and detach from the IOL surface in the postoperative period. If necessary, they can be "dusted off" the IOL surface by using an Nd:YAG laser. **EW**

References

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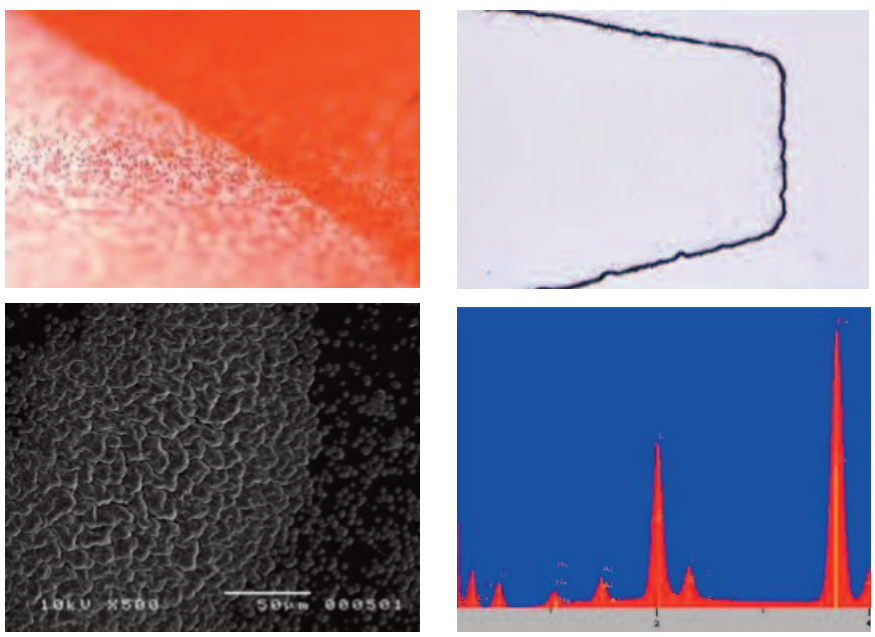

Figure 3: Histochemical (alizarin red and von Kossa), scanning electron microscopic, and surface analysis of explanted calcified hydrophilic acrylic lenses (Hydroview). P: phosphate, Ca: calcium

Source: Mamalis/Werner laboratory, John A. Moran Eye Center,

Editors' note: Drs. Stallings, Werner, and Mamalis are affiliated with the John A. Moran Eye Center, University of Utah, Salt Lake City. They have no financial interests related to this article.

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