Learning Objectives:

- Recognise and distinguish different types of viral keratitis
  - HSV
  - HZO
  - Adenovirus

- Discuss the use of antiviral agents in the treatment of herpetic infections

- Appropriately manage different types of viral keratitis
Herpes Simplex Virus

- DNA virus
- Humans are obligate host
- 90% population seropositive
- Most infections sub-clinical

Herpes Simplex virus

- HSV I – infections above waist
  - Face
  - Lips
  - Eyes
- HSV II – infections below waist*
  - Sexually transmitted
  - Genital herpes
  - Ophthalmia neonatorum*
Systemic HSV infection

- **Primary infection**
  - Usually subclinical
  - Often in infancy
  - Possible mild fever/malaise

- **Recurrent infection**
  - Virus latent in sensory ganglia
  - Reactivated HSV travels down sensory axon to target tissue e.g. eyes, skin

Primary Ocular Infection

- In children 6 month to 6 years
- Systemic “viral” symptoms
- Usually self-limiting
  - **Blepharoconjunctivitis**
    - Unilateral
    - Lids/periorbital lesions
    - Follicular conjunctivitis
    - Watery discharge
    - Acyclovir 5x day for 21 days
  - **Keratitis**
    - Rare
    - Fine punctate lesions
HSV recurrence

- Usually in adulthood
  - Dendritic keratitis
  - Stromal keratitis
  - Disciform keratitis
  - Endothelitis

HSV Dendritic Keratitis

1. Opaque cells form coarse punctate or stellate pattern

2. Desquamation of center leaves linear branching ulcer
   - Fluorescein stains bed of ulcer
   - Rose Bengal stains virus-laden margin
HSV Dendritic Ulcer

3. Day 3-5 sub-epithelial anterior stromal infiltrates
4. Occasional progression to geographic ulcer
5. Healing phase – persisting pseudodendrites

HSV: Differential diagnosis

1. Herpes Zoster ophthalmicus
2. Healing corneal abrasion
3. Acanthamoeba keratitis
4. Topical drop toxicity
5. Pseudodendrite with SCL
Acyclovir in HSV keratitis

- Acyclovir (acycloguanosine)
- Blocks virus thymidine kinase
- Very limited HSV resistance
- More effective in HSV than other antivirals

Acyclovir in HSV keratitis

- Eye ointment
- Five times per day
- Relatively non-toxic to healing epithelium
HSV Antiviral Rx

1. 50% heal spontaneously
2. 90-95% with Acyclovir
3. Acyclovir x5 a day for 14-21 days
4. Improving by 3-4 days
5. Generally healed by 10 days
6. If no response to Rx:
   • Consider resistance
   • Consider alternative diagnosis

HSV Stromal necrotic keratitis

- Uncommon but very severe
- May follow epithelial disease
- Epithelium may be intact
- Very resistant to Rx
- Usually leaves dense scar
**HSV Stromal keratitis**

- Greyish, necrotic appearance
- Similar to bacterial keratitis
- Uveitis & Keratic precipitates
- May become chronic (months)
- Inappropriate Rx leads to:
  - Vascularisation
  - Scarring
  - Possible perforation

**HSV Stromal Keratitis: treatment**

- Treat active epithelial disease with topical Acyclovir
- Consider lubricants and neurotrophic management
- Rarely employ steroids to minimize scarring when epithelium healed and convincing evidence of improvement
HSV Disciform Keratitis

- **Aetiology**
  - Immune hypersensitivity

- **Signs**
  - Central disciform lesion
  - Epithelial oedema
  - Stromal thickening
  - Underlying fine KP
  - Mild/Moderate uveitis
  - Descemets folds
  - IOP may be elevated
  - Occasional Wessely ring

HSV Disciform keratitis: treatment

- Weak topical steroid
- Acyclovir antiviral cover
- With improvement steroid concentration reduced and frequency tapered over several weeks or months
Herpes Zoster Ophthalmicus

- Human Herpes Virus 3 (HHV 3)
- Causes two distinct clinical conditions
  - Varicella (Chickenpox)
  - Herpes Zoster (Shingles)
- Following chickenpox - retrograde spread of virus along sensory nerves to dorsal root ganglia
- Trigger factors cause virus to travel via sensory nerves to skin and eye
Herpes Zoster Ophthalmicus

