

Surgical management of a recurrent hereditary benign intraepithelial dyskeratosis lesion involving a Boston keratoprosthesis

The Boston keratoprosthesis (Kpro) can provide vision in high-risk keratoplasty eyes (i.e., neovascularization, limbal stem cell deficiency [LSCD]), where normal keratoplasty invokes a high likelihood of failure. Because of increased risks of melts, keratitis, and endophthalmitis, Kpro eyes need close monitoring with close inspection of the front plate optical stem–keratoplasty junction. One disease entity in which management via Kpro has not been described previously is hereditary benign intraepithelial dyskeratosis (HBID). Patients with HBID may experience corneal involvement that can be visually disabling. Herein we present the unique case of a recurrent corneal HBID lesion after placement of a Kpro and the subsequent surgical management.

A 60-year-old female with history significant for poorly controlled type 2 diabetes, HBID bilaterally (OU), and primary open-angle glaucoma OU presented with chronically decreased vision. The patient had previously undergone a prior penetrating keratoplasty in the right eye (OD) to address a dense central scar. Despite aggressive management, the graft failed with subsequent corneal scarring, neovascularization, and total LSCD. The left eye also had corneal scarring, neovascularization, and total LSCD. Vision was counting fingers OU. While an ocular surface stem cell transplantation was considered the first choice for ocular surface rehabilitation (i.e., keratolimbal allograft), the decision was made to pursue a type 1 Kpro because her systemic comorbidities (i.e., history of hypertension, elevated cholesterol, hepatitis B, suspected fatty liver, and gout) and active smoking status made her a poor candidate for systemic immunosuppression. Because there was a 2 × 4 mm HBID lesion (cornea and conjunctiva) extending into the area to be trephined at 4:30 (Supplementary Fig. 1, available online), simple excision of the lesion's corneal aspect was performed at the time of an unremarkable Kpro surgery. Four months postoperatively, the corneal lesion recurred and progressively extended further onto the Kpro keratoplasty portion. This then subsequently encroached onto the central Kpro front plate optic (Figs. 1 and 2). Owing to the unpredictable nature of progressive growth, there was concern that this could potentially lead to microseparation between the front plate of the optical stem and the cornea with subsequent risk of additional complications, specifically endophthalmitis.

The patient was brought back to the operating room for surgical excision of the lesion (Supplementary Fig. 2, available online). The corneal and conjunctival components

combined measured approximately 4 × 6 mm. The decision was made to remove both components with a 1 mm border to decrease recurrence risk. The conjunctiva was elevated with epi-Shugarcaine with subsequent dissection of the surrounding conjunctiva with Westcott scissors. Next, a blunt lamellar dissector was used to find the posterior plane of the HBID's conjunctival aspect. Blunt dissection was carried centrally onto the cornea to the HBID's most central aspect on the front plate optic. After excision of the lesion, the no. 64 blade was used to smooth the surface. Cryotherapy was applied to the area where the lesion had resided along the cornea and to the edges of the conjunctiva in a double-freeze-thaw technique. The conjunctival edges of the conjunctival defect were undermined to form a lateral conjunctival flap and close the defect. The patient remained stable without any recurrence of the lesion for more than 2 years, with best-uncorrected visual acuity of 20/100 (Supplementary Fig. 3, available online). Unfortunately, shortly after the patient was seen at her 2-year follow-up, she suffered a large ST-segment elevation myocardial infarction and died.

HBID is a rare autosomal dominant disease first described in the Haliwa-Saponi Native American tribe of North Carolina.^{1–3} The disease presents with both ocular and oral manifestations that often have a vernal fluctuation in symptoms. The ocular manifestations are classically described as lesions of the bulbar conjunctiva, ranging from small, pinguecula-like lesions to raised, foamy, gelatinous juxtalimbal lesions. Histologically, HBID lesions are characterized by

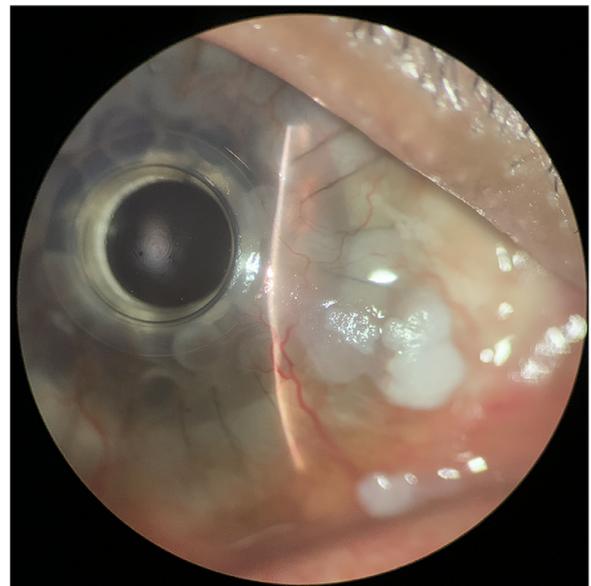


Fig. 1—Slit-lamp photograph demonstrating a recurrent hereditary benign intraepithelial dyskeratosis lesion extending over the Boston keratoprosthesis and encroaching onto the optical stem.

