Breaking the Cycle
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Abstract

A 32 year-old female with a history of LASIK surgery in both eyes and untreated Systemic Lupus Erythematosus presented with a one week history of redness, irritation and blurry vision in both eyes. Her vision was 20/40+ in the right and 20/30 in the left. She was found to have diffuse punctuate epithelial erosions and multiple filaments along the borders of her LASIK flap in both eyes and was diagnosed with filamentary keratitis in the setting of Lupus. She was initially treated with the removal of the filaments, a bandage contact lens, punctual plugs, preservative–free artificial tears and prednisolone drops. Although she initially improved, an attempt to taper the prednisolone led to a severe flare-up, requiring reinitiating steroid drops, adding restasis, artificial tear ointment and mucomyst. However, the patient continued a cycle of relapse and remission until finally, she saw a rheumatologist who started her on hydroxychloroquine for her Lupus. This case demonstrates the recalcitrant nature of filamentary keratitis and the importance of escalating treatment if a patient does not respond. Management of the underlying association, such as Lupus, is critical to breaking the cycle of inflammation and damage.

History

A 32 year-old Chinese female presented to the New York Eye and Ear walk-in clinic in January 2016, complaining of redness, irritation and blurry vision in both eyes, right greater than left, for one week. Prior to presentation, she had tried using artificial tears with no relief. She had a history of Lasik eye surgery in both eyes in 2005. Her past medical history is significant for thyroid cancer, which was treated with a total thyroidectomy and radiation three years ago. She was also diagnosed with Systemic Lupus Erythematosus in 2007 but was not on treatment.

Examination

On presentation, her vision was 20/40+ in the right eye and 20/30 in the left. Anterior exam revealed moderate meibomian gland dysfunction and collarettes along bilateral upper eyelids. Her right eye had two plus conjunctival injection, significant coalesced punctuate epithelial erosions and an intact LASIK flap. There were several discrete areas of peripheral stromal haze at the base of multiple filaments along the inferior border of the flap. Her left eye also had diffuse punctuate staining and a couple of peripheral filaments.

Diagnosis

Given her ocular irritation and blurry vision in the setting of significant punctuate epithelial erosions and filamentary deposits on her cornea, the patient was diagnosed with filamentary keratitis. This was exacerbated by her meibomian gland dysfunction and anterior blepharitis. Her condition was likely associated with Lupus.
Treatment

On the first day of presentation, the patient’s filaments were removed from both eyes using jeweler forceps. A bandage contact lens was placed, and the patient was started on preservative free artificial tears every hour, prednisolone twice a day and vigamox four times a day. She was also advised to use warm compresses four times a day and counseled on lid hygiene. The following week, the patient reported significant improvement, and her bandage contact lens was removed. Punctal plugs were placed in both lower eyelids, and restasis was initiated. She continued to improve until an attempt was made to taper off prenisolone. The patient returned with increased redness and pain, and her vision had decreased from 20/40 to 20/100 in her right eye. She was started on lotemax three times a day and lacrilube twice a day. She felt some relief after starting lotemax, but did not make a complete recovery. At this time, mucomyst was added four times a day. She was also referred to see a rheumatologist, who started her on hydroxychloroquine to treat her Lupus. The patient’s symptoms finally began to resolve two months after the initiation of hydroxychloroquine.

Discussion

Filamentary keratitis occurs in the setting of aqueous tear deficiency where damage to the epithelial basement membrane causes detachment. These focal areas of heaped up epithelium lend to deposition of mucous and epithelial cells, forming filaments. Blinking can cause a shearing motion on these filaments which are embedded in the corneal surface epithelium, sometimes leading to corneal abrasions. Inflammation then occurs, causing more damage to the epithelial basement membrane, and the cycle continues. This condition is most often caused by keratoconjunctivitis sicca, but can also be due to secondary causes such as lid closure abnormalities, ocular trauma, surgery, toxic exposure or systemic diseases such as Sjogren’s Syndrome and Lupus. It may even occur in the setting of severe contact lens allergy.

Progression of filamentary keratitis can be monitored by evaluating the surface of the cornea using tests such as the Schirmer I test, fluorescein or rose bengal staining and esthesiometer to measure corneal sensation. More advanced technology include perilimbal bulbar conjunctival cytology and the analysis of inflammatory markers on the surface of conjunctival epithelial cells.

Unfortunately, while filamentary keratitis is a relatively common and often chronic condition, very limited studies have been performed on its treatment. In fact, there has only been one randomized control trial looking at various treatment modalities of filamentary keratitis, and its results are not easily accessible.

While some cases of filamentary keratitis resolve with aggressive lubrication alone, most incidences require a prolonged, multi-pronged approach. To break the cycle, the formed filaments can be removed, the production of new filaments should be decreased using mucolytic agents such as mucomyst, the ocular surface lubricated with preservative free artificial tears, inflammation controlled with steroid eyedrops, and most importantly, the underlying disease
treated. Failure to address any of these elements increases the risk of perpetuating the cycle of dryness, inflammation and corneal damage.

