
بسم الله الرحمن الرحيم

Red eye 4

Infective Corneal ulcer

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Classification

Microbial

- Bacterial
- Fungal
- Protozoal Acanthamoeba
- Viral
- Chlamydia trachomatis

Bacterial keratitis

- Caused by bacteria
- Common by staphy-aureus; strept-pneumonia, Gonococcus, Pseudomonas aeruginosa, Moraxella, Klebsiella & Proteus
- The infection starts when the epithelial integrity is broken either due to trauma or ocular surface disease and the organism gains access into the tissue and proliferates.
- Gonococcus diphtheria & Hemophilus can damage intact epith.
- Start with Blurred vision, pain, redness, tearing, photophobia, foreign body sensations, secretions & discharge

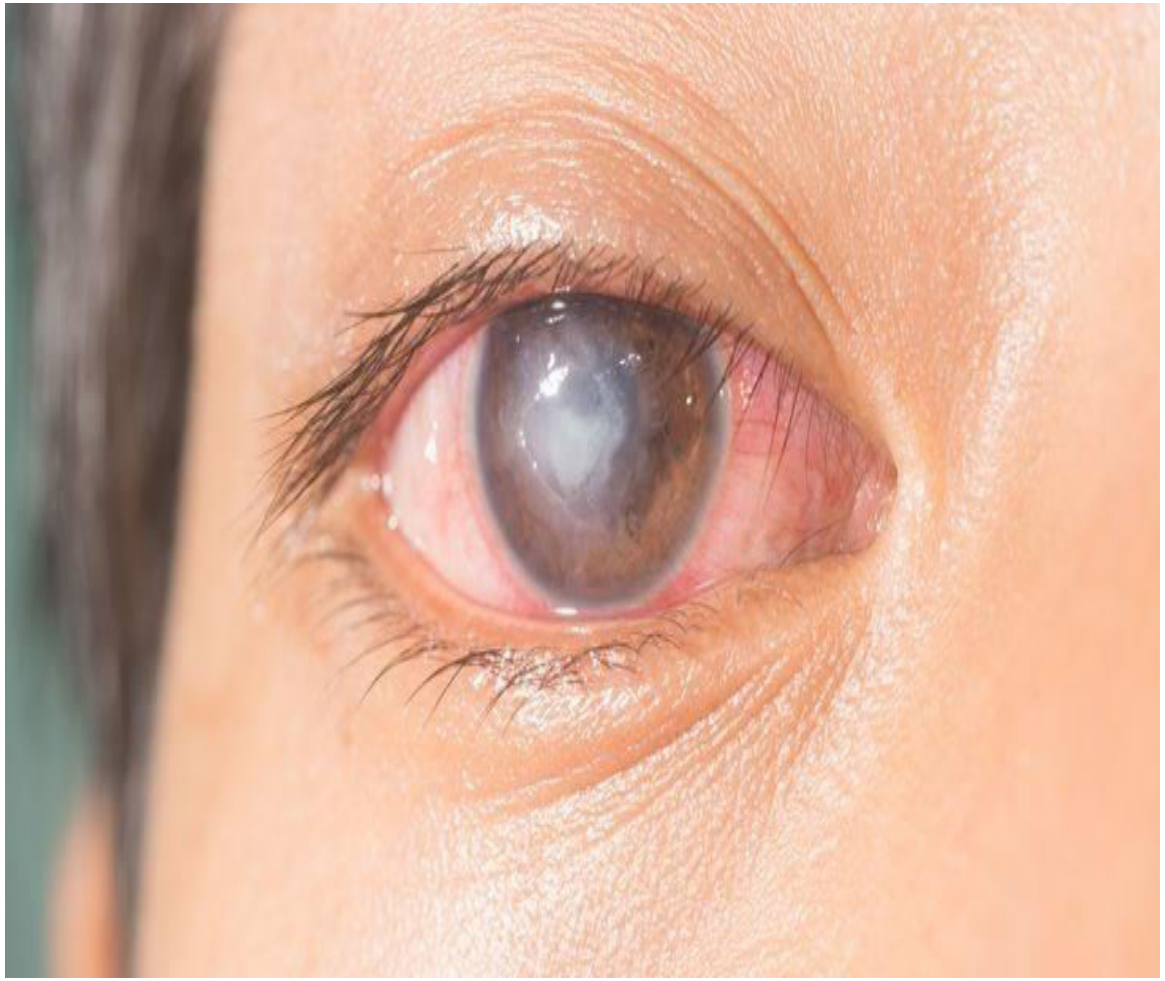
Clinical feature

- There is severe pain, redness, lacrimation, decreased vision photophobia, & blepharospasm ie the patient cannot open the eyes.
- On examination It appears as greyish white swollen cornea with necrosis at the base. Cornea stain positive with fluorescence
- Conjuctinal Hyperemia,
- Hypopyon ie pus formation & exudates in the a/c which is due to increased amount of cellular infiltrates in A/C,
- Anterior uveitis due to inflammation of iris and ciliary body due toxin & cytokines released by these inflammatory cells
- Lid edema may be there

