Letters to the Editor

Research Correspondence

Crosslinking for Recurrent Keratoconus

Dear Editor:

About 10% to 15% of keratoconus (KC) patients undergo at least 1 penetrating keratoplasty (PK) in their lifetime; however, recurrent KC is a major complication.[1] Corneal collagen cross-linking using riboflavin and ultraviolet A light (CXL) is effective for primary and secondary keractectasia.[2,3] To investigate if regrafting could be avoided, CXL was performed in 3 eyes of 3 patients with recurrent progressive KC after PK (Table 1, available at http://aaojournal.org).

Recurrent, progressive KC occurred between 17 and 21 years after initial keratoplasty and was defined as an increase of K_{max} in corneal topographies of more than 1 diopter over a follow-up of 1 year combined with a decrease in best-corrected visual acuity (BCVA) of at least 1 Snellen line. Anterior corneal curvature, height profile, and BCVA were evaluated before and for at least 12 months after CXL, including corneal topography (Keratograph C, Oculus, Wetzlar, Germany) and Scheimpflug imaging (Pentacam 70700, Oculus, Wetzlar, Germany). Patients using rigid contact lenses removed them at least 1 week before the preoperative examination and before each follow-up examination. The study was approved by the institutional review board of the canton of Zurich and adheres to the tenets of the Declaration of Helsinki.

Standard protocol[4] CXL using the "epithelium-off method" was performed except that the irradiation area was set for safety at least 1 mm within the limbus and the limbus was protected with a circular wet sponge to protect the limbal stem cells. After the treatment, ofloxacin 0.3% ointment and then a bandage contact lens soaked with preservative-free ofloxacin 0.3% were applied and left until complete healing of the corneal epithelium, followed by fluorometholone 0.1% eye drops twice daily for 2 weeks.

Progression of ectasia was arrested in all cases (Fig 1, available at http://aaojournal.org), defined as an increase of less than 1.0 diopter (D) of Kmax for at least 12 months. No operative or postoperative complications were encountered.

Recurrent keratoconus after penetrating keratoplasty usually takes up to 2 decades to occur, similar to the time needed for primary keratoconus to evolve.[1] This might be explained by the slow migration of abnormal recipient keratocytes into the donor button.[5] If this is correct, the recent trend toward deep lamellar keratoplasty might result in an increased incidence of recurrent keratectasia in the future. However, a "limbal" CXL with prophylactic irradiation of the peripheral host cornea before penetrating keratoplasty might be beneficial by destroying peripheral diseased host keratocytes, preventing them from invading the donor cornea thus reducing the incidence of recurrence and possibly also of graft rejection. Prospective trials are needed.

This initial study shows that CXL appears to arrest the progression of recurrent ectasia after penetrating keratoplasty for keratoconus with a follow-up of 12 to 19 months. Further studies are needed to confirm this therapeutic effect.

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Intravitreal Methotrexate in Uveitis

Dear Editor:

We previously reported a 6-month data analysis from a 2-year pilot study of the use of intravitreal methotrexate in uveitis, in which we found that intraocular methotrexate can be effective in some patients with uveitis (13/15), and that it has similar effects when repeated once in patients who relapsed (n = 4).[1] We would now like to report the findings of the full 2-year study.

No patient was given further injections of methotrexate after the 6-month visit. During the 18-month follow-up, 5 patients went on to develop bilateral disease activation and were switched to oral corticosteroid therapy, 1 patient had severe panuveitis for which oral therapy was deemed more appropriate, and 1 patient was lost to follow-up. Four patients with cystoid macular edema achieved partial, but not full, resolution of this with methotrexate and underwent subsequent intravitreal injection of triamcinolone acetate. The results of this were no better than the previous methotrexate injection. Four patients achieved extended disease remission, lasting in excess of 12 months.

One patient developed corneal epithelial edema 3 months after methotrexate injection. This resolved, but the patient subsequently went on to develop severe corneal endothelial decompensation at month 8; however, this patient had multiple other risk factors for endothelial failure. One patient developed reactivation of a peripapillary choroidal neovas-

