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Material Analysis and Optical Quality Assessment of Opacified Hydrophilic Acrylic Intraocular Lenses after Pars Plana Vitrectomy

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Abstract

Purpose: Explanted hydrophilic intraocular lenses (IOLs) with clinically significant opacification after pars plana vitrectomy (PPV) were assessed for material change and optical quality, in an *in-vitro* laboratory study.

Design: Retrospective observational case series.

Methods: 10 opacified IOLs after PPV with intraocular gas injection were analyzed in a laboratory setting. Analyses included evaluation of patients' medical history, optical quality assessment, light microscopy, histological staining, scanning electron microscopy and energy dispersive X-Ray spectroscopy.

Results: In all 10 IOLs a thin layer of calcium phosphate that had accumulated underneath either the anterior or posterior optical surface in a central circular area of the IOL optic caused the opacification. The calcifications lead to deterioration of the modulation transfer function (MTF) across all spatial frequencies.

Conclusion: PPV with instillation of gas into a pseudophakic eye with an acrylic hydrophilic lens seems to increase the risk for secondary calcification irrespective of the manufacturer. In these cases, IOL exchange is the only treatment option available. Since IOL exchange is associated with a high intraoperative complication rate, our results suggest to consider the risk of IOL calcification when implanting hydrophilic acrylic IOLs.