Scleral Lens + Restasis: A Novel Management of Vascularized Limbal Keratitis status-post Penetrating Keratoplasty

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BACKGROUND

Vascularized limbal keratitis (VLK) is a rare rigid contact lens complication commonly associated with untreated, chronic dryness and a tight peripheral fitting lens. In 1989, Grohe and Lebow first described and differentiated VLK as a clinical entity distinct from other forms of peripheral keratitis and corneal anomalies.[1] This inflammatory condition is characterized by an ill-defined, elevated, opaque limbal lesion along the horizontal meridian (at approximately 3 and 9 o'clock) and often associated with localized conjunctival hyperemia proximal to the lesion.

While a standardized treatment protocol for VLK has not been established, it is recommended that lens wear should be completely discontinued until elevation and vascularization have receded.[2] However, this is not possible for patients with irregular corneas who rely on rigid lenses for adequate visual function. This case report explores scleral lens wear in conjunction with Restasis as a novel treatment regimen for lens-induced VLK on a post-penetrating keratoplasty (PK) cornea.

CASE DESCRIPTION

A 71-year-old Hispanic female presented to University Eye Center with a history of advanced keratoconus OU s/p penetrating keratoplasty OD in 1996. The patient had an extensive history of contact lens wear over the past decades, including polymethyl-methacrylate (PMMA), rigid gas permeable (RGP) and piggyback lens modalities. The patient initially presented wearing spectacles with reduced acuities of $20/100^{-1}$ OD and 20/80 OS. Patient reported wearing GP lenses (Table 1) on a very limited basis over the past year due to exceeding irritation and discomfort in the right eye.

Table 1: RGP parameters

	Rx	Brand	Material	BC	Peripheral curves	Diameter	OZ	VA
OD	-3.25 sph	Conforma	Tyro-97	7.2	8.2/0.30, 9.7/0.30, 11.2/0.30	9.2	7.4	$20/40^{+2}$
OS	-9.75 sph	Conforma	Tyro-97	6.5	7.5/0.30, 9.0/0.30, 10.5/0.30	8.8	7.0	$20/40^{-2}$

Upon slit lamp examination of the right eye, a raised vascularized lesion at the limbocorneal region was noted along with associated conjunctival hyperemia. Additionally, 1+ corneal edema and 1+ deep corneal neovascularization crossing the graft-host junction were observed (Figure 1). This presentation, along with the patient's extensive contact lens wearing history, led to the suspicion of VLK in the right eye.

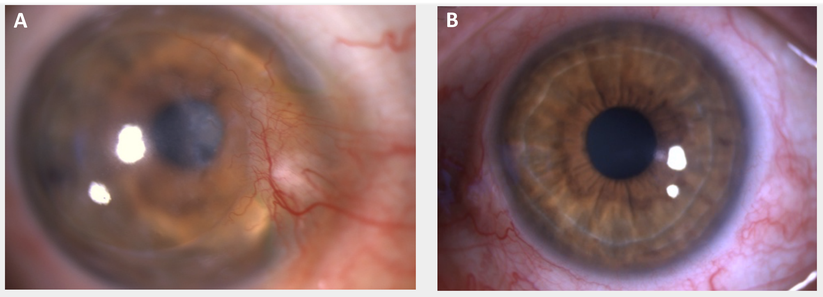

Figure 1. (A) Slit lamp photo of the right eye showing raised vascularized lesions at the nasal limbocorneal region. (B) Slit lamp photo of the left eye for comparison.

Due to her inadequate vision in spectacles and intolerance of GP lenses, patient was motivated to be fit into scleral lenses. Corneal imaging was obtained to aid in scleral lens fitting (figure 2). Endothelial cell counts were 2115 mm^2 in the right eye and 2385 mm^2 in the left eye, adequate to support scleral lens wear.

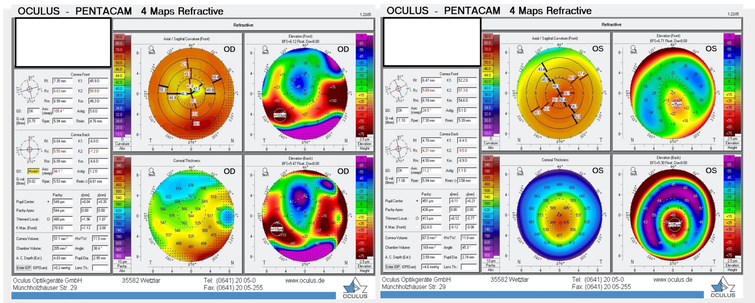

Figure 2. Pentacam topographical maps

Diagnostic fitting was performed. Various brands and lens designs were trialed on the right eye to achieve the optimal fit. An oblate lens design was utilized in order to vault over the elevated limbocorneal mass nasally. CL assessment showed good edge alignment with slight temporal edge lift, minimal lens movement, which may help to promote tear exchange and prevent hypoxic stress. Additionally, high Dk material (Boston XO) was used and low sagittal clearance was maintained throughout the lens to maximize oxygen transmission to the post-PK cornea (Figure 3). Patient reported excellent vision and all-day comfort with the scleral lenses.