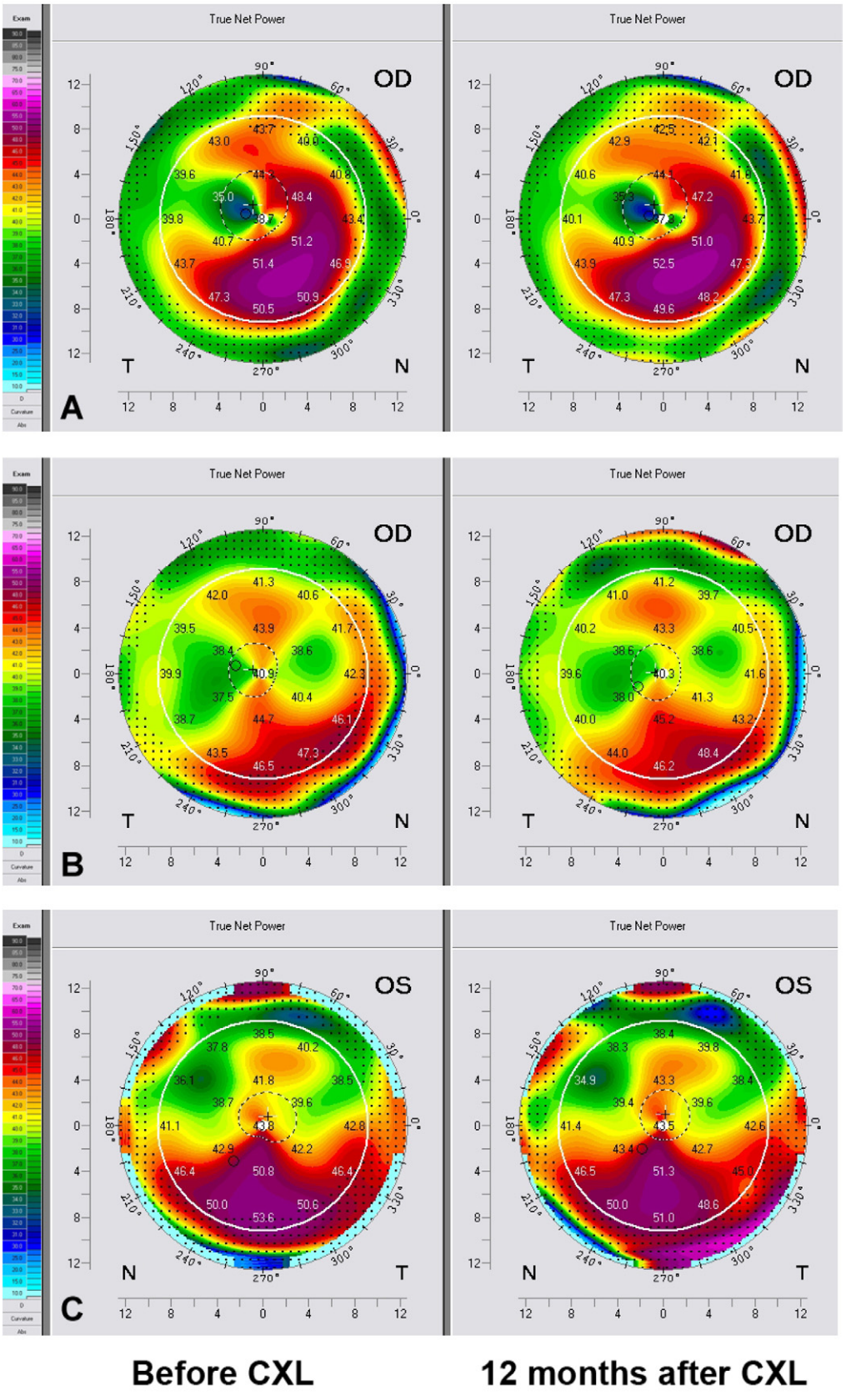

Figure 1. Scheimpflug analysis (true net power) of the anterior corneal surface before and at 12 months after CXL in **A**, case 1; **B**, case 2: and **C**, case 3 showing arrest of keratectasia in all cases. CXL = corneal collagen cross-linking; N = nasal; OD = left eye; OS = right eye; T = temporal.

Table 1. Clinical Characteristics Before and After CXL

Case	Age	Sex	Eye	Years until recurrence	BCVA before CXL	BCVA at 12 months after CXL	Kmax before CXL	Kmax at 12 months after CXI	Follow-up (months)
1	50	F	OD	21	20/100	20/100	53.7	53.3	12
2	51	M	OD	17	20/40	20/40	47.2	47.8	13
3	48	M	OS	17	20/40	20/40	53.6	51.3	19

F = Female; M = Male; OD = Right eye; OS = Left eye; BCVA = best-corrected visual acuity; CXL = corneal collagen-cross-linking.