Table 36-1.

**Patients Treated With Corneal Cross-Linking for Corneal Edema**

| | Diagnosis | Preop Central Corneal Thickness | Preop Visual Acuity | Postop Central Corneal Thickness | Postop Visual Acuity |
|---|---|---|---|---|---|
| 1. 69-yo w | Fuchs' endothelial dystrophy | 0.68 | 0.3 | 0.60 | 0.5 |
| 2. 54-yo w | Fuchs' endothelial dystrophy | 0.58 | 0.6 | 0.51 | 0.8 |
| 3. 79-yo w | Fuchs' endothelial dystrophy | 0.66 | 0.2 | 0.53 | 0.2 |
| 4. 69-yo w | Fuchs' endothelial dystrophy | 0.65<br>0.61 | 0.7 | 0.61<br>0.58 | |
| 5. 80-yo w | Bullous keratopathy | 0.73<br>0.75 | | 0.75<br>0.51 | <br>0.05 |
| 6. 76-yo m | Bullous keratopathy | 0.9<br>0.78 | 0.05 | 0.78<br>0.90 | 0.05 |
| 7. 52-yo m | Rejected corneal graft | 0.80<br>0.66 | 0.01 | 0.66<br>0.57 | <br>0.05 |
| 8. 86-yo w | Rejected corneal graft | 0.76 | 0.02 | 0.67 | 0.05 |
| 9. 55-yo w | Rejected corneal graft | 0.69 | 0.05 | 0.58 | 0.05 |
| 10. 60-yo m | Glaucoma | 0.595 | 0.1 | 0.50 | 0.32 |
| 11. 58-yo w | Trauma | 0.659 | 0.1 | 0.560 | 0.25 |
| Cases 4 to 7 were treated twice | | | | | |

thesia with drops of 0.4% oxybuprocaine and 1% lidocaine gel with the patient in the supine position. The patient was asked to look at a red fixation light in the operating microscope. The epithelium was mechanically abraded, which was very easy in these cases of incipient or manifest edema. The cornea was then exposed to 0.1% riboflavin solution in 0.9% saline for 15 to 30 minutes. The cornea was treated by establishing a small open reservoir of an 8-mm corneal marker slightly pressed against the cornea. During the treatment, the patient often required another drop of anesthetics. When the staining period was ended, the eye was flushed with saline to remove any riboflavin on the conjunctiva and limbal cornea.

Radiation was performed with commercially available equipment (IROC UV-X) following the manufacturer's instructions. The radiation intensity was checked before each treatment, and the lamp was placed above the cornea in the optical focal distance. The wavelength is 365 nm (UVA), and the effect was 3 mW/cm$^2$. The treatment time was planned to be 30 minutes (5.4 J/cm$^2$), but, in some cases, it had to be shortened when the patient felt uncomfortable. The immediate aftercare comprised Voltaren (diclofenac) eye drops a maximum of 4 times a day and chloramphenicol ointment to prevent infection until the epithelium had healed. Postoperative follow-up in all cases exceeding 3 months included slit lamp biomicroscopy, optical noncontact pachymetry, and determination of visual acuity.

The preliminary clinical study[6] comprised 11 patients (4 with Fuchs' dystrophy, 2 with secondary bullous keratopathy, 3 with edematous-rejected grafts, 1 with corneal edema due to longstanding secondary glaucoma, and 1 with endothelial damage possibly due to mechanical damage after a complicated forceps delivery). Four of the patients were treated twice. The details of the material are presented in Table 36-1.

In all cases, the alternative to UV cross-linking would have been a grafting. The patients accepted the treatment