Clinical features

- Infiltrative stage Any injury which damages the epithelium leads to polymorphonuclear attraction leading to yellow white corneal infiltrates with epithelial edema
- Active & necrotic stage There is necrosis & sloughing of the epithelium with excavation and ulcer formation. The chemical mediator are released from ulcerated area which produces the features ie congestion discharge hypopyon etc etc

- Regression There may be regression of the ulcer due to host natural protective mechanism. A line of demarcation between ulcerated & normal clear cornea.
- Healing & scarring may start by epithelialization of the ulcer leading to scarring as a result of new stromal lamellae formation by keratocyte.



Management

- Mostly treated in outpatient
- Admission may be needed if
- Large ulcer
- Resistant to the previous med
- From far flange area

Management Contd

- Proper history of any trauma specially nature & time of trauma, any associated ocular disease eg dry eyes etc & ocular medication such as steroid.
- Systemic history of any chronic illness or any medication specially of any steroid or other immunosuppressive medication should be moted.
- Clinical findings detail examination with slit-lamp. If needful then fluorescence staining should be done to confirm the diagnosis. Corneal sensitivity should be checked. The shape, size, & color of the ulcer ie height & width should be measured & documented.

Margins of the ulcer weather clear rounded , feathery margins , satellite lesion should be noted & described.

Then depth weather superficial or deep.

- Anterior chamber(AC) should be focused for depth, reaction ie cells, flare and hypopyon due to increased vascular permeability should be noted. The size ie length & width of hypopyon should be noted daily.

Investigations

- Routine blood cp with ESR urea sugar urine exam
- Swab from Discharge with can be used for examination.
- Corneal scraping specifically from margins & bed of the ulcer, with topical analgesic under microscope, is done by spatula/20 gauge syringe. Care should be taken to avoid perforation
- a) Direct examination under microscope for any fungal hyphae with KOH.
- b) Gram staining for gram positive & negative.
- c) For culture sensitivity in different culture media.

Which Medium for Which Organism?

Culture Media	Specificity
Blood agar	Most bacteria and fungi. Excludes *Haemophilus spp.*, *Neisseria spp.*, and *Moxarella spp.*
Chocolate agar	Fastidious bacteria, aerobic bacteria, *Haemophilus influenzae, Neisseria spp.,* and *Moxarella spp.*
Lowenstein-Jensen media	*Mycobacteria spp., Nocardia spp.*
Loeffler's media	Corynebacteria
Sabouraud's dextrose agar	Fungi, especially *dermatophytes*
Potato dextrose agar	Fungi
Brain-heart infusion	*Streptococci spp., Meningococci spp.*, yeast, fungi
Thioglycolate broth	Aerobic and anaerobic bacteria
Cooked meat broth	Anaerobic and fastidious bacteria
Non-nutrient agar with *E. coli*	*Acanthamoeba*
Viral transport	Viruses (e.g., HSV), *Mycoplasma spp., Ureaplasma spp.,* and *Chlamydia spp.*

- B scan for any doubtful intraocular foreign body
- X ray for any doubtful intraocular foreign body
- Ct scan can b done for any doubtful intraocular foreign body

Treatment

- A) Medical according to the pathogens involved, but broadly the following medication
- Topical antibiotics for infection control like tobramycin gentamycin ofloxacin ciprofloxacin moxifloxacin. Single or in combination, drops & in oint form. Frequency varies from half hrly to four times daily
- Cycloplegic cyclopean to relieve pain , pupil dilatation to prevent synechia formation & reduce exudation by decreasing the vascular permeability.
- Analgesic to relieve pain
- Anti glaucoma to reduce intraocular pressure (IOP) betablocker timolol etc

- Systemic
- Antibiotics oral/iv
- Analgesic oral/iv
- Antiglaucoma to reduce IOP acetazolamide AZM
- B) Bandage contact lens may b applied for mechanical support
- In resistant & non healing cases & very thin cornea

- C) Surgical in resistant & corneal thinning with threatened perforation
- Pressure bandage
- Tarsorrhaphy
- Amniotic membrane transplant AMT
- Conjunctival flape
- Tectonic graft
- PKP

Fungal keratitis

- Common pathogens
- Candida yeast
- Filamentary aspergillosis
- Mucor

Fungal keratitis

Risk factors

- Risk factors include trauma, ocular surface disease, and topical steroid use.
- In warmer climates the rule is that the most common organisms are filamentous fungi, like Fusarium spp and Aspergillus spp. With a strong relationship to trauma.
- More common in debilitated or immunocompromised patients and the causative organism being a Candida, such as yeast
- Fusarium keratitis associated with a type of contact lens solution
- Suspicion should be high in cases of trauma with vegetable matter

