No hard feelings: Scleral lens fitting for neurotrophic keratitis secondary to traumatic brain injury

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Background

Neurotrophic keratitis (NK) is a corneal disease characterized by a loss or reduction in corneal sensitivity secondary to trigeminal nerve damage. Common etiologies of neurotrophic keratitis include herpes keratitis, chemical burns, corneal anesthetic abuse, corneal surgery, contact lens abuse, diabetes mellitus, and neurological trauma. Patients experiencing NK typically present with superficial punctate keratitis (SPK), swelling of the epithelial cells, disruption of the epithelial layer, stromal scarring, and corneal neovascularization.

Case Summary

Case History:

Patient Demographics: 46 year old Caucasian Male
Chief Complaint: Blurry vision and mild irritation, OS
HPI: Constant blurry vision, redness, and irritation, OS for 7 months occurring after motorcycle accident with associated traumatic brain injury (TBI). Associated symptoms include loss of taste and smell since accident, previously diagnosed contraction field defects, OU, partial paralysis of his left arm, multiple skull fractures.

Medical history:

Traumatic Brain Injury – 7 months prior with associated subdural hematoma, multiple skull base fractures, bilateral temporal bone fractures, left sphenoid fracture, bilateral visual field defect

Ocular Medications:

Erythromycin ointment, OS; Celluvisc, OS

Pertinent Findings:

Visual Acuities (sc): OD: 20/20; OS: 20/400, PH: 20/100-
K’s: OS: 44.25@005/45.50@095
Intraocular Pressures (IOP): OD: 14 mmHg
OS: 15 mmHg
Visual Fields: Wand confrontations – generalized contraction of visual field, OU

Slit Lamp Exam:

Adnexa: OD: unremarkable
OS: incomplete blinks, full closure upon command

Conjunctiva: OD: White and Quiet
OS: 1+ injection

Cornea: OD: Clear x 3
OS: Microcystic edema lower 2/3; 3+ SPK inferior

Optic Nerve: OD: 0.35/0.35, pink and perfuse
OS: 0.40/0.40, pink and perfuse

Retina: OD: Chorioretinal scar with operculum temporal at ora serrata
OS: Flat and intact, 360

Diagnosis:

1. Exposure keratoconjunctivitis, OS
2. Unspecified corneal edema
3. Diffuse TBI w/ LOC > 24 hour with return to consciousness
4. Paralytic lagophthalmos left upper eyelid
5. Generalized contraction of visual field, OU

Treatment:

Patient elects to be fit in a scleral lens, OS to protect eye from exposure. Pressure patch every night to protect eye from the environment. Erythromycin ung 0.5% BID and Celluvisc every night and throughout day every hour until scleral lens arrives. Patient educated to practice complete blinks, OS.

Discussion

Neurotrophic keratitis:

• Most NK patients are asymptomatic due to the absence of corneal innervation. However, once epithelium has been damaged or scarred, patients typically will notice blurred vision or redness.
• Mild to moderate cases of NK require frequent non-preserved artificial tears (NPATs) and nighttime ointment along with an antibiotic ointment to prevent infection. Advanced cases often require tarsorrhaphy, pressure patching, amniotic membrane graft, and/or bandage lenses to protect the ocular surface.

Challenges Encountered:

• Prokera ammoniac membranes had to be used due to exposure while not wearing his scleral lenses on three occasions due to significant 4+ SPK.
• Insertion and removal was difficult for the patient due to left arm paralysis. Training was attempted with a stand insertion device, but patient elected to have his caregiver insert and remove the lens.
• A strong Bell’s reflex combined with a lack of orbital fat resulted in the patient repeatedly having the scleral lens stuck in his upper fornix during insertion. As the patient became more comfortable with insertion and began using a fixation point, the incidence decreased.
• Patient experienced a corneal ulcer months after lens finalization believed to be secondary to injury during insertion and removal. Although patient experienced an ulcer, he still elected to continue scleral lens wear and elected not to have tarsorrhaphy.

Treatment

Evaluation of Contact Lens Fit:

OS: ZenLens Prolate Toric PC
Central vault approximately 325um, adequate limbal clearance, aligned landing zone 360
VA: 20/20-

Contact Lens Ordered

<table>
<thead>
<tr>
<th>Power</th>
<th>Sagittal Depth</th>
<th>Diameter</th>
<th>Landing Zone</th>
<th>Manufacturer</th>
<th>Design</th>
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<td>4.350 mm</td>
<td>16.0 mm</td>
<td>Standard / Steep 4</td>
<td>Alden Optical</td>
<td>ZenLens Prolate</td>
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Results:

• Patient was successfully fit in medically necessary scleral contact lenses that provided a fluid reservoir and protection for his eye
• Combined with current lubrication therapy, patient’s corneal edema subsided and epithelial staining was reduced significantly
• Patient was able to avoid tarsorrhaphy surgery, which was a last resort for the patient.

References available upon request