BLEPHARITIS: INFECTION, INFLAMMATION OR INFESTATION?

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WHAT IS BLEPHARITIS?

- blepharo- or -blepharon
  - From the GRΣΣΚ blepharon, meaning eyelid
- -itis
  - From the GRΣΣΚ, denoting or characterized by inflammation

BLEPHARITIS - NONSPECIFIC SIGNS & SYMPTOMS

**Signs:**
- Eyelash debris
- Crusty
- Greasy
- Scaly
- Lid erythema
- Madarosis, trichiasis
- Conjunctival injection
- Inferior punctate keratitis
- Recurrent hordeola

**Symptoms:**
- Itching of eyes and lids
- Burning, scratchiness, foreign body sensation
- Excessive lacrimation

BLEPHARITIS

- Inflammation can be primary or secondary

**PRIMARY**
- Hypersensitivity
  - (Staph toxins, contact allergy)
- Rosacea
- Seborrhea

**SECONDARY**
- Infection
  - Bacterial (rare)
  - Viral
- Infestation
  - Phthiriasis
  - Demodex

“STAPH” BLEPHARITIS

- Bacterial stimulation releases exotoxins
  - Stimulates production and release of pro-inflammatory cytokines and other mediators
  - Secondary recruitment of inflammatory cells, triggering host-induced as well as organism-induced inflammation
- Bacteria also produce lipases
  - Hydrolyze lipid secretions into free fatty acids
  - Leads to increased tear evaporation & dry eye
  - Free fatty acids are directly toxic to the cornea

Speaker Disclosure: Dr. Alan Kabat

All views in this talk, including off-label (non-USA-FDA approved) use of medications, are solely those of the presenter. The presenter has served as consultant to, and/or received research support and/or speaking honoraria within the past 12 months from the following:

- Alcon
- BlephEx
- Bio-Tissue
- Ocusoft
- TearScience
- ThermiAesthetics
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**BLEPHARITIS: MANAGEMENT STRATEGIES**

- **Lid hygiene**
  - Hyperthermia or "warm soaks"
  - Lid margin cleansing or "lid scrubs"

- **Ocular lubricants** or "artificial tears"

- **Topical medications**
  - Antibiotic (drops or ointment)
  - Antibiotic-corticosteroid combination

- **Oral antibiotics**

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**“STAPH” BLEPHARITIS: STAGED MANAGEMENT**

- **Hyperthermia:**
  - Helps to diminish bacterial reservoirs and "melt" accumulated lid scurf & debris

- **Lid margin cleansing:**
  - Detergent hinders bacterial growth and helps wash away debris (the bacteria’s "food supply")

- **Topical antibiotics +/- corticosteroids**
  - Used for more severe or advanced cases
  - Antibiotics help to suppress bacterial overgrowth
  - Steroids help to rapidly alleviate local inflammation

- **Oral antibiotics** may be indicated for secondary lid infections, i.e. hordeolum or preseptal cellulitis.

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**A NEW TAKE ON LID MARGIN CLEANSING...**

- **Microblepharoexfoliation**
  - BlephEx® (BlephEx, LLC; Palm Beach, FL)

- **Antiseptic lid cleaner**
  - Avenova® (NovaBay Pharmaceuticals; Emeryville, CA)

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**“STAPH” BLEPHARITIS: STAGED MANAGEMENT**

- Disposable, high-speed, rotating surgical-grade microsponge on an Alger brush-like handpiece
- Designed to strip away accumulated debris and biofilm from the lid margins
  - Recommended to be used with surfactant lid cleanser
- Can be safely used for upper and lower eyelids on anterior and posterior surfaces
- Painless... but some experience an extreme "tickling" sensation
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- “...the first FDA 510K cleared prescription product to clean the lids and lashes, removing the debris and microorganisms that cause chronic inflammation.”
- Consists of stabilized hypochlorous sol’n (0.01%)
  - Neutrox
  - Hypochlorous acid is produced by the white blood cells
  - Neutralizes toxins released from pathogens, as well as inflammatory mediators
  - Eliminates biofilm from the eyelids
  - Solution is free from bleach and other impurities
- Touted as “more natural” and “less sensitizing” than detergent-based cleansers