Clinical features

- Fungal keratitis was first described by Leber in 1879. Fungal keratitis or keratomycosis refers to an infective process of the cornea caused by any of the multiple pathologic fungi capable of invading the ocular surface. It is most typically a slow, relentless disease that must be differentiated from other types of corneal conditions with similar presentation; especially its bacterial counterpart
- Different fungi including but not limited to yeasts of Candida spp., filamentous spp Aspergillus spp., Fusarium spp., Cladosporium,spp., Curvularia, and non septated such as Rhizopus.
- Bare in mind that any agent capable of infecting humans is a potential infectious agent, especially if the host has a debilitating disease.

C/f contd

- The infection starts when the epithelial integrity is broken either due to trauma or ocular surface disease and the organism gains access into the tissue and proliferates.
- Proteolytic enzymes, fungal antigens and toxins are liberated into the cornea with the resulting necrosis and damage to its architecture thus compromising the eye integrity and function.
-

C/f contd

- Blurred vision, pain, redness, tearing, photophobia, foreign body sensations, secretions related to agr- trauma, ocular surface disease and topical steroid use are all important characteristics to ascertain in the history.
- The filamentary corneal lesions have a white/gray infiltrate with feathery borders. There might be satellite lesions with a hypopyon and conjunctival injection as well as purulent secretions.
- Candida/ Yeast ulcer are plaque-like and slightly more defined, similar to bacterial keratitis.

Management

- Hx
- Examination
- Investigation
- Treatment

Diagnosis

- Proper & detail History
- Slit lamp examination
- A high degree of suspicion from the physician accounts for early diagnosis and treatment, which are paramount for a successful resolution of the fungal keratitis.
- a) associated ocular & systemic disease, b) steroid or other immunosuppressive medication Corneal ulcers unresponsive to broad-spectrum antibiotics, c) the presence of satellite lesions, and d) scanty secretions in a large ulcer are some signs that should raise flags to the attending professional about the possibility of a mycotic agent.

Investigation

- Corneal scrapping
- For direct examination with KOH for fungal hyphae
- Gram staining
- Culture sensitivity
- B scan for any doubtful intraocular foreign body
- X ray for any doubtful intraocular foreign body

Treatment

- Topical antifungal different preparation
- Natamycin 5% drops
- Fluconazole 2% drops
- Amphotericin B 0.15% drops
- Voriconazole 1-2% drops
- Clotrimazole cream 2%
- The antifungal are fungistatic so it is used for 4 week at least
- Antibiotics for secondary bacterial infection
- Cycloplagic to relieve pain & synechiae prevention

- Systemic different preparation in Pakistan
- Ketoconazole(Nizoral)
- Fluconazole(Diflucan)
- Itraconazole (sporonox/ Icon)
- Used at least for 4-6 weeks
- Antibiotic mix with antifungal in a case of any doubt

