

AB083. Intraocular lens biocompatibility: a novel, objective approach

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Background: Understanding factors that contribute to posterior capsular opacification (PCO) development is a significant public concern as treatment can lead to complications. In order to prevent PCO, a better understanding of intraocular lens (IOL) characteristics, including design and material, and patient interaction is required. Herein, we performed a retrospective multivariable analysis to determine which factors (IOL and patient based) were least likely to result in PCO.

Methods: One hundred eighty post-mortem eyes with implanted IOLs were collected from the Minnesota Eye Bank, along with clinical history, including date of cataract surgery and IOL model number. The capsular bag (CB) with the IOL implant was removed from all eyes to obtain digital images. PCO outcome was quantified on CB images using an objective, automated custom image analyzer (Medical Parachute Automated Detector Opacification Software). The software measured intensity and area of the opacification within the IOL optic edge, intra-optic edge (IOE = intensity/area), and in Soemmering's ring (SR = intensity/area). Epidemiologic analysis assessed which IOL characteristics and patient-related factors correlated with PCO. IOL factors included material, edge design, lens filter, company, IOL model, decentration and time from cataract surgery to death. Patient factors included sex, age and diabetes, among others.

Results: Multivariate analyses showed non-diabetic patients had less PCO ($P=0.05$). Individuals 50–80 years old compared to 80+ had lower SR PCO ($P=0.04$). Non-blue light filter IOLs had lower SR and IOE PCO compared to filter IOLs ($P=0.03$, 0.001). Square and frosted optic edge design had lower SR and IOE PCO rates compared to OptiEdge and round optic edge design ($P=0.002$, 0.02). The IOL model that had the least PCO was the ZA9003 model, but this was only significant for SR and not IOE PCO ($P=0.04$). Adjusting for patient-factors, IOL lens model was no longer a confounding factor for PCO. Patients with an IOL implanted for <7 years had lower SR PCO, whereas lower IOE PCO was only seen in implants <4 years old ($P=0.0001$, 0.04).

Conclusions: In order to generate a lens that does not develop PCO, it is critical to understand the IOL- and patient-related factors that lead to PCO development. Based on our data, the most susceptible patients are elderly and diabetic, and it may be preferable to implant a square and frosted edge lens without blue-light filtering in this cohort.

Keywords: Intraocular lens (IOL); posterior capsule opacification (PCO)

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