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Articles

Surgical prevention of posterior capsule opacification: Part 3: Intraocular lens optic barrier effect as a second line of defense ¹

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Abstract

Purpose

To emphasize an important aspect of preventing posterior capsule opacification (PCO), the barrier effect established by the optic of a posterior chamber intraocular lens (PC IOL), and present a new classification regarding capsular bag status after extracapsular cataract extraction, including phacoemulsification.

Setting

Center for Research on Ocular Therapeutics and Biodevices, Storm Eye Institute, Medical University of South Carolina, Charleston, South Carolina, USA.

Methods

This analysis included 150 consecutive eyes obtained postmortem with United States-manufactured PC IOLs including (1) poly(methyl methacrylate), (2) silicone, and (3) hydrophobic acrylic designs that were accessioned in the Center from September 1995 to January 1, 1998. Gross photographs from behind (Miyake's "Apple views") were taken and serial histologic sections prepared.

Results

Microscopic analysis of the 150 eyes showed that the morphologic appearance of the capsular bag could be grouped into 2 categories: (1) those with little or no evidence of retained cortical material and cells, and (2) those with retained cortical material and cells in which a Soemmering's ring formed. With the latter, when a distinct barricade to cellular migration created by the IOL optic was noted, 2 discrete configurations occurred, depending on the different geometries of the optic components. With a classic biconvex optic with a curved and tapered edge, in many instances some ingrowth of cells proceeded posteriorly around the edge of the IOL optic in the direction of the central axis. With a lens optic that had a squared, truncated, and relatively thick edge, there was often abrupt termination of cells at the peripheral edge of the optic. The posterior capsule subtending the entire optic zone was therefore relatively or totally cell free.

Conclusions

The barrier effect of the IOL optic appears to be of critical importance in retarding ingrowth of cells, functioning as a second line of defense when cortical cleanup is incomplete. Analysis of PC IOLs obtained postmortem showed that a square, truncated optic edge seemed to provide the maximum impediment to cell growth behind the IOL optic.



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