- Mechanical debridement
- Keratoplsty

Acanthamoeba keratitis

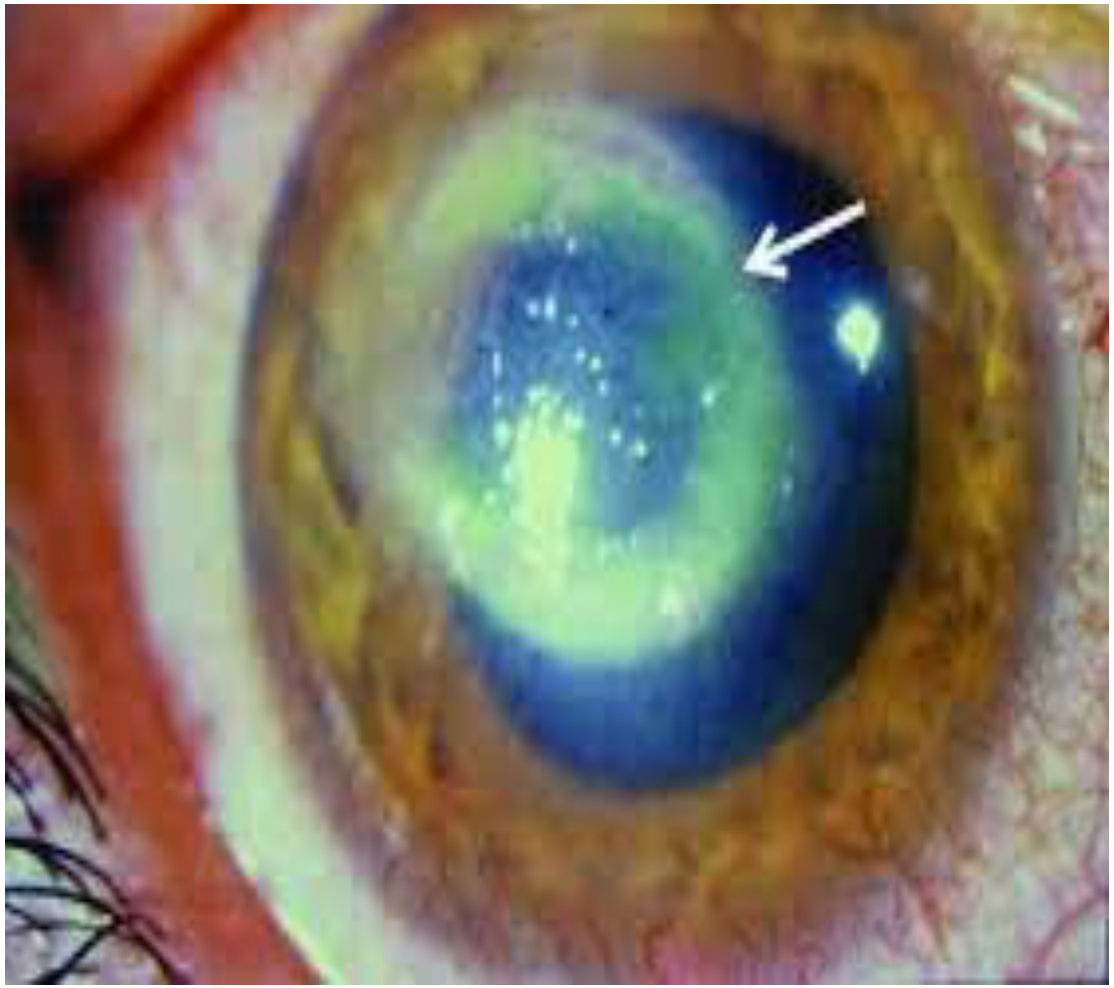
- Acanthamoeba is free living protozoa living in fresh water & soil
- Exist in active trophozoite or dormant cystic form, resistant to kill by freezing , desiccation & chlorination
- It can lead to Very serious & blinding ocular condition
- Needs urgent treatment
- Admission

Risk factors

- Contact lens wear
- Ocular trauma
- Swimming pool

Symptoms & signs

- Blurred vision
- Severe pain as compared to the lesion ie out of proportion pain
- Epithelial keratitis diffuse or psuedodendrites like herpes
- Ring infiltrate & abscess
- Characteristic perineural radial infiltrates & abscess formation with enlargement of corneal nerves are diagnostic signs
- Corneal melting may occur



