Nearly 1 million Americans develop shingles each year
- Ocular involvement accounts for up to 25% of presenting cases
- Over 50% incur long-term ocular damage

**Varicella-Zoster Virus**
- Herpes DNA virus that causes 2 distinct syndromes
  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
  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
     - Shingles involving the dermatome supplied by the ophthalmic division of the CNV (trigeminal)
     - 15% of zoster cases

**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**

- Signs:
  - Maculopapular rash -> vesicles -> pustules -> crusting on the forehead
  - Respects the midline***
  - Hutchinson sign
    - rash on the tip or side of the nose***
  - Classically does not involve the lower lid
  - Numerous other ocular signs

**Herpes Zoster**

- Other Eye Disease (Acute):
  - Acute epithelial keratitis (pseudodendrites)
  - Conjunctivitis
  - Stromal (interstitial) interstitial keratitis
  - Endotheliitis (disciform keratitis)
  - Neurotrophic keratitis

**Herpes Zoster**

- Other Eye Disease (Chronic):
  - Neurotrophic keratitis - 50%
  - Scleritis
  - Mucous plaque keratitis - 5%
  - Eyelid scarring

**Herpes Zoster**

- Other Eye Disease (Acute):
  - Episcleritis
  - Scleritis
  - Anterior uveitis
  - IOP elevation
  - Retinitis
  - Choroiditis
  - Neurological complications (nerve palsies)
  - Vascular occlusion

  - Treat the complications just like as if they were primary conditions

**What is your medication of choice when treating herpes zoster ophthalmicus?**

A. Acyclovir 400 mg 5x/day
B. Acyclovir 800 mg 5x/day
C. Valtrex 500 mg 3x/day
D. Valtrex 1000 mg 3x/day
E. Famvir 250 mg 3x/day
F. Famvir 500 mg 3x/day
G. Zirgan 5x/day
Herpes Zoster

- **Treatment:**
  - Treat the complications just like as if they were primary conditions
  - Oral antivirals – must be started within 72 hours of symptoms**
    - Acyclovir 800mg 5x/day x 7-10 days
    - Valtrix 1000mg 3x/day X 7-10 days
    - Famciclovir 500mg 3x/day X 7-10 days
  - Topical ointment to skin lesions to help prevent scarring
    - Bacitracin, erythromycin

- **Prevention:**
  - Zostivax vaccine
    - Live attenuated herpes virus
    - Only given to people who know they had chicken pox as a child***
    - Only studied in patients > 60 yo
      - 51% reduction in incidence of HZ
      - 60% reduction in symptom severity in those who got HZ
      - 66.5% reduction in post-herpetic neuralgia

Herpes Zoster

- **Post-herpetic Neuralgia**
  - Constant or intermittent pain that persists for more than one month after the rash has healed
  - Older patients with early severe pain and larger area are at greater risk
  - Can be so severe that it leads to depression & suicide
  - Improves with time
    - Only 2% of pts affected 5 years out
  - Tx:
    - Cool compresses
    - Topical capsaicin ointment or lidocaine cream
    - Analgesics (Tylenol 3, Vicoden)
    - Amitriptyline 25mg PO TID
    - Neurotin (Gabapentin)

Viral conjunctivitis

- **Signs:**
  - Red eye (conj hyperemia)
  - Watery discharge
  - Follicles in the inferior fornix & conj
  - (+) PA node***
  - Red/swollen eyelids
  - Petechial conj hemes
  - SPK
  - SEI’s (sub-epithelial infiltrates)
  - Pseudomembranes/membranes often seen in EKC

EKC

- **Timecourse**

Viral conjunctivitis

- **Signs:**
  - Red eye (conj hyperemia)
  - Watery discharge
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  - (+) PA node***
  - Red/swollen eyelids
  - Petechial sub-conj hemes
  - SPK
  - SEI’s (sub-epithelial infiltrates)
  - Pseudomembranes/membranes often seen in EKC
EKC

EKC conjunctivitis

- Diagnosis
  - Based on clinical symptoms
- Treatment:
  - Cool compresses
  - Artificial tears
  - “get the red out drops”
  - Vasoconstrictors such as Visine
  - Hygiene
  - Quarantine/Isolation
  - Betadine 5% solution
  - Zirgan
  - Lotemax/Pred Forte QID – not until late

Herpes Simplex

- Most common virus found in humans
  - 60-99% are infected by 20 years old
- Double stranded DNA virus
  - HSV type 1 (HSV-1)
  - HSV type 2 (HSV-2)
- Primary infection
  - Occurs in childhood via droplet exposure
  - Subclinical infection in most
- Secondary infection (recurrence)

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

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
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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Epithelial Keratitis:

**Symptoms:**
- Mild associated subepithelial haze
- Elevated IOP***
- Persistent SPK and irregular epithelium as the ulcer is healing

**Differential diagnosis:**
- Herpes zoster
- Healing corneal abrasion
- Acanthamoeba keratitis
- Medicamentosa

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**Treatment (con’t):**
- Debridement of the dendritic ulcer???
- Oral antivirals???
- IOP control
  - Avoid prostaglandins???
  - Steroids???

