Acute reversible corneal endothelial changes associated with selective laser trabeculoplasty

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Purpose: To report transient, reversible corneal endothelial changes observed following selective laser trabeculoplasty (SLT).

Methods: Transient endothelial changes were observed approximately one hour after routine uncomplicated SLT at 2 centres using different machines and lenses. To further characterise this potential safety issue, a small group of patients undergoing routine SLT consented to have anterior segment photography, endothelial in vivo confocal microscopy (Heidelberg Retina Tomograph III Rostock Cornea Module) and non-contact specular microscopy (Tomey EM-3000). The treatment protocol was 50-60 shots, 0-9-1.3 mJ per shot to 180 degrees of angle with a coated Goldman lens (Ellex Tango combined YAG/SLT Laser, Adelaide, Australia). Postoperative steroids were not routinely given. Measurements were taken immediately after treatment and at routine followup at 6 weeks.

Results: All patients had clinically normal corneal endothelium prior to treatment with baseline endothelial cell counts of 2237 +/-211 cells/mm², (n = 14 eyes). Mean IOP drop was 4.9mm Hg (n = 14 eyes). Slit lamp biomicroscopy revealed small, localised spot-like corneal endothelial changes in all treated patients. Changes were most evident on confocal microscopy with limited or absent specular microscopic findings. The appearance was of patchy endothelial hyper-reflectivity without gross morphologic abnormality suggestive of cellular swelling. These changes were not present at the 6 week followup and endothelial cell counts remained unchanged (2278 ± 242 cells/mm², n = 14). There was also no change in endothelial cell size, central corneal thickness or visual acuity. Multisector confocal microscopic mapping in one patient following 180 degree inferior treatment revealed scattered endothelial changes throughout the entire cornea, suggesting a diffuse effect rather than focal laser injury or damage from ‘champagne bubbles’ related to the procedure.
Conclusions: SLT appears to cause transient corneal endothelial changes in most patients that have no impact on endothelial cell counts or visual acuity. Experimental exposure of endothelial cells to SLT treatment, pilocarpine, apraclonidine and free radical inducing compounds will help elucidate the mechanism behind this finding in future.