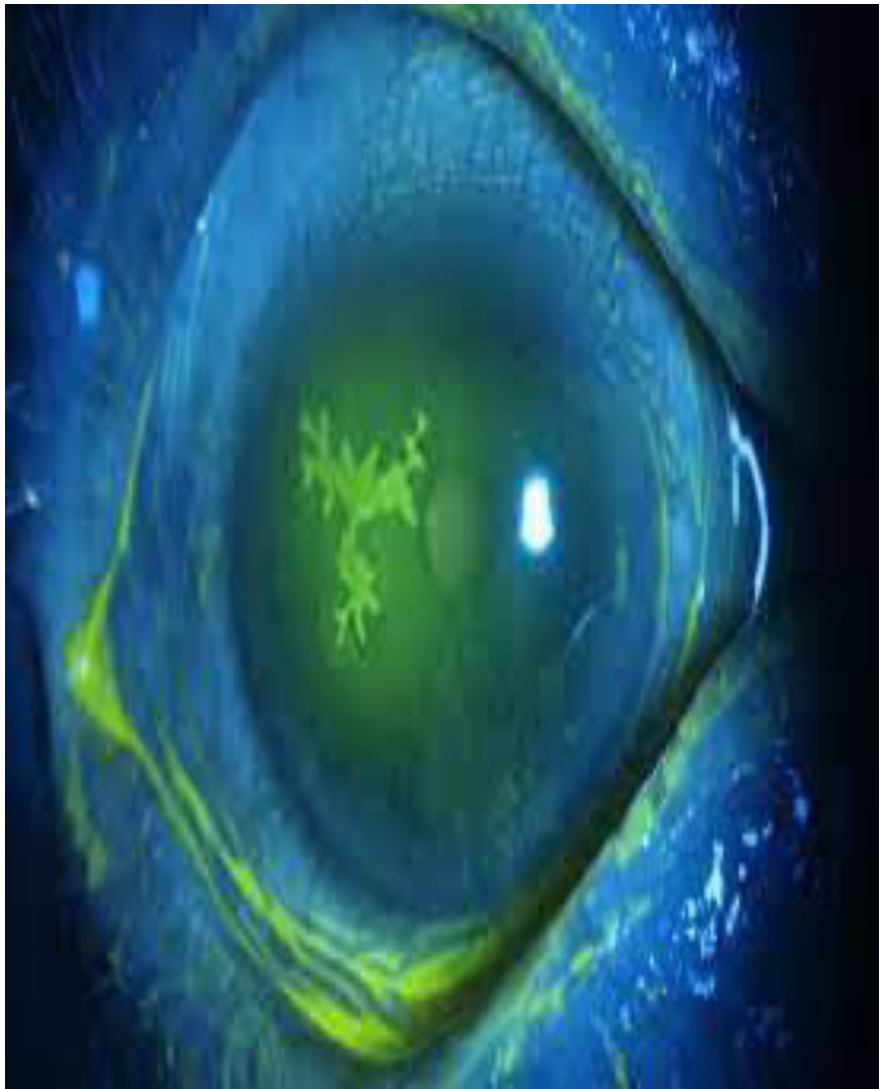
Diagnosis

- Typical history features & finding
- Investigation
- Corneal scrapping for
- A direct examination with periodic Acid Schiff(PAS) or Calcofluor white stain which have affinity for Acanthamoeba cyst & Fungai
- B gram staining cyst
- C culture in non-nutrient agar with E-coli overlay
- Corneal biopsy

Treatment

- Epithelial scraping to remove the organism
- Aminoglycoside neomycin
- Chlorhexidine 0.02%
- Voriconazole
- Polyhexaquinidine biguanide
- Propamidine isethionate(brolene)
- Keratoplasty Pkp in nonresponsive & proressive

- A male age 45 yrs come to eye opd with itching foreign body sensation watering & blurred vision Lt eye for last 15-20 days. On examination his vision is 6/12 Lt eye & 6/6 in Rt eye. There is a corneal lesion with branching pattern & conjunctival congestion. a/c is quiet. Rt is insignificant. He gives hx of fever few days back.
- What is the most probable diagnosis
- A bacterial keratitis
- B fungal keratitis
- C traumatic keratitis
