

- Roll of Antibiotics
- Affect both conjunctiva and cornea
- Common viral infections
 - Herpes simplex keratitis
 - Herpes zoster ophthalmicus
 - Adenovirus keratitis

HERPES SIMPLEX KERATITIS

ETIOLOGY

Herpes simplex virus (HSV).

It is a DNA virus. Its only natural host is man.

Basically, HSV is epitheliotropic but may become neurotropic.

HSV is of two types:

- ❖ HSV type I typically causes infection above the waist
- ❖ HSV type II below the waist (herpes genitalis).

HSV-II has also been reported to cause ocular lesions.

MODE OF INFECTION

- HSV-I infection. It is acquired by kissing or coming in close contact with a patient suffering from herpes labialis.
- HSV-II infection. It is transmitted to eyes of neonates through infected genitalia of the mother

OCULAR LESIONS OF HERPES SIMPLEX

PRIMARY HERPES

- ❖ 1. Skin lesions
- ❖ 2. Conjunctiva-acute follicular conjunctivitis
- ❖ 3. Cornea
 - Fine epithelial punctate keratitis
 - Coarse epithelial punctate keratitis
 - Dendritic ulcer

RECURRENT HERPES

- ❖ 1. *Active epithelial keratitis*
 - Punctate epithelial keratitis
 - Dendritic ulcer
 - Geographical ulcer
- ❖ 2. *Stromal keratitis*
 - i. Disciform keratitis;
 - ii. Diffuse stromal necrotic Keratitis
- ❖ 3. *Trophic keratitis (meta-herpetic)*
- ❖ 4. *Herpetic iridocyclitis*

PRIMARY OCULAR HERPES

Primary infection involves nonimmune person.
It typically occurs in children of 6 months till 5 years of age and in teenagers.

CLINICAL FEATURES

- 1. Systemic features:** mild fever, malaise, non-suppurative lymphadenopathy.
Rarely, severe morbidity can result from multi-system failure.
Disease may be fatal when encephalitis develops.
- 2. Skin lesions :** Vesicular lesions involving skin of face, lips, lids, periorbital region and the lid margin (vesicular blepharitis).

3. *Ocular lesion* :

- *Acute follicular conjunctivitis* with regional lymphadenitis
- *Keratitis*: coarse punctate or diffuse branching epithelial keratitis that does not usually involve the stroma.

Primary infection is usually self-limiting but virus travels up to the trigeminal ganglion and establish latent infection

The virus which lies dormant in the trigeminal ganglion, periodically reactivates and replicates. The reactivated virus travels down along the trigeminal nerve to cause recurrent infection. It is not associated with systemic features and typically is a unilateral disease.

Predisposing stress stimuli which trigger an attack include fever such as malaria, flu, exposure to UV rays, general ill health, emotional or physical exhaustion, mild trauma, menstrual stress, following administration of topical or systemic steroids and immunosuppressives.

SYMPTOMS

Redness, pain
Photophobia
Lacrimation
Decreased vision.

SIGNS

Three distinct patterns of epithelial keratitis

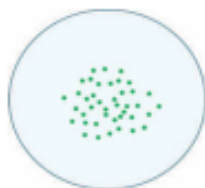
1. Punctate epithelial keratitis: The initial epithelial lesions resemble those seen in primary herpes and may be either in the form of fine or coarse superficial punctate lesions.

2. *Dendritic ulcer*

- ✓ A typical lesion of recurrent epithelial keratitis.
- ✓ The ulcer has irregular, zigzag linear branching shape.
- ✓ The branches are generally knobbed at the ends.
- ✓ Floor of the ulcer stains with fluorescein and the virus-laden cells at the margin take up rose bengal.
- ✓ Corneal sensations is decreased

3. *Geographical ulcer*

- ✓ The branches of dendritic ulcer enlarge and coalesce to form a large epithelial ulcer with a 'geographical' or 'amoeboid' configuration
- ✓ The use of steroids in dendritic ulcer hastens the formation of geographical ulcer.

