



Ultrastructural effects of silicone oil on the clear crystalline lens of the human eye

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Abstract:

PURPOSE: To evaluate light and electron microscopic changes of the anterior capsule and its epithelium after clear lens extraction of vitrectomized myopic eyes with silicone oil tamponade. **METHODS:** This prospective, controlled, non-randomized, interventional study included 20 anterior lens capsular specimens that were excised during combined clear lens extraction and silicone oil removal from previously vitrectomized highly myopic patients with silicone oil tamponade for previous retinal detachment surgeries. The specimens were examined via light microscopy and electron microscopy and compared with 20 anterior capsule specimens removed during clear lens extraction of non-vitrectomized highly myopic eyes. **RESULTS:** Light microscopic examination of clear lens anterior capsule specimens of vitrectomized myopic eyes filled with silicone oil showed relatively more flat cells with irregular outline of lens' epithelial cells with wide intercellular spaces, deeply stained nuclei, and multiple intracytoplasmic vacuoles. Scanning electron microscopy revealed collagenous surfaces filled with multiple pits, depressions, and abnormal deposits. Transmission electron microscopy revealed lens epithelial cells with apoptotic changes, many cytoplasmic vacuoles, and filopodia-like protrusions between lens epithelial cells and the capsule. Epithelial proliferation and multilayering were also observed. **CONCLUSION:** silicone oil may play a role in the development of apoptotic and histopathological changes in clear lens epithelial cells. Clarity of the lens at the time of silicone oil removal does not indicate an absence of cataractous changes. We found justification of combined clear lens extraction and silicone oil removal or combined phacovitrectomy when silicone oil injection is planned, but further long-term studies with larger patient groups are required.

Keywords:

Anterior capsule, apoptosis, cataract, clear lens, silicone

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