- D viral keratitis



Viral keratitis

- Commonly caused by
- Herpes simplex
- Herpes zoster
- Adenoviral
- Measles
- Mumps

Herpes simplex HSV

- DNA virus
- Common cause infection
- Common cause of corneal scar
- 90% of population are seropositive to herpes simplex
- Two types
- Type i mainly affect above the waist ie face lips etc
- Acquired by droplet infection/ close contact with patients
- Type ii mainly below waist cause by sexual process spread by genital secretion

Primary HSV

- No previous exposure
- First 06month usually no infection, due by maternal antibodies
- Mild flue like & sore throat
- Periocular vesicles
- Conjunctivitis
- Eyelid blepharits

- Antiviral oint

Recurrence

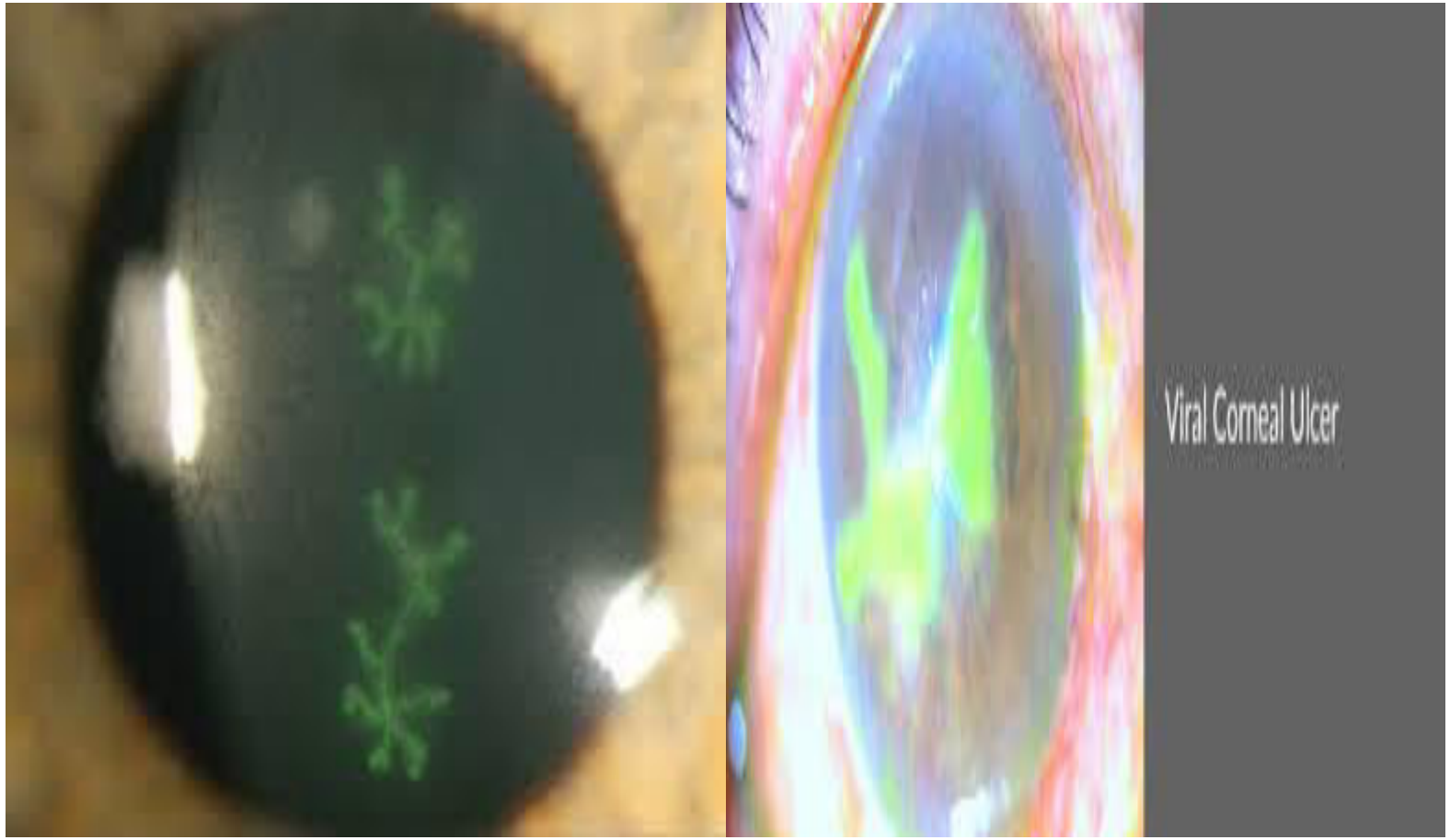
- After primary infection the virus travels along the axon of sensory nerves to the regional gangelion
- Type I to trigeminal gangelion
- Type ii to the spinal gangelion
- Recurrence
- Is due to the reactivation, replication & travels down the nerve to the target tissue causing recurrent infection.

