Editorial: Corneal endothelium

Studies in corneal physiology have established the crucial role of the endothelium in maintaining corneal transparency by keeping the stroma in a state of deturgescence. Application of this knowledge has led to the concept of endothelial decompensation as the primary factor in the pathogenesis of corneal oedema. Also there is now good evidence that human corneal endothelium does not replicate in vivo, and this has two important implications. First, it appears that the total complement of endothelial cells is slowly but progressively reduced throughout life. Second, if endothelial cells are destroyed the loss is not made good but the defect is covered by the expansion of surrounding cells, and clearly the endothelium has a limited capacity for repair. Thus it is possible to explain not only acute corneal oedema resulting from gross endothelial damage but also the phenomenon of delayed decompensation appearing sometimes many years after previous damage to the endothelium.

The corneal endothelium is susceptible to damage by many of the manipulations involved in surgery of the anterior segment of the eye, and assessment of the effects of endothelial damage in both the short and long term should be one of the most important criteria in evaluating new techniques of anterior segment surgery. This should be of particular importance in the new and often complicated methods of cataract surgery—for example, phacoemulsification and intraocular lens implants—for there is evidence that these techniques can be associated with considerable endothelial damage. In-vivo endothelial cell counts obtained by clinical specular reflection microscopy will give very useful information and should be included in studies of new techniques of anterior segment surgery, particularly when comparisons are made with established well-tried methods. However, the fundamental question which will concern all ophthalmic surgeons is the incidence of both early and delayed corneal oedema. The answer can come only from carefully planned and executed prospective clinical studies.