



CORNEAL ULCER



PRESENTED BY-

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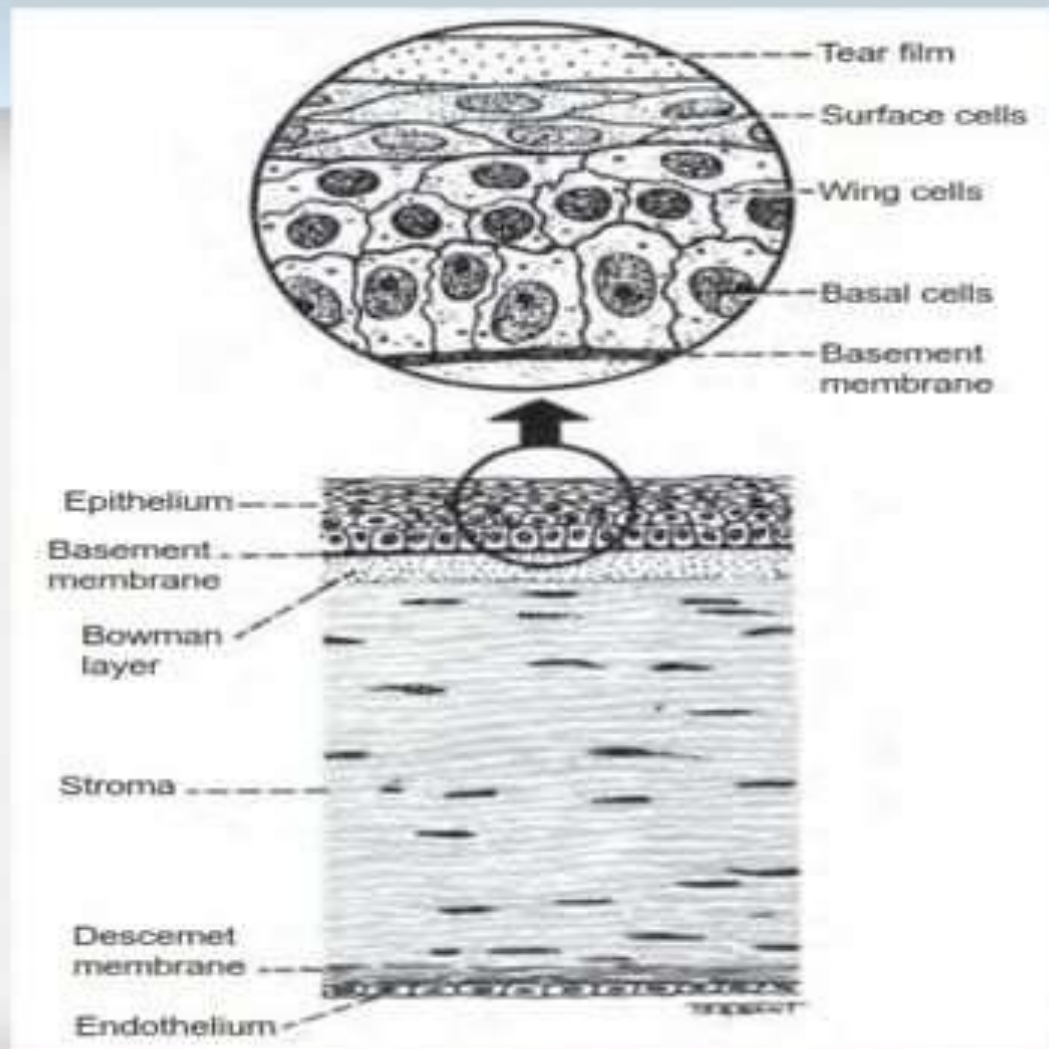


Definition

Corneal ulcer : Refers to corneal tissue excavation associated with an epithelial defect, usually with infiltration and necrosis.