**Conclusion**

Filamentary keratitis is a condition that affects many people with decreased aqueous production either from primary keratoconjunctivitis sicca or secondary to other etiologies such as trauma, toxic exposure and systemic autoimmune disorders. While some patients respond to conservative measures with preservative free artificial tears alone, it is often refractory to treatment and can become a chronic condition, causing extreme irritation and even corneal scarring. When planning treatment, it is important to consider multiple angles, which include removing the filaments, decreasing their production and lubricating the eyes. Ultimately, the underlying cause needs to be evaluated and managed in order to successfully treat the secondary filamentary keratitis.

**References**


Breaking the Cycle

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No Relevant Financial Relationships with Commercial Interests
Case Presentation

▶ January 2016

– 32 yo F presents with redness, irritation and blurry vision OD>OS for 1 week
– No improvement with artificial tears
### Case Presentation

<table>
<thead>
<tr>
<th>POH</th>
<th>LASIK OU (2005), no h/o contact lens wear</th>
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<tbody>
<tr>
<td>PMH</td>
<td>Thyroid cancer s/p total thyroidectomy &amp; radiation (2013)</td>
</tr>
<tr>
<td>Meds</td>
<td>Synthroid</td>
</tr>
<tr>
<td>Gtts</td>
<td>Artificial Tears</td>
</tr>
<tr>
<td>Allergies</td>
<td>NKDA</td>
</tr>
<tr>
<td>SH</td>
<td>No tobacco, alcohol, drugs</td>
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<tr>
<td>FH</td>
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## Exam

<table>
<thead>
<tr>
<th>OD</th>
<th>OS</th>
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</thead>
<tbody>
<tr>
<td><strong>20/40+</strong></td>
<td>Va (SC)</td>
</tr>
<tr>
<td>Round, reactive, no RAPD</td>
<td>Pupil</td>
</tr>
<tr>
<td>Within normal limits</td>
<td>Lids</td>
</tr>
<tr>
<td><strong>2+ Injection, follicular reaction</strong></td>
<td><strong>Conjunctiva</strong></td>
</tr>
<tr>
<td>Diffuse PEE’s, filaments, LASIK flap</td>
<td><strong>Cornea</strong></td>
</tr>
<tr>
<td>D/Q</td>
<td>AC</td>
</tr>
<tr>
<td>16</td>
<td>IOP</td>
</tr>
<tr>
<td>Cup to disc ratio 0.3, pink/sharp</td>
<td><strong>Optic Nerve</strong></td>
</tr>
<tr>
<td>Within normal limits</td>
<td><strong>Fundus</strong></td>
</tr>
<tr>
<td>20/30</td>
<td>Round, reactive</td>
</tr>
<tr>
<td>Within normal limits</td>
<td></td>
</tr>
<tr>
<td>1+ injection, follicular reaction</td>
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<tr>
<td>Diffuse PEE’s, filaments, LASIK flap</td>
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<td>D/Q</td>
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<td>17</td>
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</tr>
<tr>
<td>Cup to disc ratio 0.3, pink/sharp</td>
<td>Within normal limits</td>
</tr>
</tbody>
</table>
Slit Lamp Photos w/ Fluorescein - OD
Slit Lamp Photo - OS
Slit Lamp Photos w/ Fluorescein - OS
Differential Diagnosis

- Corneal dystrophy (eg: Map dot fingerprint)
- **Filamentary keratitis**
- Keratoconjunctivitis Sicca
- Toxic keratopathy
- Limbal stem cell deficiency
- HSV keratitis
Filamentary Keratitis

Aqueous Tear Deficiency

Blinking shears epithelium causing inflammation

Damage to epithelial basement membrane

Deposition mucous and epithelial cells = filaments

Focal areas of heaped up epithelium
Filamentary Keratitis

Etiologies:
- Keratoconjunctivitis sicca
- Eyelid abnormalities
- Ocular trauma
- Ocular surgery
- Autoimmune systemic disease (Sjogren’s, Lupus, etc)
Filamentary Keratitis

- Monitoring Progression
  - Schirmer I test
  - Fluorescein or Rose Bengal staining
  - Perilimbal bulbar conjunctival cytology
  - Inflammatory markers on conjunctival epithelial cells

Albietz J, et al.
Filamentary Keratitis

Treatment
- Filament removal
- Bandage contact lens
- Lubrication: Preservative-free artificial tears, Artificial tear ointment
- Punctal plugs
- Steroid eyedrop
- Mucolytic agent
- Treat the underlying disease
Discussion

- Filamentary keratitis occurs from damage to the epithelial basement membrane, causing a cycle of mucin deposition, inflammation and further damage.

- If not properly treated, it can lead to corneal scarring and permanent decrease in vision.

- Treatment should be multi-pronged, including aggressive lubrication of the cornea, mucolytics and anti-inflammatory agents.

- It is imperative to treat the underlying cause.
References

THANK YOU