Risk for recurrence

- Fever
- Poor health
- Xposure to sunrays/ultraviolet rays
- Psychiatric disturbance
- Use of steroid

Recurrent HSV

- Dendritic
- When it
- Widens
- It leads to
- Geographical
- Ulcer

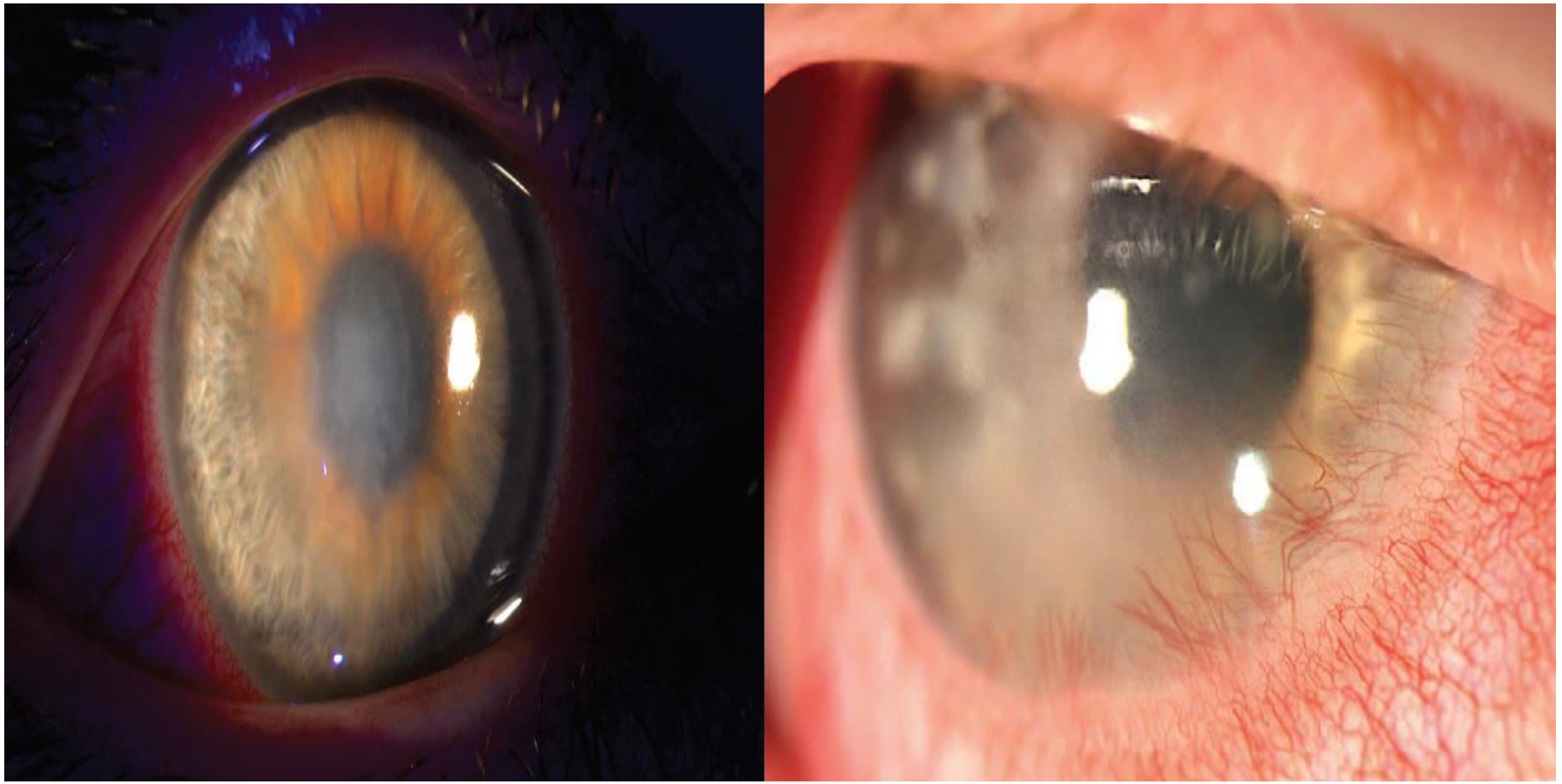


Recurrent kts

Stromal Keratitis

Necrotic stromal Keratitis

keratouvitis



- Under poor health condition the virus in the ganglion, reactivates, replicates travel to the target tissue cornea, causes rec-ulceration
- It damages the epithelial cells coalesce to form linear pattern
- Destruction of the cells--ulceration--further recurrence--further expansion of the ulcer

Clinical features typical feature

- Recurrence
- Foreign body sensation
- Blurred vision
- Mild pain
- On examination
- Branching ulcer
- Stain with fluoresce
- Corneal sensitivity is reduced

Sign

Bacterial	Fungal	Viral
Epithelial defect with large infiltrate and conjunctival injection	Grey or whitish stromal infiltrate with indistinct fluffy margins	Punctate/stellate pattern
Anterior chamber reaction	Feathery branch-like extensions	Linear branching ulcer with or without terminal buds
Hypopyon	Satellite lesions	Reduced corneal sensation
	Hypopyon	

Treatment

- Topical
- Antiviral ointment. Antivral like Acyclogaunosine Acyclovir usually here
- Triflurothimidine drops
- Adenine arabinoside drops

- Antibiotics for secondary infection
- Steroid cautious use to reduce inflammation & soothing
- Cycoplagic to reduces pain
- Systemic
- Analgesics
- Antivral Acylex tab ?? 1gm QID in case of systemic illness & weakness

Stromal keratitis

- It is a localized disc shape stromal greyish edema due to the endothelial infection of the cornea
- It is delayed type of reaction to the viral antigen
- Endothelial damage result in corneal edema due to hydration

- Blurred vision
- Stromal thickening
- Epitheliam is intact
- Corneal sensitivity is reduced
- Kps may be there
- Ant uveitis

Treatment

- Topical antiviral
- Steroid
- Cycloplagic
- Antibiotics

Herpes zoster ophthalmicus HZO

- Caused by the infection of the involvement of the skin of the ophthalmic branch of the trigeminal nerve
- By the human herpes virus 3
- Zoster
- Varicella

- Causing ischemic vasculitis
- Cellular infiltration
- Inflammatory Granulomatous reaction