Histology of Cornea





Classification

Corneal ulcers can be classified in three ways :

1. On the basis of aetiology
2. On the basis of location of ulcer
3. On the basis of involvement of the corneal layers





Classification

1. On the basis of aetiology -

a. Infective:

- Bacterial
- Viral
- Fungal
- Protozoal

b. Non-infective/sterile :

- Neuroparalytic
- Neurotrophic
- Corneal ulcer due to Vit A deficiency
- Mooren ulcer



Classification

2. On the basis of location of ulcer-



Paracentral

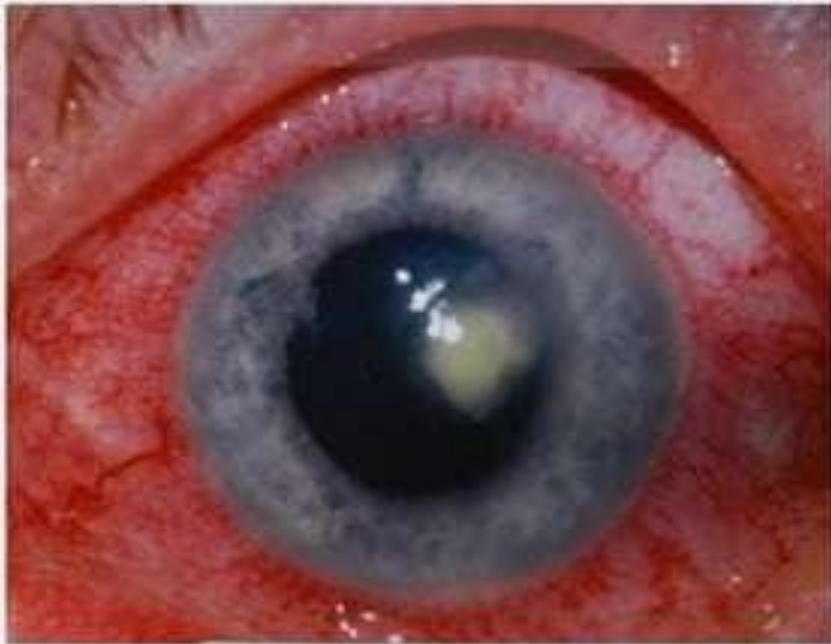


Peripheral



Classification

3. On the basis of involvement of the corneal layers-



Superficial



Deep





Predisposing Factors

Local Factors :

- Ocular trauma
- Dry eye
- Chronic dacryocystitis
- Exophthalmos
- Xerophthalmia
- Entropion
- Trichiasis
- Contact lens wear
- Prolong use of local steroids





Predisposing Factors

- Systemic Factors :

- Malnutrition
- DM
- Alcoholism
- Drug addiction
- Malignancy
- Immunosuppressive drugs





Predisposing Factors

Contact lens users are predisposed to corneal ulcer.

Causes :

- Negligence
- Prolonged period of time
- Cleaning with tap water
- Contamination





Infective Corneal Ulcer

- Compromised **ocular defence**
- Sight threatening condition
- Ocular emergency





Ocular defence mechanism

- Corneal epithelium- mechanical barrier
- Conjunctiva- cellular & chemical components
- Tear film- biological protective system



Major components of ocular defence system





Barriers of microbial infection

Anatomical

- Bony orbital rim, eyelids,
- Intact corneal & conjunctival epithelium

Mechanical

- Tear film-mucus layer
- Lacrimal system

Antimicrobial

- Tear film constitutes-IgA, complement components, and enzymes lysozyme, lactoferrin, betalysins
- CALT



Causative Organisms

Bacterial

- *P. aeruginosa*
- *S. aureus*
- *S. pyogenes*
- *S. pneumoniae*

Fungal

- *Candida*
- *Fusarium*
- *Aspergillus*

Viral

- HSV – 1
- HZV





Pathogenesis

Corneal abrasion → Microbes **adhere**, **clone** and **invade** to stromal lamellae, **release** toxins & lytic enzymes



Host response

PMNs at the site of defect from tears & limbal vessels → **release** of cytokines & interleukins → progressive invasion of cornea & increase in size of ulcer



Phagocytosis

Release of free radicals, proteolytic enzymes → Necrosis & sloughing of epithelium, Bowman's membrane & stroma



A saucer shaped defect with projecting walls above the normal surface due to swelling of tissue resulting from fluid imbibition by corneal stroma with grey zone of infiltration