SPECTRUM & EFFICACY

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**SEBORRHEIC BLEPHARITIS:**

- Seborrhea is a papulosquamous disorder of the sebum-rich areas of the scalp, face, and trunk
- Intermittent, active phases with burning, scaling & itching, alternating with inactive periods
- Manifestations range from mild dandruff to exfoliative erythroderma; occurs as “cradle cap” in infants

- When pilosebaceous glands of the eyelids are involved it is referred to as seborrheic blepharitis
- Zeis glands; meibomian glands to a lesser degree
- Typically bilateral

**SEBORRHEA OF THE EYEBROWS & FACE**

- Large, greasy scales • Oily lid margins
**SEBORRHEIC BLEPHARITIS: MANAGEMENT**

- **Hyperthermia:**
  - Heat helps to "melt" waxy seborrheic scales

- **Lid margin cleansing:**
  - Detergent helps to remove excess sebum from the lids and skin surface, as well as scales
  - However, ABSOLUTELY DO NOT use "dandruff shampoo" in or near the eyes!

- **Topical antibiotics** are unnecessary.
- **Topical corticosteroids** are contraindicated.
- **Oral therapies** are generally UNNECESSARY.

**TRUE INFECTIOUS BLEPHARITIS**

- **Relatively UNCOMMON!**
- **Ulcerative blepharitis**
  - Staph, Strep, other normal flora
  - May be exacerbated by atopic disease

- **Angular blepharitis**
  - *Moraxella lacunata*
  - Staph. aureus

- **Herpes simplex blepharitis**
  - HSV-1 or HSV-2
  - Primary or recurrent

**INFECTIOUS BLEPHARITIS: MANAGEMENT**

- Generally not cultured; diagnosis made by classic appearance
- **Lid hygiene** (same as for Staph blepharitis)
- **Empirical treatment with broad spectrum antibiotics** dosed similarly to conjunctivitis tx.
  - Fluoroquinolones are a good choice since they have activity against both *Moraxella* and *Staph.* species
**HSV BLEPHARITIS: MANAGEMENT**

- Self-limiting condition
  - For mildly symptomatic patients, may only need supportive therapy:
    - Warm saline compresses
    - Topical drying agent (aluminum acetate solution)

- *NO PROVEN THERAPEUTIC VALUE FOR TOPICAL OR ORAL ANTIVIRALS IN THE ACUTE PHASE OF HSV BLEPHARITIS.*

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**HSV BLEPHARITIS: ROLE OF ORAL ANTIVIRALS**

- May be helpful in reducing the frequency of recurrences in HSV infection
- According to Herpetic Eye Disease Study, Part II, Acyclovir Prevention Trial (HEDS-APT)
  - For patients with two or more recurrences of HSV ocular disease, prophylactic acyclovir 400 mg BID reduced recurrence rate by 41% over the course of 12 months

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**INFESTATIVE (INFESTATIONAL?) BLEPHARITIS**

- Defined as multicellular, parasitic or opportunistic organisms inhabiting the eyelid microcosm
  - Eyelashes
  - Lash follicles
  - Meibomian glands

- Organisms:
  - *Phthirus pubis* (pubic lice)
  - *Demodex folliculorum & Demodex brevis* (lid mites)

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**PHTHIRIASIS PALPEBRARUM: PRESENTATION**

- Ocular signs
  - Reddish-black deposits (louse feces)
    - Deposits may be extremely thick
  - Visible organisms
    - May be more easily seen with lids everted
  - 2º blepharitis
  - Preauricular lymphadenopathy
  - Follicular conjunctivitis

- Symptoms:
  - Complaints of chronic or intermittent redness
  - Itching and irritation
    - Typically bilateral
    - May be exacerbated following hot showers

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**PHTHIRIASIS PALPEBRARUM: MANAGEMENT**