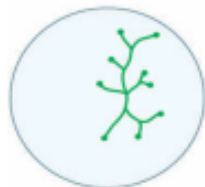


A



B

PUNCTATE EPITHELIAL KERATITIS



C



D

DENDRITIC ULCER

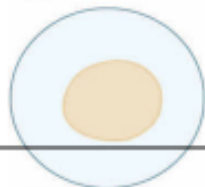


E



F

GEOGRAPHIC ULCER



G



H

DISCIFORM KERATITIS

SPECIFIC TREATMENT

1. **Antiviral drugs** are the first choice presently.

- *Acycloguanosine* (Aciclovir) 3% ointment, 5 times a day X 14–21 days. It penetrates intact corneal epithelium and stroma, achieving therapeutic levels in aqueous humour.
- *Ganciclovir* (0.15% gel), 5 times a day until ulcer heals and then 3 times a day X 5 days.
- *Triflurothymidine* 1% drops: Two hourly until ulcer heals and then 4 times a day X 5 days.
- *Adenine arabinoside* (Vidarabine) 3% ointment 5 times a day until ulcer heals and then 3 times a day X 5 days.

2. Mechanical debridement of the involved area along with a rim of surrounding healthy epithelium reserved for resistant cases, cases with noncompliance and those allergic to antiviral drugs.

3. Systemic antiviral drugs- period of 10 to 21 days used for recurrent and even acute cases.

- Acyclovir 400 mg p.o. tid to bid, or
- Famcyclovir 250 mg p.o. bid, or
- Valacyclovir 500 mg p.o.bid.

NON SPECIFIC TREATMENT

a. Cycloplegic drugs- 1% atropine eyeointment or drops

- To reduce pain from ciliary spasm
- To prevent the formation of posterior synechiae
- Atropine also increases the blood supply
- Reduce exudation by decreasing hyperaemia, vascular permeability.
- Other cycloplegic- 2% homatropine eye drops.

b. Systemic analgesics and anti-inflammatory drugs

such as paracetamol and ibuprofen relieve pain & decrease oedema.

c. Vitamins (A, B-complex and C) help in early healing of ulcer.

DISCIFORM KERATITIS

Pathogenesis

Due to delayed hypersensitivity reaction to the HSV antigen.
Endothelitis → Endothelial damage → disciform
corneal stromal oedema due to imbibition of aqueous humour.

Symptoms

- ❖ Photophobia
- ❖ Mild to moderate ocular discomfort
- ❖ Reduction in visual acuity.

Signs

Disciform keratitis is characterized by

- ❖ *Focal disc-shaped patch* of stromal oedema without necrosis, usually with an intact epithelium.
- ❖ *Folds in Descemet's membrane.*
- ❖ *Keratic precipitates* under the round area of stromal edema.
- ❖ *Ring of stromal infiltrate* (Wessley immune ring)
- ❖ *Corneal sensations* are diminished.
- ❖ *Intraocular pressure (IOP)* may be raised

Treatment

- ***Diluted steroid eye drops***

- ✓ Instilled 4–5 times a day with an antiviral cover (aciclovir 3%) twice a day.
- ✓ Steroids should be tapered over a period of several weeks.
- ✓ If disciform keratitis is present with an infected epithelial ulcer, antiviral drugs should be started 5–7 days before the steroids.

- ***Non-specific and supportive treatment***

Interstitial keratitis

Active viral invasion and tissue destruction.

Symptoms: Pain, photophobia and redness

Signs

- *Corneal lesions* include necrotic, blotchy, cheesy white infiltrates lie under the epithelial ulcer or present independently under the intact epithelium.

- *Mild* iritis, keratic precipitates & Stromal vascularization

Treatment

Topical antiviral drugs, systemic antiviral drugs
keratoplasty

Epithelial sterile trophic ulceration is not an active viral disease, but is a mechanical healing problem due to persistent defects in the basement membrane of corneal epithelium.

Clinical features: It presents as an indolent linear or ovoid epithelial defect. Margin of the ulcer is grey and thickened due to heaped up epithelium.

