Eye Care and the Emergency Department

- Non-injury related ocular ER visits comprised 51% of ocular-related visits\(^2\)
- Only 3% of ocular-related ER visits required hospitalization\(^7\)
- 75% of the time, there was a clinically significant change in the diagnosis when care was first delivered at the ED or PCP and then followed up by a visit to an eye care specialist

<table>
<thead>
<tr>
<th>Condition</th>
<th>Percent of Ocular ER visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allergic conjunctivitis</td>
<td>20%</td>
</tr>
<tr>
<td>Trauma (including contact lenses)</td>
<td>15%</td>
</tr>
<tr>
<td>Trauma (excluding contact lenses)</td>
<td>10%</td>
</tr>
<tr>
<td>Non-injury related</td>
<td>51%</td>
</tr>
<tr>
<td>Injury related</td>
<td>14%</td>
</tr>
</tbody>
</table>


Herpes Simplex Keratitis: Clinical Features

- Characterized by primary outbreak and subsequent reactivation
- Primary outbreak is typically mild or subclinical
- After primary infection, the virus becomes latent in the trigeminal ganglion or cornea
- Stress, UV radiation, and hormonal changes can reactivate the virus
- Lesions are common in the immunocompromised (i.e. recent organ transplant or HIV patients)

Herpes Simplex Keratitis

- **Epithelial Keratitis:**
  - Symptoms:
    - Ocular irritation, redness, photophobia, watering, blurred vision
  - Signs:
    - Swollen opaque epithelial cells arranged in a course punctate or stellate pattern
    - Central desquamation results in a dendrite***
      1. Central ulceration
      2. Terminal end bulbs
    - ***Corneal sensation is reduced***

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Case

- 20 year old male presents with a red painful eye
  - Started that morning when he woke up
  - Reports a watery discharge, no itching, and is not a contact lens wearer
- SLE:
  - See attached image with NaFl stain

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Dendritic Ulcers
Herpes Simplex Keratitis Management

- **Topical:**
  - Viroptic (trifluridine) q 2h until epi healed then taper down for 10-14 days.
  - Viroptic is toxic to the cornea.
  - Zirgan (ganciclovir) available, use 5 times a day until epi healed then 3 times for a week (US only)

HSV Stromal Disease

- HSV Stromal disease is an immune-mediated disease
- Increased risk of scarring and high risk of poor visual prognosis
- Requires corticosteroids (HEDS: corticosteroid reduced risk of progression by 68%)
  - Without epithelial defect: corticosteroids and prophylactic anti-viral dosage
  - With epithelial defect: active infection anti-viral dosage with judicious corticosteroids

Anti-Viral Medication

<table>
<thead>
<tr>
<th>Drug</th>
<th>Mechanism of Action</th>
<th>Bioavailability</th>
<th>Dosing</th>
<th>Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acyclovir</td>
<td>Acyclovir interferes with DNA synthesis inhibiting viral replication</td>
<td>10-30% gets absorbed</td>
<td>Simplex: 400 mg 5x/day Zoster: 800 mg 5x/day</td>
<td>Overall very safe, nausea, vomiting, headaches, dizziness, confusion</td>
</tr>
<tr>
<td>Valacyclovir</td>
<td>Acyclovir pro-drug Equivalent to acyclovir but better for pain management</td>
<td>95% converted to acyclovir*</td>
<td>Simplex: 500 mg 5x/day Zoster: 1 g 5x/day</td>
<td>Same as acyclovir</td>
</tr>
<tr>
<td>Famciclovir (Famvir)</td>
<td>Inhibits DNA chain elongation It is metabolized to penciclovir where it is active 10-20x as long as acyclovir</td>
<td>Superior to acyclovir*</td>
<td>Simplex: 250 mg 5x/day Zoster: 500 mg 5x/day</td>
<td>Same as acyclovir</td>
</tr>
</tbody>
</table>

How much to dose steroid?

