Treatment and Management of Bilateral Alkaline Ocular Burns

Jessica Jose, OD and Stephanie Fromstein, OD
Illinois College of Optometry
Chicago, Illinois

3241 South Michigan Avenue, Chicago, Illinois 60616

BACKGROUND

Chemical burns of all types require immediate treatment and daily follow-ups. While alkaline materials typically penetrate more deeply than acidic substances, all burns require similar management. Thorough rinsing of the globe in order to reach a neutral pH (7.0-7.4)[1] is required in order to facilitate healing. In cases of limbal blanching, Prokera Cryopreserved Amniotic Membranes (PCAM) may be used in order to preserve stem cell structure and function.[3,4] If left untreated, pathological effects, including conjunctival and corneal necrosis, loss of limbal vasculature and stem cells, and damage to internal ocular tissues, are an absolute certainty.[2]

CLINICAL PRESENTATION

A 24-year-old black male presented to clinic with severe bilateral alkaline chemical burns. Initial pH was measured to be 8.4 OU. Five hours of rinsing with non-preserved saline was performed in-office.

CLINICAL TESTING

At the initial visit, visual acuity was reduced; 360 limbal blanching OU; 4+ diffuse hyperemia; and adnexal and conjunctival chemosis OU. The patient left the office with a pH of 7.4 OU.

PLAN

The patient was prescribed a topical antibiotic 1gtt OU QID; a topical steroid 1gtt OU QID; and Preservative Free Artificial Tears 1gtt OU every 30 minutes. PCAM was placed on both eyes at the 1day follow-up.

TREATMENT

After removal of the Prokera, 8.6mm bandage contact lenses were placed on both eyes. Daily patient follow-up was initiated until corneal epithelial tissue was completely healed. The medication schedule remained unchanged.

DISCUSSION

Prokera Cryopreserved Amniotic Membrane use as the sole treatment of ocular burns is off-label and is not indicated or suggested. However, due to their ability to speed healing and promote regeneration of ocular tissue by encouraging re-epithelialization, reducing inflammation and scarring, preventing neovascularization, and improving patient comfort[4], PCAMs may be a strong addition to the ocular burn "gold-standard" of treatment.

Composed of three layers - a single layer of epithelium, a thick basement membrane, and an avascular stroma[4] - PCAMs have a variety of unique, inherent properties which gives them their specialized treatment profile.

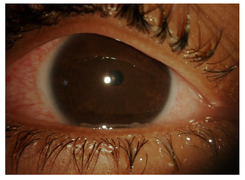
The stromal layer is thought to be the mediator of inflammation, reducing the prevalence of inflammatory complexes that can lead to scarring. In addition, specialized fibroblast inhibition provides an anti-scarring effect as well. Furthermore, the tissue is naturally avascular, making it inherently anti- vascular endothelial growth factor (VEGF), preventing growth of neovascular vessels into the cornea; the inhibition of VEGF migration allows the cornea underneath to receive the same antiangiogenic properties as the PCAM. [4,5] In addition, studies have shown that PCAM promotes expansion of limbal stem cells, even in cases of cellular decompensation.

Clinical uses for PCAM include any condition causing damage to the surface cells or underlying stromal inflammation or scarring. [4,5] There is a select group of patients in which the PCAM would be contraindicated: patients with glaucoma drainage devices or filtering blebs and/or patients with an allergy to ciprofloxacin or amphotericin B[4,5], as the PCAMs are stored in a medium which contains both pharmacologic agents.

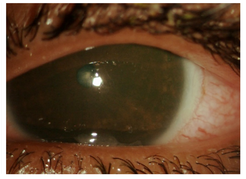
DAY 1

Initial Presentation and Examination Pertinent Clinic Findings		
CC: Bilateral Alkaline Burns Initial assault 1day ago 10/10 pain OU; (+) redness, photophobia, changes in vision OU		
	OD	OS
Visual Acuity, sc	20/40-2	20/40-2
Lids/ Lashes	*3+ chemosis *3+ hyperemia *Mucous discharge in lashes	*3+ chemosis *3+ hyperemia
Conjunctiva	*4+ diffuse injection *Possible symblepharon formation temporal LEL	*4+ diffuse injection
Cornea	*Epithelial disruption (-) NaFl stain *Stromal edema *360 limbal blanching	*Epithelial disruption (-) NaFl stain *Stromal edema *360 limbal blanching
Treatment	*Topical Antibiotic 1gtt OU QID *Topical Steroid 1gtt OU QID *PF AT 1gtt OU every 30minutes *Prokera Cryopreserved Amniotic Membrane placed OU at Day 2 f/u	