Treatment is aimed to promote healing by use of lubricants (artificial tears), bandage soft contact lens and lid closure (tarsorrhaphy).

HERPES ZOSTER OPHTHALMICUS

- It is an acute infection of Gasserian ganglion of the fifth cranial nerve by the varicella-zoster virus (VZV).
- Approximately 10% of all cases of herpes zoster.
- Occurs more commonly in immunocompromised individuals.

Etiology

- ***Varicella-zoster virus***. It is a DNA virus and produces acidophilic intranuclear inclusion bodies.
- It is neurotropic in nature.

Pathogenesis

- The infection is contracted in childhood, which manifests as chickenpox and the child develops immunity.
- The virus then remains dormant in the sensory ganglion of trigeminal nerve.
- In immunocompromised patients, the virus reactivates, replicates and travels down along branches of the ophthalmic division of the fifth nerve to produce cutaneous and ocular lesions.

Clinical Features

- *Frontal nerve* is more frequently affected than the lacrimal and nasociliary nerves.
- *Hutchinson's rule*: ocular involvement is frequent if the side or tip of nose presents vesicles (cutaneous involvement of nasociliary nerve)

Lesions are strictly limited to one side of the midline of head.

Clinical phases

- I. *Acute phase lesions*, totally resolve within few weeks.
- II. *Chronic phase lesions*, which may persist for years.
- III. *Relapsing phase lesions*, where acute or chronic lesions reappear sometimes years later..

General features: The onset of illness is sudden with fever, malaise and severe neuralgic pain along the course of the affected nerve.

Cutaneous lesions: are in the area of distribution of the involved nerve appear usually after 3 to 4 days of the onset of disease. The skin of lids and other affected areas become red and oedematous (mimicking erysipelas), followed by vesicle formation. vesicles are converted into pustules, subsequently burst to become crusting ulcers. When crusts are shed, permanent pitted scars are left. Active eruptive phase lasts for about 3 weeks. Main symptom is severe neuralgic pain which usually diminishes with the subsidence of eruptive phase.



Cutaneous lesions of herpes zoster ophthalmicus

Ocular lesions

1. Conjunctivitis: It may occur as mucopurulent conjunctivitis with petechial haemorrhages or acute follicular conjunctivitis with regional lymphadenopathy. Sometimes, severe necrotizing membranous inflammation may be seen.

2. Zoster keratitis

- ✓ *Epithelial keratitis.* To begin with fine or coarse *punctate epithelial keratitis.*
- ✓ *microdendritic epithelial ulcers* are usually peripheral and stellate. They have tapered ends which lack bulbs.

- ✓ *Nummular keratitis*: characterised by *anterior stromal infiltrates*. It typically occurs as multiple tiny granular deposits surrounded by a halo of stromal haze. After healing 'nummular scars' are left behind.
- ✓ *Disciform keratitis*: always preceded by nummular keratitis.