- Ophthalmic division of trigeminal nerve
- Approximately 15% of Herpes Zoster
- Usually in elderly
  - Rare under 45
  - Consider immunosuppression /AIDS

Herpes Zoster Ophthalmicus

- Ophthalmic division of Vth cranial nerve
- Rarely with maxillary division
- Overall 50% develop ocular involvement
- Hutchison’s sign (nasociliary nerve) in 30%
  - correlates with ocular involvement
Herpes Zoster Ophthalmicus

Clinical path

Acute phase

Chronic Phase

Relapsing phase

HZO – Acute phase

1. Influenza-like illness
   - Fever, headache, malaise
   - Up to a week prior to rash

2. Neuralgia
   - Distribution Ophthalmic division
   - Itching, tingling, burning or severe pain

3. Rash
HZO – Rash

**Rash**
- Macules that rapidly progress to papules
- Papules progress to vesicles & pustules
- Crusting occurs from day 6 onwards
- Lesions vary in size & distribution
- Haemorrhagic bullae may develop
- Oedema is variable

HZO treatment

- **Ocular**
  - In acute phase: simple lubricant or as indicated by manner of ocular involvement
- **Oral**
  - Acyclovir 800mg x 5 a day for 1 week
- **Topical to skin**
  - Wet dressings
  - Calamine lotion
HZO: Ocular involvement

1. Lid oedema/rash
2. Conjunctivitis
3. Episcleritis
4. Scleritis
5. Acute epithelial keratitis
6. Nummular keratitis
7. Disciform keratitis
8. Anterior uveitis
Neurological complications

1. Cranial nerve palsies
2. Optic neuritis
3. Encephalitis
4. Contralateral hemiplegia
HZO: chronic ocular disease

- Ptosis, trichiasis, lid margin scarring
- Mucous secreting conjunctivitis
- Scleritis/sclerokeratitis
- Neurotrophic keratitis
- Mucus plaque keratitis
- Corneal vascularisation

Relapsing disease

- Up to ten years after initial event
- Reduction/cessation of topical steroid
- Episcleritis
- Scleritis
- Iritis
- Glaucoma
- Keratitis:
  - Nummular
  - Disciform
  - Mucous plaque
HZO - keratouveitis

Post-herpetic neuralgia

- Affects 7% of patients
- Constant or intermittent
- Touch/heat may exacerbate
- Generally improves with time
- May lead to severe depression
- Suicide risk in severe cases
- Rx amitriptyline / pain clinic
Adenoviral keratoconjunctivitis

- Clinical presentation – mild to severe conjunctivitis / keratitis
- Highly contagious!
- Occupational hazard of ophthalmologists & optometrists
- Transmission by respiratory or ocular secretion
- Incubation period 4-10 days
- Shedding of virus for 12 days

Adenoviral keratoconjunctivitis

- Highly contagious, spread by contaminated items
- Towels, tonometers, diagnostic lenses
- Strict hand & instrument disinfection
- Quarantine of infected staff from patient contact
Adenoviral keratoconjunctivitis: PCF

**Pharyngoconjunctival fever (PCF)**

- Adenovirus 3 & 7
- Typically affects children
- Upper respiratory infection
- Keratitis in around 30%
- Keratitis usually mild

Adenoviral keratoconjunctivitis: EKC

**Epidemic keratoconjunctivitis (EKC)**

- Adenovirus 8 & 19
- Usually no systemic symptoms
- Keratitis in 80%
- Keratitis may be severe
Adenoviral conjunctivitis

- Watery discharge, redness, photophobia
- Bilateral involvement in two-thirds
  - Swelling of lids
  - Conjunctival chemosis & follicles
  - Occasional haemorrhages
  - Occasional pseudomembranes
- Tender pre-auricular lymphadenopathy

Spontaneous resolution in 10-14 days

Treatment
- Largely symptomatic/supportive
- No role for antivirals at present
- Steroids best avoided
Adenoviral keratitis

- Three stages
  1. Diffuse epithelial keratitis in first 7 days
  2. Transient focal epithelial keratitis
  3. Persisting sub-epithelial infiltrates
Adenoviral keratitis

- Usually self limiting
- Sub-epithelial infiltrates may persist for months or years
- Treatment with corticosteroids
  - Generally to be avoided
  - Use only if severe discomfort or reduced vision
  - Do not shorten course of disease merely suppress inflammation
  - Keratitis may become “steroid dependent”

Thankyou