Retinal Detachment Prevention in Opaque-Cornea Eyes Receiving A Permanent Keratoprosthesis

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INTRODUCTION

Placement of a permanent keratoprosthesis (KPro), as a solution to otherwise untreatable corneal blindness, is becoming increasingly commonplace.[1,2] But approximately 20% of KPro eyes suffer either rhegmatogenous, tractional or combined retinal detachment within seven years postoperatively.[2] The dominant KPro model (Boston type 1 KPro)[3] provides only a 3mm diameter optical stem, so that the retinal periphery remains largely obscured to clinical examination postoperatively. Partially as a consequence, repair of retinal detachment in KPro eyes is successful in less than 50% of cases, with most such eyes losing even ambulatory vision.[4] This can be especially important because the fellow eye of most KPro patients, if it is even present, is also severely diseased.

PURPOSE

To present a new method of effective retinal detachment prophylaxis for high-risk/ monocular KPro eyes that can be performed intraoperatively, immediately prior to KPro placement, in a single operation.

METHODS

We removed an opaque central cornea with an 8.75mm trephine, in order to accept a 9.00 mm graft with a pre-installed, 3mm optical stem, Boston KPro. We then emplaced a wide-field **temporary** keratoprosthesis (TKP) with an 8.2mm optical stem and a 13mm diameter flange; performed closed, wide-field (25-gauge) vitrectomy; and placed encircling laser prophylaxis from the ora serrata to the posterior vitreous base in all quadrants (ora secunda cerclage, OSC).[5] Finally, we removed the TKP and placed the 3mm optical stem, permanent KPro device, installed in the 9.00mm graft, into the same trephination (TKP/VIT/OSC/ KPro).

Fig. 1 – Preoperative opaque cornea left eye.

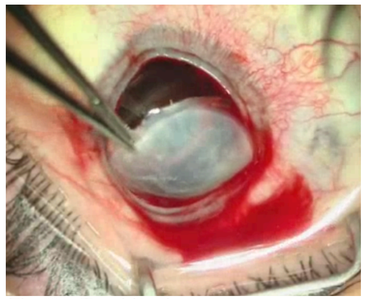

Fig. 2 – Trephined cornea.

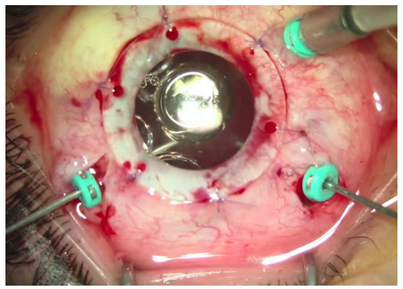

Fig. 3 – Wide-field Temporary Keratoprosthesis (TKP) vitrectomy (8.2mm optic)

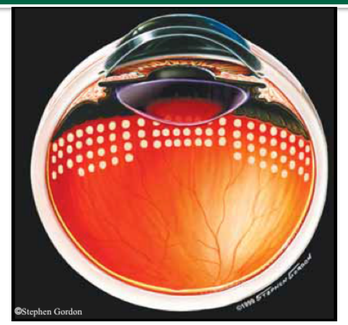

Fig. 4 – Ora secunda cerclage encircling laser prophylaxis, artist illustration (©Stephen Gordon)

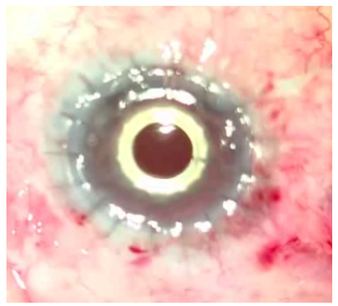

Fig. 5 – Permanent Keratoprosthesis (KPRO, 3.0 mm optic)

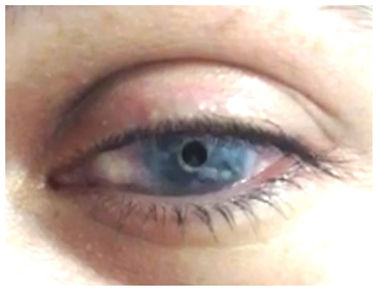

Fig. 6 – KPro left eye 36 months post-operatively.

RESULTS

Fourteen months after regaining useful vision in the right eye by KPro instillation, a 29-year-old man with bilateral failed penetrating keratoplasty* suffered phthisis and loss of all useful vision in this right eye, due to spontaneous retinal detachment with irreparable proliferative vitreoretinopathy. The fellow left eye then underwent the TKP/VIT/OSC/KPro procedure described above. Thirty-six months postoperatively, the retina remained completely attached in the left eye, with visual acuity of 20/100 at distance, and 20/25 at near with a low vision aid.

- Congenital cataract, aniridia, and glaucoma; extreme myopia; aphakia; status post glaucoma shunt; nystagmus; and opaque cornea, O.U.

CONCLUSION

Use of a wide-field, temporary keratoprosthesis, enabling both vitrectomy and retinal detachment prophylaxis by encircling laser, prior to permanent KPro instillation, should be considered for high-risk and/or monocular KPro recipients, pending a prospective clinical trial of this technique.

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Illustration courtesy of Stephen Gordon See Video at: helenkellerfoundation.org
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