- HEDS used QID of prednisolone phosphate
- Current Recommendations:
  - Mod – severe (especially with neo): 1% Prednisolone or Lotemax QID to 6x/day
  - Want the lowest dose needed to control the inflammation
  - AAO EBM Treatment Guideline 2014
    - Topical steroid for 10 weeks (this is based on HEDS results) with oral antiviral
Herpes Simplex Epithelial Keratitis

- Treatment Regimen:
  - Zirgan 5x/day until the ulcer heals, then 3x/day for one week
  - Oral Valtrex 500 mg 3x/day for 7-10 days
  - Artificial tears
  - L-Lysine 2 grams daily:
    - Proven to "slow down" and retard the growth of the herpes virus and inhibit viral replication
  - Debride the ulcer:
    - Prior to topical antiviral therapy debridement was treatment of choice
    - Generally try to avoid use of sharp instruments and use of cotton swab and anesthetic
  - RTC 1 day, 4 days, 7 days

Herpes Simplex Keratitis

- Prophylactic Treatment:
  - Reduces the rate of recurrence of epithelial and stromal keratitis by ≈ 50%
  - Acyclovir 400 mg BID
  - Valtrex 500 mg QD
  - Famvir 250 mg QD
  - L-Lysine 1 gram/day:
    - Proven to "slow down" and retard the growth of the herpes virus and inhibit viral replication
  - Frequent debilitating recurrences, bilateral involvement, or HSV infection in a monocular patient

Prophylaxis??

- Pitfalls to Prophylaxis:
  - Reduction of recurrence does not persist once drug stopped
  - Resistance????
    - van Velzen, et. al., (2013) demonstrated that long-term ACV prophylaxis predisposes to ACV-refractory disease due to the emergence of corneal ACVR HSV-1.

Aussie OD’s “Story”

- Male 59 Anglo Celtic heritage
- Asymptomatic, accidental detection by daughter following island holiday Bali and further sun exposure August 2016
- Hx: surfer and excessive sun exposure – coconut oils etc for first 2 decades of life.
Which of the following lid nevi have the greatest chance to convert to a malignant melanoma?

1. Lid nevi:
   - congenital or acquired
   - occur in the anterior lamella of the eyelid and can be visualized at the eyelid margin.

2. The congenital eyelid nevus is a special category with implications for malignant transformation.

3. With time, slow increased pigmentation and slight enlargement can occur.

4. An acquired nevus generally becomes apparent between the ages of 3 and 10 years as a small, flat, lightly pigmented lesion

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**Congenital Nevus**

- The nevus is generally well circumscribed and not associated with ulceration.
- The congenital nevus of the eyelids may present as a "kissing nevus" in which the melanocytes are present symmetrically on the upper and lower eyelids.
  - Presumably this nevus was present prior to eyelid separation

**Congenital Nevus**

- Most nevi of the skin are not considered to be at increased risk of malignancy.
  - However, the large congenital melanocytic nevus appears to have an increased risk of malignant transformation of 4.6% during a 30 year period

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**Acquired Lid Nevi**

- Acquired nevi are classified as:
  - junctional (involving the basal epidermis/dermis junction), typically flat in appearance
  - intradermal (involving only the dermis), tend to be dome shaped or pedunculated
  - compound (involving both dermis and epidermis) tend to be dome shaped

**30 YR WM**

- Patient calls from his PCP office asking if we can see him today because he has had red/painful eyes for over a week and has not resolved
- Medical history:
  - Past week has been experiencing painful urination and discharge
  - New sexual partner approx 10 days ago, who also had developed a red eye
  - Chlamydia and gonorrhea testing were negative
  - Has tested positive for HSV2 but no current flare up
30 YO WM

- Medications:
  - In the past week patient:
    - 2 courses of azithromycin (1 gram each)
    - Injection of rocephin
    - Injection of penicillin G
    - Currently taking doxycycline 100 mg bid
    - Valtrex 1 gram 3 times per day for 7 days (d/c 1 day ago)
    - Was on Vigamox qid for 7 days (d/c 1 day ago)
  - VA: 6/7.5 (20/25) OD, OS
  - Entrance skills unremarkable though some pain on eye movement

- SLE:
  - 2+ injection conjunctival both eyes
  - 1-2+ lid edema
  - Mixed papillary and follicular response
  - 1-2+ diffuse SPK (no staining noted above infiltrates)
  - No cells or flare noted

