Cosmetic Eyeliner Tattoo as a Risk-Factor for Ocular Surface Disease

History:
A 60 year old caucasian female was referred to UPMC Eye Center for evaluation and management of progressive eyelid ulceration and ocular surface disease. She reports developing red, irritated eyes and lesions on both eyelids about 6 months ago that have progressed to ulcerations that intermittently bleed. Her past ocular history was notable for bilateral myopic LASIK in 2000. Her medical history was significant for hypothyroidism and a prior episode of Clostridium difficile infection. She is a former smoker and denied alcohol or drug abuse. She has no known drug allergies and her medication list included: levothyroxine, montelukast, omega-3, multi-vitamin, and vitamin B12.

She had been under the diligent care of a community ophthalmologists and her symptoms had not improved with conservative treatment using warm compresses, Ocusoft scrubs, Bacitracin ointment, and artificial tears. An extensive variety of treatment therapies followed, including: Blephamide (Allergan Inc.), Pataday (Alcon Inc.), and generic steroid eye drops. Besides eye drops, erythromycin and TobraDex (Alcon Inc.) ointments as well as Ketoconazole 2% shampoo, doxycycline, fish oil supplements, and vitamin C were also utilized but had no effect on the disease process or symptomatology.

Examination:
At the time of her referral, ocular examination showed a distance visual acuity of 20/20 and 20/25 in right and left eye, respectively. Pupils, intraocular pressure, motility, confrontation visual fields were normal. External examination was notable for upper and lower lid edema along with Rosacea skin changes. Slit lamp examination of the anterior segment demonstrated bilateral crusting and ulceration along the lashes as well as eyeliner (Figure 1), papillofollicular reaction of the conjunctiva, superficial punctate keratitis, and LASIK flaps with mild peripheral epithelial ingrowth in the cornea. The anterior chamber was deep and quiet, iris was round and reactive, and the lenses had trace nuclear sclerosis. Dilated fundus examination was unremarkable.

Discussion:
Our patient presents with progressive ulcerative blepharitis and associated ocular surface disease that was nonresponsive to conservative and higher level therapies. The differential for this presentation is broad and includes infection (bacterial, viral, fungal, demodex), carcinoma
(squamous, basal, and sebaceous), autoimmune (Sarcoid, Lupus), Rosacea, allergic and seborrheic dermatitis, erythema multiforme, and ichthyosis. Given the extensive ocular treatments, we thought it would be prudent to take a step back and look at the disease presentation with a new set of eyes. We stopped all topical eye medications and lid hygiene as well as obtained a smear/culture for viral, fungal, and bacterial infections. There was no demodex noted on evaluation of epilated lashes. Viral and fungal studies were negative while both eyelids grew coagulase-negative mannitol-negative staphylococci and coagulase-negative mannitol-positive staphylococci and diphtheroids. Based on bacterial sensitivities, bacitracin ointment was restarted and Avenova (NovaBay Pharmaceuticals) was initiated as an adjuvant for a daily gentle lid hygiene routine. Despite escalating therapies with HydroEye (ScienceBased Health), doxycycline, and a Medrol DosePak (Pfizer, Inc.), the ulcerations continued to worsen. Basic laboratory evaluation and clinical presentation did not necessitate an autoimmune work-up. Ultimately, an eyelid biopsy was pursued and revealed extensive necrotizing granulomatous dermatitis and no evidence of carcinoma. After multiple extensive discussions, the patient remembered that she had a cosmetic eyeliner tattoo procedure performed 10 years ago (Figure 2).

This patient had progressive ulcerative blepharitis and associated ocular surface disease with no clinical response to anti-infective and anti-inflammatory treatment. By process of exclusion based on the differential diagnosis with supporting evidence from the eyelid biopsy, she was determined to have an allergic granulomatous reaction to blepharopigmentation (eyeliner tattoo). She was started on eyelid intradermal Kenalog (Bristol-Myers Squibb Inc.) injections along indurated areas and showed great improvement with resolution of ulcers after 2 rounds of injections (Figure 3).

Blepharopigmentation, commercially known as eyeliner tattoo, involves the introduction of ferrous oxide or other metallic pigment into the eyelid margin with a needle of microblade. This procedure is marketed as “permanent”, although pigmentation typically fades over years. While it was originally performed by physicians, it is now mostly done by cosmetologists with freehand tattooing or blading the eyelid.

Only a few cases of allergic granulomatous reaction to blepharopigmentation have been reported in the literature. This reaction causes chronic inflammation that can lead to permanent scarring, lid deformity, eyelash loss and misdirection. Blepharopigmentation has been demonstrated to cause meibomian gland loss, tear film and ocular surface abnormalities, as well as trigger diffuse lamellar keratitis.

**Conclusion:**
Ophthalmologists should consider cosmetic permanent eyeliner tattoos (blepharopigmentation) as a risk-factor for ocular surface disease. Allergic granulomatous reaction to blepharopigmentation should be on the differential diagnosis for patients presenting with ulcerative blepharitis and associated ocular surface disease resistant to medical therapy. A careful history is critical because patients often can think of it as a cosmetic treatment and not attribute it to be an invasive medical procedure. It is important to remember that the degree of pigmentation can fade in time but a delayed allergic reaction can still develop years later.

**Acknowledgement:**
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References:


Photos:
Figure 1: Eyelid photo of patient with ulcerative blepharitis and associated ocular surface disease. There is bilateral eyelid induration and inflammation as well as crusting and ulceration along the lashes. Note the subtle residual traces of blepharopigmentation in both upper and lower eyelids.

Figure 2: Eyelid photo of same patient from 10 years ago when she had a cosmetic eyeliner tattoo procedure (blepharopigmentation) but did not have any evidence of ulcerative blepharitis.

Figure 3: Eyelid photo of same patient after successful diagnosis and initiation of eyelid intradermal steroid injections with resolution of induration, inflammation, and ulceration.