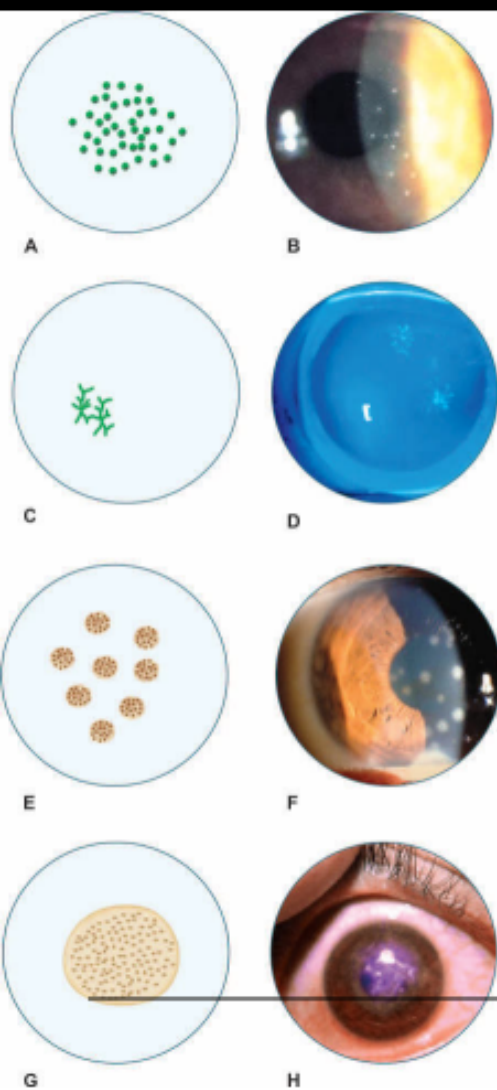
3. Episcleritis and scleritis

4. Iridocyclitis

5. Acute retinal necrosis

6. Secondary glaucoma. It may occur due to trabeculitis or synechial angle closure in late stages.

7. Anterior segment necrosis and phthisis bulbi



1. *Punctate epithelial keratitis*
2. *Microdendritic epithelial ulcer*
3. *Nummular keratitis*
4. *Disciform keratitis*

Chronic phase lesions

Sequelae of acute phase, may last for upto 10 years

1. **Post-herpetic neuralgia** refers to persistence of pain even after subsidence of eruptive phase of zoster. Pain is mild to moderate in intensity, worsens at night and is aggravated by touch and heat.
There occurs some anaesthesia is called anaesthesia dolorosa.

2. **Lid lesions** as sequelae of scarring include ptosis, trichiasis, entropion and notching

3. **Conjunctival lesions:** chronic mucous secreting conjunctivitis

4. Corneal lesions

- *Neuroparalytic ulceration* due to acute infection and Gasserian ganglion destruction.
- *Exposure keratitis* due to associated facial palsy.
- *Mucous plaque keratitis* characterised by sudden development of elevated mucous plaque, stains with rosebengal.

5. Scleritis and Uveitis may persist in chronic form.

RELAPSING PHASE LESIONS

Lesions which may recur even after ten years of acute phase include nummular keratitis, mucous plaque keratitis, episcleritis, scleritis and secondary glaucoma.

Systemic therapy for herpes zoster

1. Oral antiviral drugs. stop viral progression and reduce the incidence as well as severity of keratitis and iritis.

It has no effect on post herpetic neuralgia.

- *Acyclovir* - 800 mg, 5 times a day for 10 days
- *Valaciclovir* - 500 mg TDS.

2. Analgesics

combination of mephenamic acid and paracetamol /pentazocin

3. Systemic steroids. Reduce postherpetic neuralgia when given in high doses. Recommended in cases of neurological complications such as third nerve palsy and optic neuritis.

4. **Cimetidine** -300 mg QID for 2–3 weeks starting within 48–72 hours of onset reduce pain & pruritis by histamine blockade.

5. **Amitriptyline** relieve depression in acute phase.

LOCAL THERAPY FOR SKIN LESIONS

1. **Antibiotic-corticosteroid skin ointment or lotions.**

Three times a day till skin lesions heal.

2. **No calamine lotion.**

LOCAL THERAPY FOR OCULAR LESIONS

1. For zoster keratitis, iridocyclitis and scleritis
 - Topical steroid eyedrops 4 times a day.
 - Cyclopentolate eyedrops BD or atropine eye ointment OD.
 - Topical acyclovir 3% eye ointment 5 times a day for 2 weeks.
2. To prevent secondary infections topical antibiotics are used.
3. For secondary glaucoma
 - 0.5% timolol or 0.5% betaxolol drops, BD.
 - Acetazolamide 250 mg, QID.
4. For mucous plaques, topical mucolytics e.g. acetyl cysteine 5 to 10%, three times a day.
5. For persistent epithelial defects use:
Lubricating artificial tear drops & bandage soft contact lens.

Surgical treatment

For neuromparalytic corneal ulcer caused by herpes zoster:

1. *Lateral tarsorrhaphy* should be performed.
2. *Amniotic membrane transplantation (AMT)* or conjunctival flap for nonhealing cases.
3. *Tissue adhesive* with BCL for corneal perforation.
4. *Keratoplasty*. for visual rehabilitation of zoster patients with dense scarring.