- AdenoPlus:
  - Performed on the right eye (patient felt that was the worst eye)
  - Negative

- Started patient on the miracle drop
  - Tobradex 4 times per day and scheduled patient to come back the next day
  - 1 day f/u
    - Patient was feeling better
    - Less redness and much reduced photophobia and discomfort
    - No improvement on painful urination or discharge and is now seeing blood in his urine
    - Continue tobradex 4 times per day and RTC in 4 days for f/u with dilation and told to contact PCP to update on the blood in the urine

- 4 day f/u:
  - Patient says his eyes are doing great and that all of his urogenital problems abruptly stopped on Saturday
  - Discussion with PCP: Kidney stone
  - What was going on with the eye?
    - Viral conjunctivitis likely EKC

What did we learn from this?

Herpes Zoster

1. Primary infection – Chicken pox (Varicella)
   - Usually in children
   - Highly contagious***
   - Very itchy maculopapular rash with vesicles that crust over after ≈ 5 days
   - 96% of people develop by 20 years of age
   - Vaccine now available
Herpes Zoster

2. Reactivation – Shingles (Herpes Zoster)
   - More often in the elderly and immunosuppressed (AIDS)
   - Systemic work-up if Zoster in someone < 40
   - Can get shingles anywhere on the body
   - Herpes Zoster Ophthalmicus (HZO)
     - Shingles involving the dermatome supplied by the ophthalmic division of the CNV (trigeminal)
       - 15% of zoster cases
   - Can get shingles anywhere on the body

Herpes Zoster

• Symptoms:
  - Generalized malaise, tiredness, fever
  - Headache, tenderness, paresthesias (tingling), and pain on one side of the scalp
    - Will often precede rash
  - Rash on one side of the forehead
  - Red eye
  - Eye pain & light sensitivity

Herpes Zoster

• Associated factors include increasing age, immune deficiency and stress.
  • Only people who had natural infection with wild-type VZV or had varicella vaccination can develop herpes zoster.
  • Children who get the varicella vaccine appear to have a lower risk of herpes zoster compared with people who were infected with wild-type VZV.

Herpes Zoster

• Other Eye Complications (Acute):
  - Anterior uveitis (most common ocular manifestation)
  - Acute epithelial keratitis (pseudodendrites)
  - Conjunctivitis
  - Stromal (interstitial) interstitial keratitis
  - Endothelitis (disciform keratitis)
  - Neurotrophic keratitis

Herpes Zoster

• Management includes:
  - Oral antivirals:
    - 800mg acyclovir 5x/day
    - valacyclovir (Valtrex) 1g TID
    - famciclovir (Famvir) 500 mg TID
  - Effectiveness of therapy is best started within 72 hours
  - Oral steroids (clinical trials show variable results but often prescribed with antiviral to reduce pain)
    - Management of pain (capsaicin, tricyclic antidepressants, gabapentin).
  - If ocular complications, consider topical steroids (Pred Forte QID).

Herpes Zoster

• A person’s risk for herpes zoster increases sharply after 50 years of age.
• Almost 1 out of 3 people in the United States will develop herpes zoster during their lifetime.
• A person’s risk of developing post-herpetic neuralgia also increases sharply with age.
NEW!! Shingrix HZ Vaccine

- Approved in US/Canada as of October 2017
- non-live antigen, to trigger a targeted immune response, with a specifically designed adjuvant to enhance this response and help address the natural age-related decline of the immune system
- Shingrix is 97% effective against shingles for people between the ages of 50 and 69 and 91% effective for people 70 or older.
- It is 91% effective against postherpetic neuralgia for people 50 and older.
- These rates are based on evidence presented to the committee from clinical trials with over 38,000 total participants.