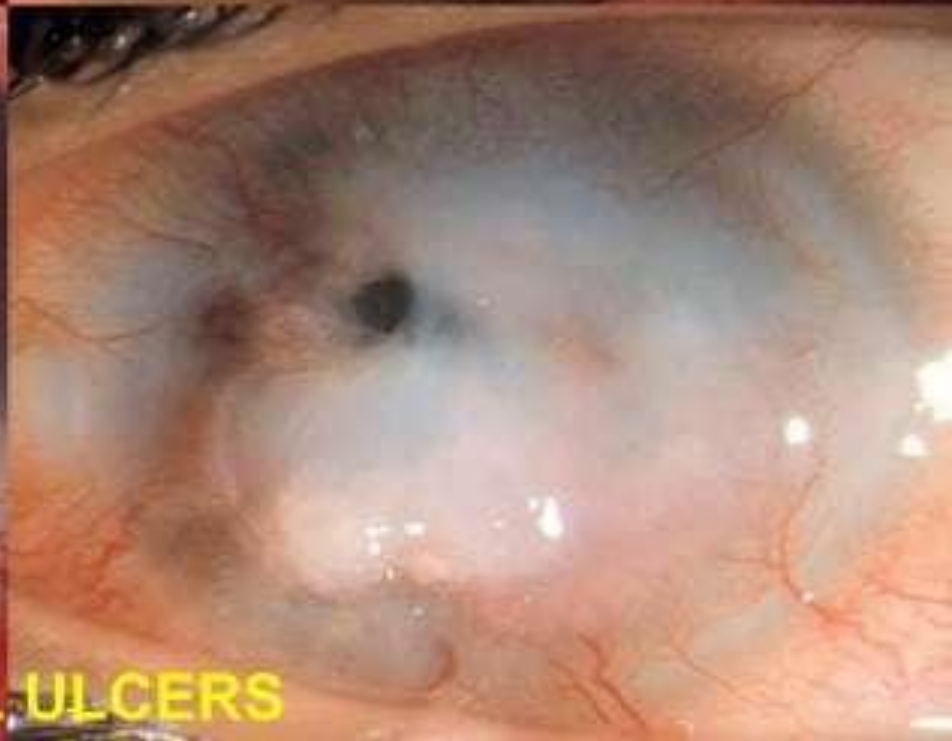
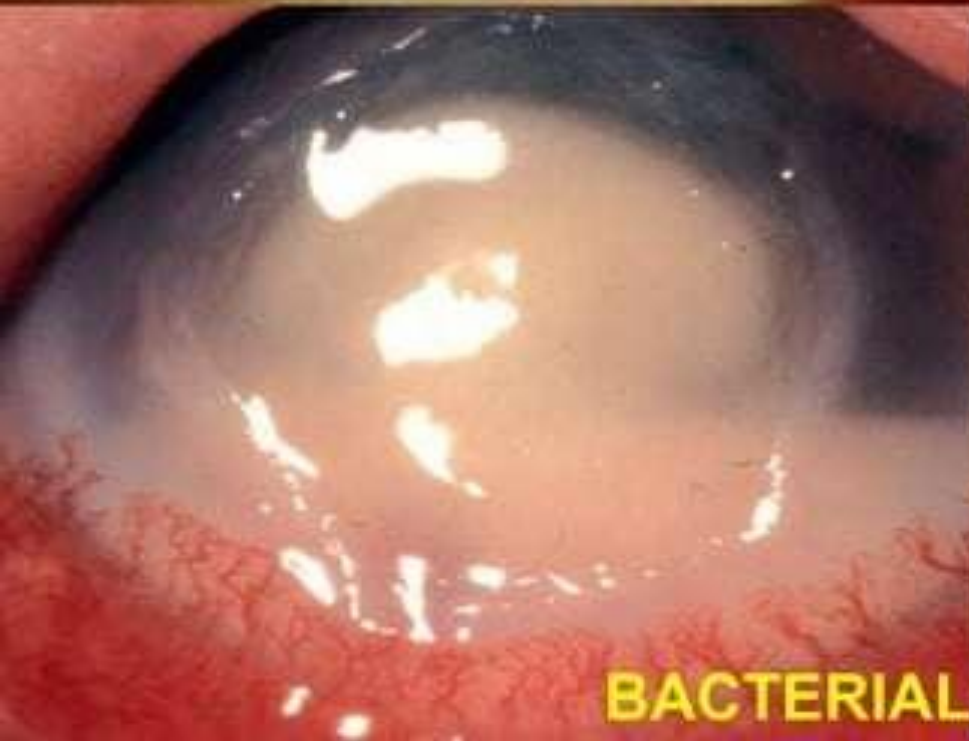