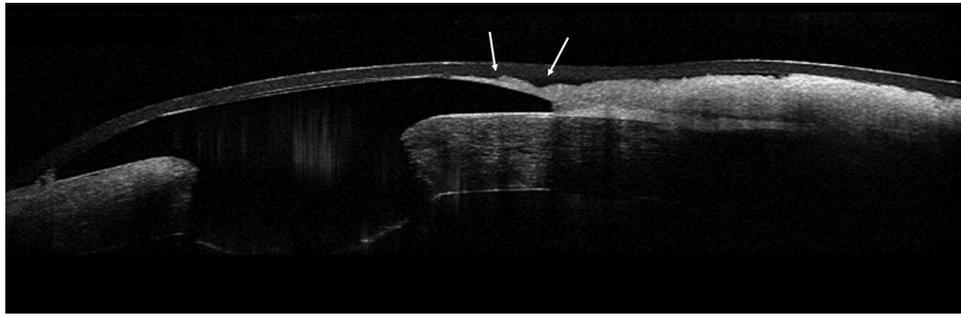


Fig. 2—Anterior segment optical coherence tomography image confirming extension over the Boston keratoprosthesis front plate optic (white arrows). There was no optical stem–keratoplasty separation.

acanthosis, parakeratosis, and hyperkeratosis with prominent dyskeratosis⁴ (Supplementary Fig. 4, available online).

Literature review revealed a relative paucity of information regarding management of recalcitrant HBID lesions. Typically, HBID presents with mild symptoms and requires only supportive care such as artificial tears or short courses of topical corticosteroid for episodes of acute keratitis.⁵ However, in more extensive cases, a reliable method for eradication of the lesion has yet to be established. Excision alone typically enables only temporary resolution, with recurrence of the lesions seemingly inevitable.⁵ Beta-irradiation was attempted by Reed et al.,⁵ but for some patients, plaques recurred in as few as 5 weeks, with recurrent lesions of greater visual significance.⁵ Similarly, injection of periocular corticosteroids in the form of subconjunctival triamcinolone has been described with some success,⁵ but often with recurrence.⁶ Penetrating keratoplasty also has been performed, with some studies demonstrating resolution of lesions for up to 10 months.⁵

Although HBID lesions are not malignant, they can result in visually significant sequelae including LSCD.⁷ Patients have been managed successfully with allogeneic limbal stem cell transplantation with systemic immunosuppression, which demonstrated no recurrence of HBID lesions for 1.5 years following limbal stem cell transplantation.⁷ Our patient was a poor candidate for systemic immunosuppression given her systemic comorbidities and active smoking status. Despite placement of a Kpro, the excised HBID lesion recurred 4 months postoperatively and began encroaching on the front plate optic over the subsequent months. We are unaware of any description in the literature of this HBID behavior with growth onto the front plate optic of the Kpro. While it is unclear whether this would have caused future problems in terms of microseparation of the Kpro components, the decision was made to remove the lesion prophylactically. Here we also present a potential surgical technique to address this recurrent HBID lesion.

No recurrence was observed in our patient for more than 2 years when she unfortunately succumbed to a sudden cardiovascular event. If anything, her sudden myocardial infarction further underscores that our patient was a poor candidate for the necessary systemic immunosuppression of limbal stem cell transplantation.

Double-freeze-thaw cryotherapy is a technique that has been used in both benign and malignant lesions of the conjunctiva to decrease rates of recurrence.^{8,9} The combination of using cryotherapy in this setting and covering the area with conjunctiva may help in deterring recurrence. Although this has prevented recurrence for a much longer period than 4 months (when the lesion recurred after simple excision), it is unclear how successful this treatment could be long term. For our patient, the procedure was enough to maintain a clear visual axis for the remainder of her life and prevent any further sequelae.

Supplementary Materials

Supplementary material associated with this article can be found in the online version at doi:[10.1016/j.cjjo.2022.05.006](https://doi.org/10.1016/j.cjjo.2022.05.006).

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References

1. Witkop C, Shankle C, Graham J, et al. Hereditary benign intraepithelial dyskeratosis II: oral manifestations and hereditary transmission. *Arch Pathol* 1960;70:696–711.
2. Von Sallmann L, Paton D. Hereditary benign intraepithelial dyskeratosis I: ocular manifestation. *Arch Ophthalmol* 1960; 63:421–42.
3. Allingham R, Seo B, Rampersaud E, et al. A duplication in chromosome 4q35 is associated with hereditary benign intraepithelial dyskeratosis. *Am J Hum Genet* 2001;68:414–91.
4. Cummings T, Dodd L, Eedes C, et al. Hereditary benign intraepithelial dyskeratosis: an evaluation of diagnostic cytology. *Arch Pathol Lab Med* 2008;132:1325–8.
5. Reed J, Cashwell F, Klintworth G. Corneal manifestations of hereditary benign intraepithelial dyskeratosis. *Arch Ophthalmol* 1979;97:297–300.

6. Shields C, Shields J, Eagle Jr. R. Hereditary benign intraepithelial dyskeratosis. *Arch Ophthalmol* 1987;105:422–3. doi: 10.1001/archophth.1987.01060030142045.
7. Cai R, Zhang C, Chen R, et al. Clinicopathological features of a suspected case of hereditary benign intraepithelial dyskeratosis with bilateral corneas involved: a case report and mini review. *Cornea* 2011;30:1481–4.
8. Fraunfelder F. Liquid nitrogen cryotherapy for conjunctival lymphangiectasia: a case series. *Trans Am Ophthalmol Soc* 2009;107:229–32.
9. Papaioannou I, Melachrinou M, Drimtzias E, et al. Corneal-conjunctival squamous cell carcinoma. *Cornea* 2008;27:957–8.

Footnotes and Disclosure

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