- recommended for healthy adults aged 50 years and older to prevent shingles and related complications
- recommended for adults who previously received the current shingles vaccine (Zostavax®) to prevent shingles and related complications
- the preferred vaccine for preventing shingles and related complications

AAO Recommendations (2015)

- The AAO recommends vaccination for 50-59
  - Highest efficacy in this group
  - Decreasing age of disease onset
  - Higher risk of ocular and systemic complications
  - Greatest number of cases
- Vaccination in this earlier age group would reduce the economic burden (work productivity) and morbidity

Differentiating Orbital vs. Preseptal

<table>
<thead>
<tr>
<th>FINDING</th>
<th>ORBITAL</th>
<th>PRESEPTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual Acuity</td>
<td>Decreased</td>
<td>Normal</td>
</tr>
<tr>
<td>Proptosis</td>
<td>Marked</td>
<td>Absent</td>
</tr>
<tr>
<td>Chemosis and Hyperemia</td>
<td>Marked</td>
<td>Rare/Mild</td>
</tr>
<tr>
<td>Pupils</td>
<td>RAPD</td>
<td>Normal</td>
</tr>
<tr>
<td>Pain and Motility</td>
<td>Restricted and Painful</td>
<td>Normal</td>
</tr>
<tr>
<td>IOP</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>Temperature</td>
<td>102-104</td>
<td>Normal/mild elevation</td>
</tr>
<tr>
<td>HA and Assoc. Symptoms</td>
<td>Common</td>
<td>Absent</td>
</tr>
</tbody>
</table>

Preseptal Cellulitis

- Infection and inflammation located anterior to the orbital septum and limited to the superficial periorbital tissues and eyelids.
- Usually follows sinus infection or internal hordeolum (possibly trauma)
- Eyelid swelling, redness, ptosis, pain and low grade fever.

Treatment: Drs for Preseptal, Oftns IV for Orbital

- Tx:
  - **Clavulin (Augmentin)** 500 mg TID or 875 mg BID for 5-7 days
  - **Keflex** 500 mg QID 5-7 days
  - or if moderate to severe IV Fortaz (ceftazidime) 1-2 g q8h.
  - If MRSA possible, consider Bactrim/Septa
Penicillins: Augmentin

• **Augmentin** is amoxicillin with potassium clavulanate (clavulanic acid 125 mg).
• Clavulanate is a B-Lactamase inhibitor which reduces a bacteria’s ability to negate the effect of the amoxicillin by inactivating penicillinase (enzyme that inactivates the antibiotic affect).
  – Dicloxacillin can also be used in infections due to penicillinase-producing staph.

Penicillins: Augmentin

– **Augmentin** is very effective for skin and skin structure infections such as:
  - dacrocystitis,
  - internal hordeola,
  - preseptal cellulitis.
– Treatment of:
  - otitis media,
  - sinusitis,
  - lower respiratory and urinary infections.
– Given prophylactically to dental surgery patients.

Penicillins: Augmentin

– It has **low**:
  - GI upset,
  - allergic reaction and anaphylaxis.
– Serious complications include:
  - anemia,
  - pseudomembranous colitis and
  - Stevens-Johnson syndrome.

Cephalosporins

• Closely related structurally and functionally to the penicillins,
  – have the same mode of action,
  – tend to be more resistant to B-lactamases.
• classified as 1st, 2nd, 3rd, 4th and now 5th generation based largely on their bacterial susceptibility patterns and resistance to B-lactamases.
  – allergic response without allergy to penicillin is 1-2%.
• Typically administered IV or IM, **poor oral absorption**.

Cephalosporins

• **Keflex** (cephalexin):
  – treatment of respiratory, GI, skin and skin structure, and bone infections as well as otitis media
  – Adults: 250-1000 mg every 6 hours
    • typical dosing 500 every 6 hours
  – Children: 25-100 mg/kg/day divided 6-8 hours
Co-T trimoxazole (Bactrim/Septra)

- Combination of trimethoprim and sulfamethoxazole
  - shows greater antimicrobial activity than equivalent quantities of either drug alone.
- Has broader spectrum of action than the sulfa’s and is effective in treating:
  - UTIs and respiratory tract infections
  - often considered for treatment of MRSA skin infections

Co-T trimoxazole (Bactrim/Septra)

- Available:
  - Bactrim/Septra tablets:
    - contains 80 mg trimethoprim and 400 mg sulfamethoxazole
    - dosing 2 tablets every 12 hours
  - Bactrim DS/Septra DS (Double Strength)
    - contains 160 mg trimethoprim and 800 mg sulfamethoxazole
    - Dosing 1 tablet every 12 hours