Clinical features

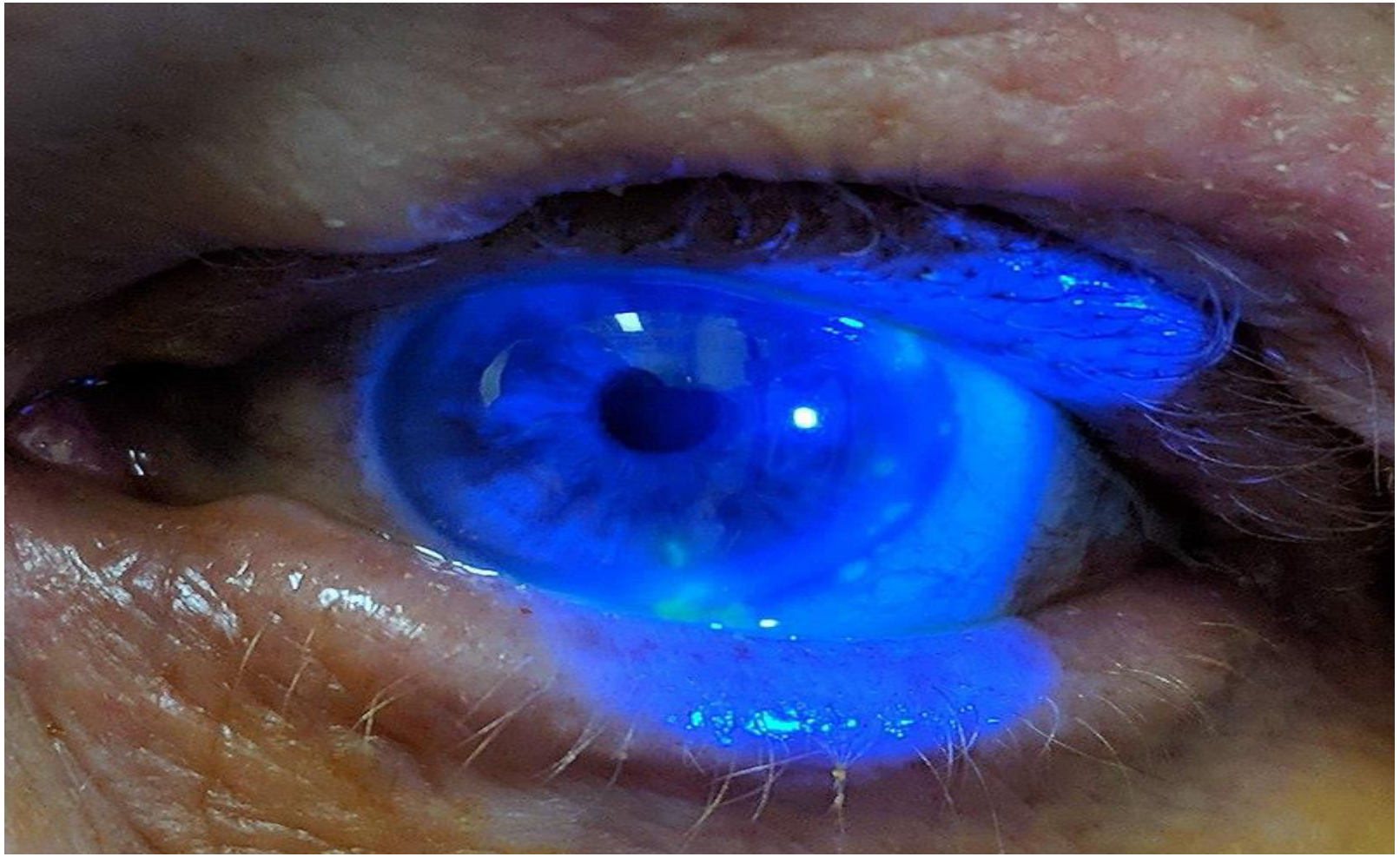
- Typical features
- Pre-herpetic neuralgia with pain in the distribution of the nerve involved before the appearance of the skin rash
- Skin rash--- maculopapular rash in the painful area of the ophthalmic nerve area
- Vasicular rash develop in 24 hrs ---- leads to pustules & crustes ---- subsides in weeks in pitted scar form
- Edema is there ---in some cases to the opposite side


eksudativni eritem
(eryhema exsudativum)
kraste
(crusta)
mehurić
(vesikula)
otok očnog kapka
(oedema palpebrae)

- Post herpetic neuralgia after the rash is subsided pain disappears in few weeks (2-3) but there is continuous pain in some of the cases--- persists for years

Ocular lesion different forms

- Keratitis epithelial in 50% of cases
- Micodendritic keratitis
- Filamentary keratitis
- Disciform keratitis
- Anterios uveitis
- Secondary glaucoma due to trabeculitis
- Conunctivitis

- 

Treatment

- Systemic oral antiviral may reduce the duration severity & post herpetic neuralgia
- Start In pre neuralgic episode 1-2 days before eruption starts
- Acyclovir (tab Acylex zovirex) common 500 5times
- Valacyclovir
- Famciclovir
- Anagesic
- Antibiotics
- Steroid

Topical

- Topical skin cream antibiotic steroid combination for skin lesion

- Antibiotic drops
- Antiviral oint
- Cyloplagic
- Antiglaucoma

Table 1: HSV KERATITIS CLASSIFICATION

HSV CATEGORY	COMMON NOMENCLATURE	BASIC TREATMENT APPROACH
Epithelial keratitis	• Dendritic keratitis • Geographic keratitis	Antiviral (topical or oral) or debridement
Stromal keratitis without ulceration	• Interstitial keratitis • Immune stromal keratitis	Topical steroid + oral antiviral prophylaxis
Stromal keratitis with ulceration	• Necrotizing keratitis	Oral antiviral in therapeutic doses + topical steroid
Endothelial keratitis	• Disciform keratitis	Oral antiviral in therapeutic doses + topical steroid

- Thanks