Glistenings in Intraocular Lenses

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Statement of Purpose: The aim of this study is to provide a review on the literature related to the development of glistenings within the optic of intraocular lenses (IOLs) manufactured from different biomaterials and in different designs.

Methods: A literature search using the MEDLINE/PubMED database with the terms IOL glistenings, IOL vacuoles, and IOL microvacuoles was performed yielding approximately 50 articles, including approximately 18 articles from the Japanese literature. A search on adverse reports related to glistenings was performed in the FDA website (www.fda.gov / Medical Devices / Tools and Resources / Medical Devices Database / MAUDE / Go to Simple Search) using the search term intraocular lens glistenings. Analyses of explanted lenses performed by the author were also included in the review.

Results: Glistenings are fluid-filled microvacuoles that form within the IOL optic when the lens is in an aqueous environment (Figures 1 and 2). They can be observed with any type of IOL, although the majority of the available literature describes them in association with hydrophobic acrylic lenses. However, experimental and clinical studies suggest that different hydrophobic acrylic lenses currently in the market exhibit different tendencies to glistenings. Factors that may influence glistenings formation include IOL manufacturing technique, IOL packaging, associated conditions such as glaucoma or conditions leading to breakdown of the blood-aqueous barrier, as well as concurrent use of ocular medications. While the exact impact of glistenings on the postoperative visual function of the patient, as well as their evolution in the late postoperative period remains matters of controversy, IOL explantation due to glistenings has been rarely reported. Glistenings should be differentiated from other conditions leading to intraoptical opacities, including snowflake degeneration, and IOL calcification.

Conclusions: There are differences in wettability or water content of different hydrophobic acrylic lenses as a function of temperature changes, which may account for different tendencies for glistenings formation among these lenses, besides possible influences of the manufacturing technique. IOL manufacturers have been making efforts to improve manufacturing methods, carrying out the polymerization process as uniformly as possible to obtain polymer structures with minimal voids, which are the sites of glistening formation.

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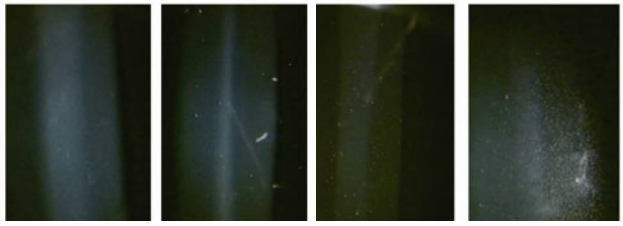

Figure 1: Slit lamp photographs from eyes implanted with hydrophobic acrylic lenses taken after pupil dilation at high magnification, showing the Miyata clinical grading system for glistenings (grades 0-3).

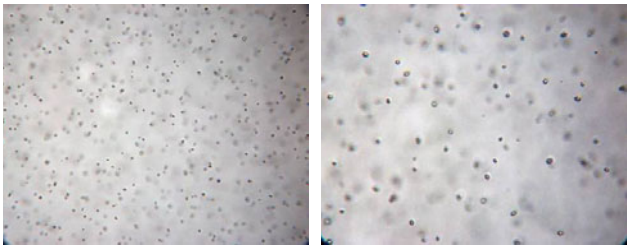

Figure 2: Light photomicrographs showing glistenings experimentally developed in the optic of a hydrophobic acrylic lens (Original magnification X200 and X400).