**Follow-up**
- Day 1, 4, 7

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Epithelial Keratitis:

**Symptoms:**
- Acyclovir 400 mg 5x/day X 7-10 days
- Valtrex 500 mg 3x/day X 7-10 days
- Famvir 250 mg 3x/day X 7-10 days
Marginal keratitis:
- Very rare
- Looks like a marginal infiltrate...but
- In HSV marginal keratitis:
  1. Much more pain
  2. Deep neovascularization
  3. No clear zone between infiltrate and limbus

Immune Stromal Keratitis (ISK):
- 2% of initial ocular HSV presentations
- 20-61% of recurrent disease
- 88% non-necrotizing
- 7% necrotizing
- ***Can be visually devastating***

Symptoms:
- Gradual blurred vision
- Halos
- Discomfort/Pain
- Redness

Signs (non-necrotizing):
- Stromal haze (inflammation & edema)
- Neovascularization (deep)
- Immune ring
- Scarring and/or thinning
- Intact epithelium***

Signs (necrotizing):
- All of the above
- More dense infiltration
- Often w/ overlying epithelial defect
- Necrosis and/or ulceration
- ***high perforation risk***
The treatment of choice for immune stromal keratitis is

A. Oral antivirals
B. Topical antivirals
C. Topical steroids with prophylactic antiviral cover
D. Debridement

Herpes Simplex Keratitis

- Immune Stromal Keratitis:
  - Treatment:
    - Topical steroids
      - Pred Forte QID-q2H
      - Durezol BID-QID
      - Lotemax QID
    - Topical anti-viral cover
      - Viroptic (trifluridine 1%) QID
      - Zirgan (ganciclovir 0.15%) QID
    - Topical cyclosporin (Restasis), AT’s, ung’s to facilitate epithelial healing if ulceration is present

Herpes Simplex Keratitis

- Endotheliitis: AKA Disciform Keratitis
  - Not considered a primary form of stromal keratitis
    - Stromal edema is present secondary to endothelial inflammation
  - Symptoms:
    - Blurred vision
    - Halos
    - Discomfort/Pain
    - Redness

Herpes Simplex Keratitis

- Endotheliitis: AKA Disciform Keratitis
  - Signs:
    - Central zone of stromal edema often with overlying epithelial edema
    - KP’s underlying the edema
    - AC reaction
    - IOP may be elevated
    - Reduced corneal sensation
    - Healed lesions often have a faint ring of stromal or subepithelial opacification and thinning
Herpes Simplex Keratitis

- **Endotheliitis:** AKA Disciform Keratitis
  - **Treatment:**
    - Topical steroids
      - Pred Forte QID-q2H
      - Durezol BID-QID
      - Lotemax QID
    - Topical anti-viral cover
      - Viroptic ( trifluridine 1%) QID
      - Zirgan (ganciclovir 0.15%) TID
    - Topical cyclosporin (Restasis), AT’s, ung’s to facilitate epithelial healing if ulceration is present

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Neurotrophic Keratitis

- **Keratopathy:**
  - Keratopathy occurs from loss of trigeminal innervation to the cornea resulting in complete or partial anaesthesia
  - The cornea is numb so the pt doesn’t blink
  - **Sx’s:**
    - Irritation/burning/FB sensation
    - Redness
    - Tearing
    - Decreased vision

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Herpes Simplex Keratitis

- **Neurotrophic Keratitis:**
  - Keratopathy occurs from loss of trigeminal innervation to the cornea resulting in complete or partial anaesthesia
  - The cornea is numb so the pt doesn’t blink
  - **Sx’s:**
    - Irritation/burning/FB sensation
    - Redness
    - Tearing
    - Decreased vision

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Neurotrophic Keratitis

- **Signs:**
  - Decreased corneal sensation***
  - Interpalpebral SPK
  - Persistent epithelial defects in which the epithelium at the edge of the lesion appears rolled and thickened, and is poorly attached
  - Advanced cases may have sterile ulceration, keratitis, and/or corneal melt
    - Pt may be surprisingly asymptomatic**

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Neurotrophic Keratitis

- **Tx:**
  - Find out the cause
  - D/C any meds that may be responsible
  - Lubricate, lubricate, lubricate***
    - Preservative free AT’s, gels, and ung’s q1h-QID
  - Topical Ab drops and/or ung (Polytrim QID, etc)
  - Taping the eyelids at night to ensure adequate closure
  - In severe cases:
    - Patching, tarsorrhaphy, Botox to induce ptosis

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Neurotrophic Keratitis

- **Tx:**
  - Healing an ulcer that won’t heal
    1. Autologous serum
    2. Prokera
      - Amniotic membrane in a CL skirt
  - Also could use a scleral lens
**Autologous Serum**

1. Draw 40cc of blood through venipuncture
2. Centrifuge for 5 minutes @ 1500 rpm
3. Centrifuging will divide the blood into its separate components
4. Place 1cc of serum in each bottle
5. Add 4cc of saline to make a concentration of 20% serum eye drops
6. 20% serum eye drop concentration

**Herpes Simplex Keratitis**

- **My 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?
  - Debride the ulcer?
- RTC 1 day, 4 days, 7 days

**Herpes Simplex**

- **Visual Prognosis:**
  - 90% 20/40 or better after 12 years
  - 3% 20/100 or worse after 12 years

**HSV, HZO, & EKC:**

**VIRAL EYE DISEASE ALPHABET SOUP**

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