

Cytotoxicity of Indocyanine Green on Retinal Pigment Epithelium Implications for Macular Hole Surgery

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摘要

Abstract

OBJECTIVE: To evaluate the potential cytotoxic effects of indocyanine green (ICG) on cultured human retinal pigment epithelium (RPE) and the resultant implications for macular hole surgery. **METHODS:** Human RPE cells were exposed to ICG in concentrations from 0.001 to 5 mg/mL. The exposure duration ranged from 5 minutes to 3 hours. Light microscopy, MTS viability assay, and calcein AM-ethidium homodimer 1 staining were used to evaluate the cytotoxic effects of ICG. **RESULTS:** The RPE cells incubated with up to 5 mg/mL of ICG for 5 minutes or less exhibited no morphologic change and no significant decrease in dehydrogenase activity. When RPE cells were exposed to 5 mg/mL of ICG for 10 minutes, 1 mg/mL of ICG for 20 minutes, or 0.01 mg/mL of ICG for 3 hours, cell morphologic features were altered, mitochondrial dehydrogenase activity decreased, and some cells were necrotic. **CONCLUSIONS:** Indocyanine green caused cytotoxicity in cultured human RPE in a dose- and time-dependent manner. Cell death occurred by necrosis. **CLINICAL RELEVANCE:** Exposure of RPE cells to ICG concentrations up to 5 mg/mL for 5 minutes or less was not injurious; prolonged exposure to a low ICG concentration was toxic. Since ICG may be retained in the vitreous cavity for a lengthy period, thorough washout of ICG during macular hole surgery is required