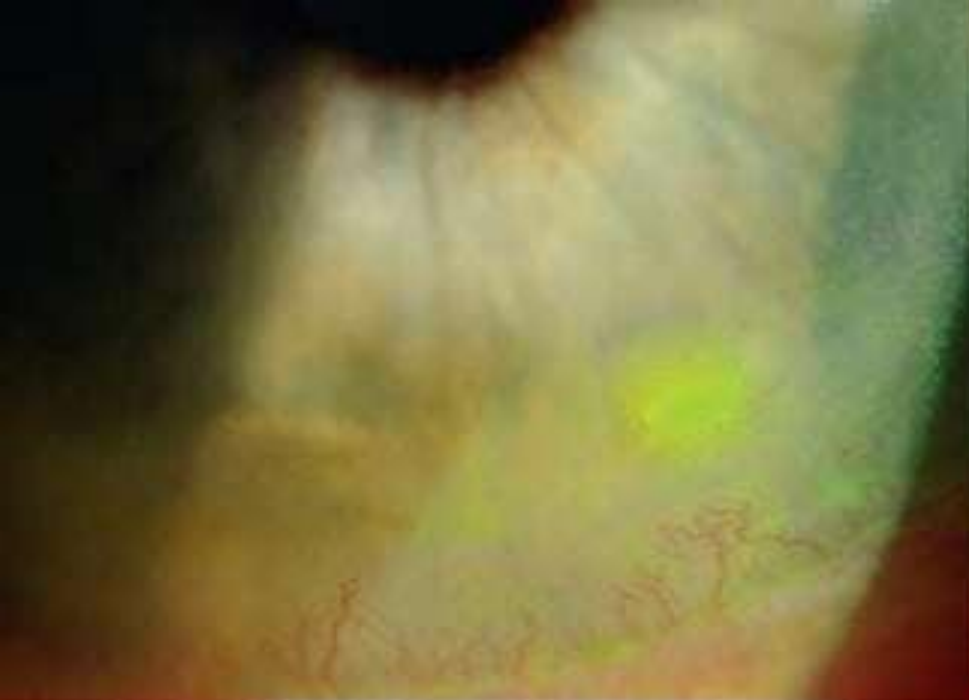
Presenting Symptoms