Table 2: Final scleral lens parameters

	Rx	Brand	Type	BC/SAG	Diameter	CT	Material	Edge	VA
OD	-5.00 sph	Alden Optical	Zenlens Oblate	7.50/5600	17.00	0.25	Boston XO	STD/ FLT2	20/20
OS	+0.50 sph	Art Optical	Ampleye Toric	8.04/4400	16.50	0.30	Boston XO	SLZ 6.00	$20/25^{+2}$

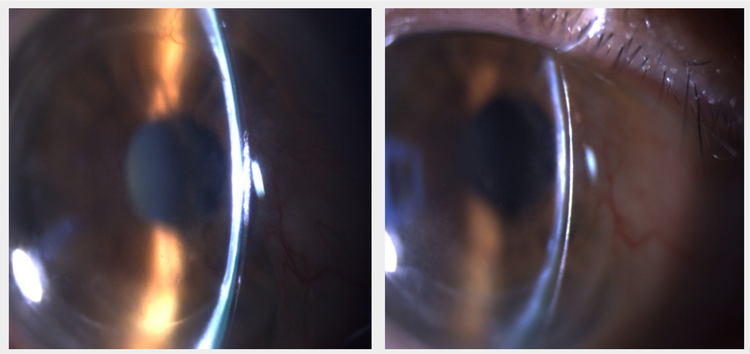

Figure 3. Scleral lens on the right eye in optic section showing minimal vaulting over the graft to enhance oxygen transmission to the cornea and prevent hypoxia.

At follow-up, patient was instructed to place a drop of an anti-inflammatory agent, Restasis, into the scleral bowl before topping off with LacriPure. Upon the initiation of scleral lens fitting, substantial regression of neovascularization and opacification has been observed (Figure 4). Patient continued to do well with the current treatment regimen.

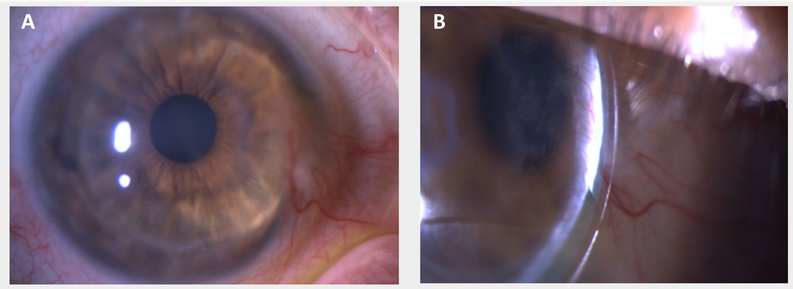

Figure 4. Slit lamp photo showing the reduction of the corneal haze and encroachment of the neovascularization into the graft cornea (A). A greater limbal vault was noted as the limbocorneal lesion flattened out (B).

DISCUSSION

Vascularized Limbal Keratitis (VLK) is a rigid contact lens complication due to poor peripheral fit, therefore, treating mild cases VLK often involves minimizing the peripheral lens-to-cornea relationship, by modifying the edges of the GP lens. However, discontinuation of rigid lens wear is often warranted in severe cases. Successful management of VLK with Prosthetic Replacement of the Ocular Surface System (PROSE) has been previously reported.[3] This case investigated the novel management of VLK using an oblate scleral lens design with concomitant delivery of an anti-inflammatory agent. The scleral lens acts as a shield that protects the cornea and conjunctiva against the environment and eyelids, while the anti-inflammatory agent addresses the inflammation associated with VLK. Our patient has also been using a low-dose steroid (Fluorometholone 0.1%) 1 gtt QD OD on a long-term basis to prevent graft rejection. However, she was educated not to instill any steroid in the fluid reservoir of the scleral lens but rather to utilize preservative-free Cycloporine 0.05% in conjunction with her habitual LacriPure.

Close monitoring of patients with VLK is critical, as regression of the limbal lesion may alter the lens-to-cornea relationship, potentially resulting in excessive limbal clearance and creating a hypoxic environment for the cornea. If too much limbal clearance was noted upon resolution of VLK, parameters of the scleral lens design should be re-optimized to ensure ample oxygenation to the cornea.

CONCLUSION

Rigid gas permeable contact lenses remain as the first-line treatment for post-PK patients due to their excellent oxygen transmissibility, but unsatisfactory fits and corneal complications warrant a change in management. This case demonstrates that refitting patients into scleral lens along with an anti-inflammatory agent promotes the visual rehabilitation of GP-intolerant post-PK corneas in the setting of VLK.

REFERENCES

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