RIGHT EYE



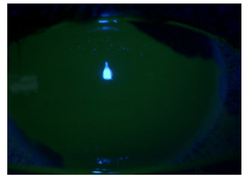
LEFT EYE



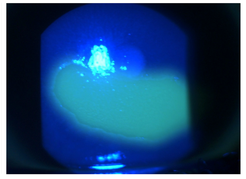
DAY 4

Day 4 Presentation and Examination Pertinent Clinic Findings		
CC: Bilateral Alkaline Burns Initial assault 4days ago 4/10 pain OU; (+) redness, photophobia, changes in vision OU Prokera Cryopreserved Amniotic Membrane removed OU today		
	OD	OS
Visual Acuity, sc	20/15	20/20
Lids/ Lashes	*Mild chemosis	*Mild chemosis
Conjunctiva	*3+ diffuse injection	*3+ diffuse injection
Cornea	*10x10mm epithelial erosion (+) NaFl stain *Stromal edema, haze *360 limbal blanching	*7x4mm epithelial erosion (+) NaFl stain *Stromal edema, haze *360 limbal blanching
Treatment	*Topical Antibiotic 1gtt OU QID *Topical Steroid 1gtt OU QID *PF AT 1gtt OU every 30minutes *400mg Ibuprofen po q6hours *Placed 8.6mm BCL OU	

RIGHT EYE



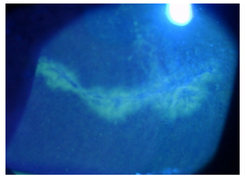
LEFT EYE



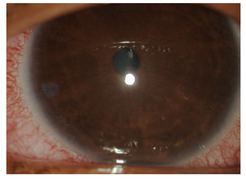
DAY 14

Day 14 Presentation and Examination Pertinent Clinic Findings		
CC: Bilateral Alkaline Burns Initial assault 14days ago 0/10 pain OU; (+) mild redness, photophobia; (-) changes in vision		
	OD	OS
Visual Acuity, sc	20/15	20/20
Conjunctiva	*Trace diffuse injection *1+ nasal injection	*Trace diffuse injection *1+ nasal injection
Cornea	*1+ diffuse PEE *6mm linear epithelial defect, resolving *(-) stromal edema, haze *(+) Nasal, temporal limbal blanching	*1+ diffuse PEE *(-) epithelial defects *(-) stromal edema, haze *(+) Nasal, temporal limbal blanching
Treatment	*Topical Antibiotic 1gtt OU QID *Topical Steroid 1gtt OU TID (began taper) *PF AT 1gtt OU q1h *Removed 8.6mm BCL OU	

RIGHT EYE



LEFT EYE

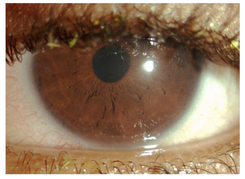


DAY 21

Day 21 Presentation and Examination Pertinent Clinic Findings		
CC: Bilateral Alkaline Burns Initial assault 21days ago 0/10 pain OU; (+) mild redness (-) changes in vision, photophobia		
	OD	OS
Visual Acuity, sc	20/15	20/20
Conjunctiva	*Trace diffuse injection *1+ nasal injection	*Trace diffuse injection *1+ nasal injection
Cornea	*Trace diffuse PEE *(+) Nasal, temporal limbal blanching	*Trace diffuse PEE *(+) Nasal, temporal limbal blanching
Treatment	*Discontinue topical Antibiotic 1gtt OU QID *Continue taper topical Steroid 1gtt OU BID *PF AT 1gtt OU QID	

RIGHT EYE

LEFT EYE



CONCLUSION

Our patient continues to display signs of limbal blanching nasally and temporally in both eyes; however, his epithelium has remained in-tact and visual acuity returned to 20/15 OU. We continue to monitor closely.

Key Words: Chemical Burn; Limbal Blanching; Prokera Cryopreserved Amniotic Membrane

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CONTACT INFORMATION
Jessica Jose, O.D. at jejose@ico.edu
www.ico.edu