Bacterial	Fungal	Viral
<ul style="list-style-type: none">- Pain and irritation- Blurred vision- Photophobia- Redness- Watering- Discharge- Eyelid swelling	<ul style="list-style-type: none">- Blurred vision- Redness- Eyelid swelling- Photophobia- Pain and irritation	<ul style="list-style-type: none">- Discomfort and gritty feeling- Redness- Photophobia- Watering- Blurred vision

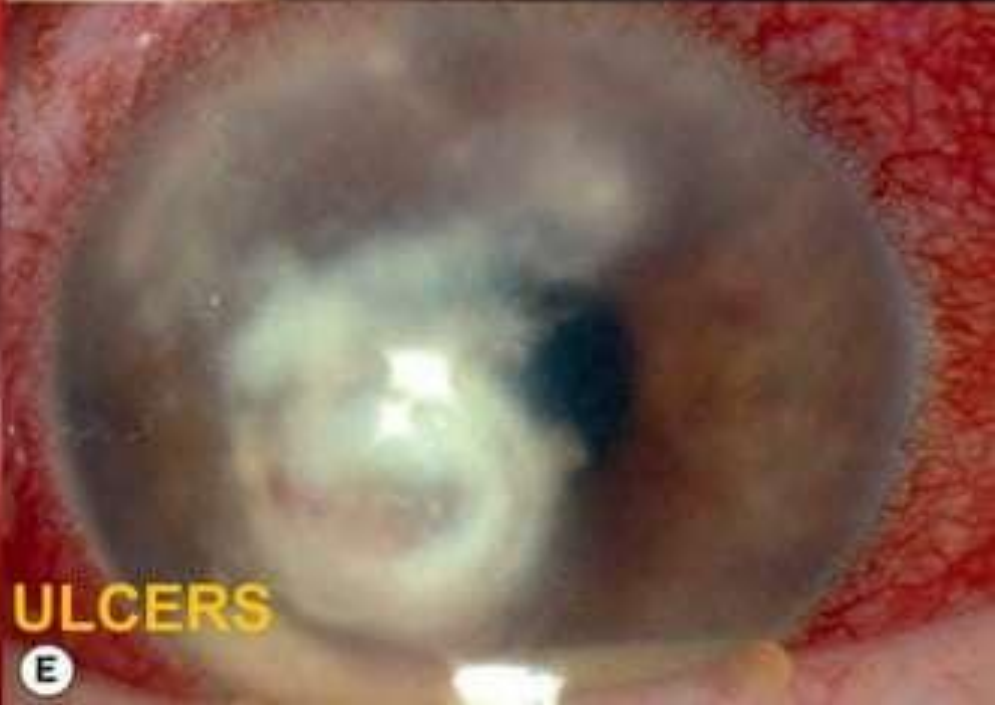
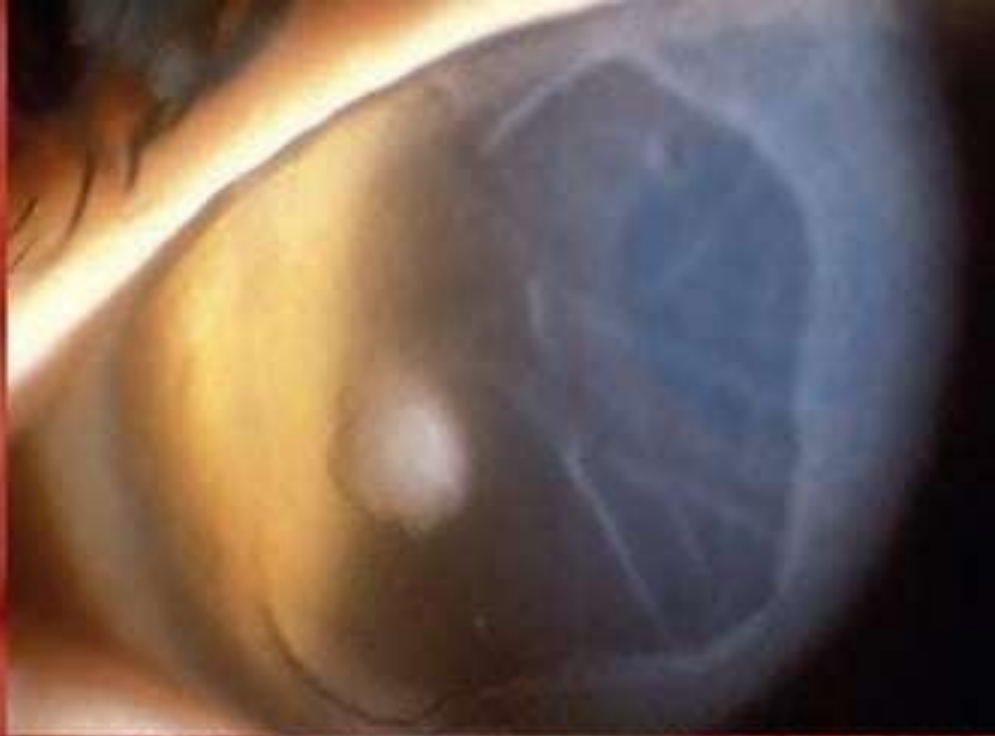


Sign

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 Hypopyon	Reduced corneal sensation