- Manual removal with forceps
  - Time consuming but effective

- Topical therapy:
  - Bland ointment (e.g. petrolatum) to smother lice & nits
  - "Pesticides" applied to the lid margins
    - Cholinesterase inhibitors (e.g. physostigmine)
    - 25% sodium fluorescein solution
    - Kills adults; nits typically survive a single application
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**PHTHIRIASIS PALPEBRARUM: MANAGEMENT**
- Wash all clothing & linens; dry on high heat
- Must also treat other infested areas!
  - PCP referral; educate "partners"
  - Pediculocidal medicated shampoo
    - Lindane 1% (gamma benzene hexachloride)
    - Kwell®, Nix® or Rid® (nonprescription)

**DEMODICOSIS: PATHOPHYSIOLOGY**
- Demodicosis = infestation by Demodex
  - Demodex folliculorum
  - Demodex brevis
  - MOST COMMON age-dependent ectoparasite
- Organism:
  - From the Greek, *demos* - fat and *dex* - worm
  - Semi-transparent, elongated mite
  - 0.1 mm to 0.4 mm in length
  - Tiny claws allows it to anchor into hair follicles
  - Life span ~3 weeks

**DEMODICOSIS: PATHOPHYSIOLOGY**
- Demodex inhabits hair follicles
  - NOT parasitic by nature
    - Feed on sebaceous oils and dead skin cells
    - Avoid light; most active at night
- Overpopulation can cause localized inflammation
  - More common in stressed immune systems

**DEMODICOSIS: PRESENTATION**
- More common in patients >50 years
- Signs/symptoms identical to *Staph* blepharitis
  - Red, inflamed lid margins
  - Crusty debris
  - Burning / irritation
  - Secondary dry eye
- Key feature is “cylindrical dandruff” or “sleeves”
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**DEMODICOSIS: MANAGEMENT**

- Requires:
  - Physical removal of debris field
  - Chemical assault on live organisms

**MICROBLEPHAROEXFOLIATION**

- Induction therapy prior to chemotherapy greatly accelerates recovery

**DEMODICOSIS: MANAGEMENT**

- RESISTANT to conventional blepharitis therapy
  - Lid scrubs inadequate
  - Antibiotics / steroids inadequate

- Recorded treatment options:
  - “Baby shampoo” lid scrubs
  - Topical 2% metronidazole gel
  - 1% mercury oxide
  - 4% pilocarpine

**TEA TREE OIL THERAPY**

- TTO is very irritating... must be diluted
- In-office treatment (50% TTO) vs. home therapy (10% TTO)
  - SteriLid®...
  - Cliradex®:
    - 4-terpineol
    - Once or twice daily therapy X 2-8 weeks
    - Maintenance therapy thereafter

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PURPOSE: To determine the active ingredient in tea tree oil (TTO) responsible for its reported killing effect on Demodex mites.

METHODS: Using an in vitro killing assay to measure the survival time of adult Demodex folliculorum up to 150 minutes, we screened concentrations of 13 out of the 15 known ingredients of TTO.

RESULTS: Terpinen-4-ol or 4-Terpineol... was the most potent ingredient to exhibit killing effects. Was more potent than TTO at equivalent concentrations. Was effective in killing mites at a mere concentration of 1%.


DEMODICOSIS: ADDITIONAL MANAGEMENT

- 4% pilocarpine gel (PILOPINE HS³) - Applied to lids QD-BID - Theorized to interfere with respiration & motility via toxic muscarinic effects

- Oral ivermectin (STROMECTOL®) - Antihelminthic agent; typically prescribed for parasitic disorders such as strongyloidesis or onchocerciasis - Demodex therapy – two 200-mcg/kg doses given 7 days apart
  - e.g. for a 165-pound adult, five 3-mg tablets at the time of diagnosis, and an identical dose to one week later. - Most common side-effects include: nausea, diarrhea, dizziness and pruritus (all <3%)


SUMMARY & CLINICAL PEARLS:

- Blepharitis is an INFLAMMATORY disorder with multiple, diverse etiologies. - History and careful evaluation are the key to diagnosis.

- Conditions CANNOT be treated identically
  - Targeted management based upon etiology.
  - Lid hygiene is the one constant, but it is rarely the mainstay of therapy.

- Recognize Demodex as a significant and common pathogen in blepharitis
  - Specific therapy with mitocidal agents like TTO
  - New developments in this area will help to detect and manage this elusive organism

THANK YOU...

Questions? Email me at: xkabat@sco.edu