BACTERIAL ULCERS



FUNGAL ULCERS

E





E



F P



O





Investigations

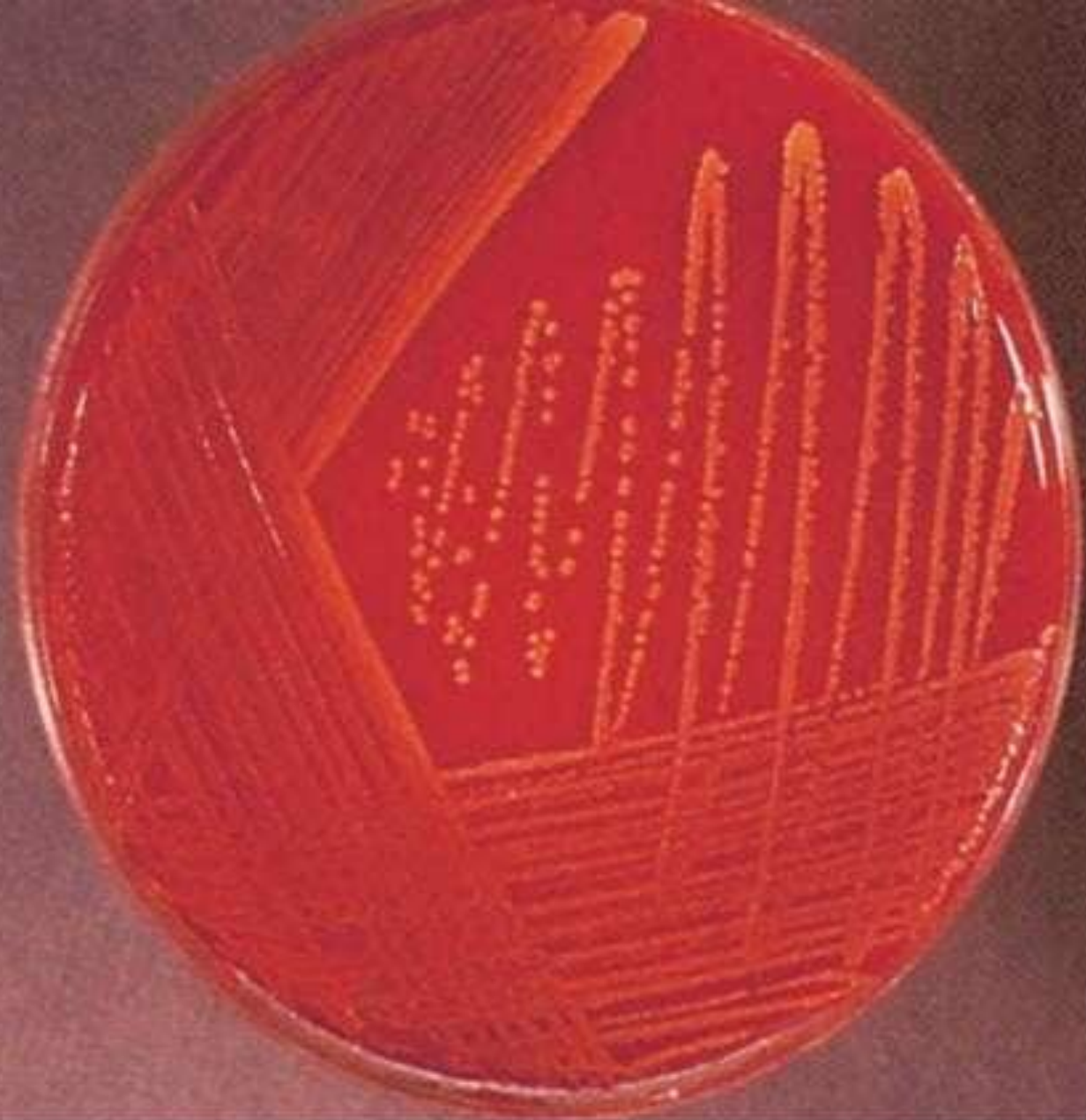
Bacterial	Fungal	Viral
Corneal scraping for -		
Gram stain	10% KOH stain	PCR
Culture and sensitivity	Giemsa stain	
- Blood agar media	Culture and sensitivity	
- Chocolate agar media	- SDA media	
- McConkey agar media		

Corneal Scraping



Culture Media





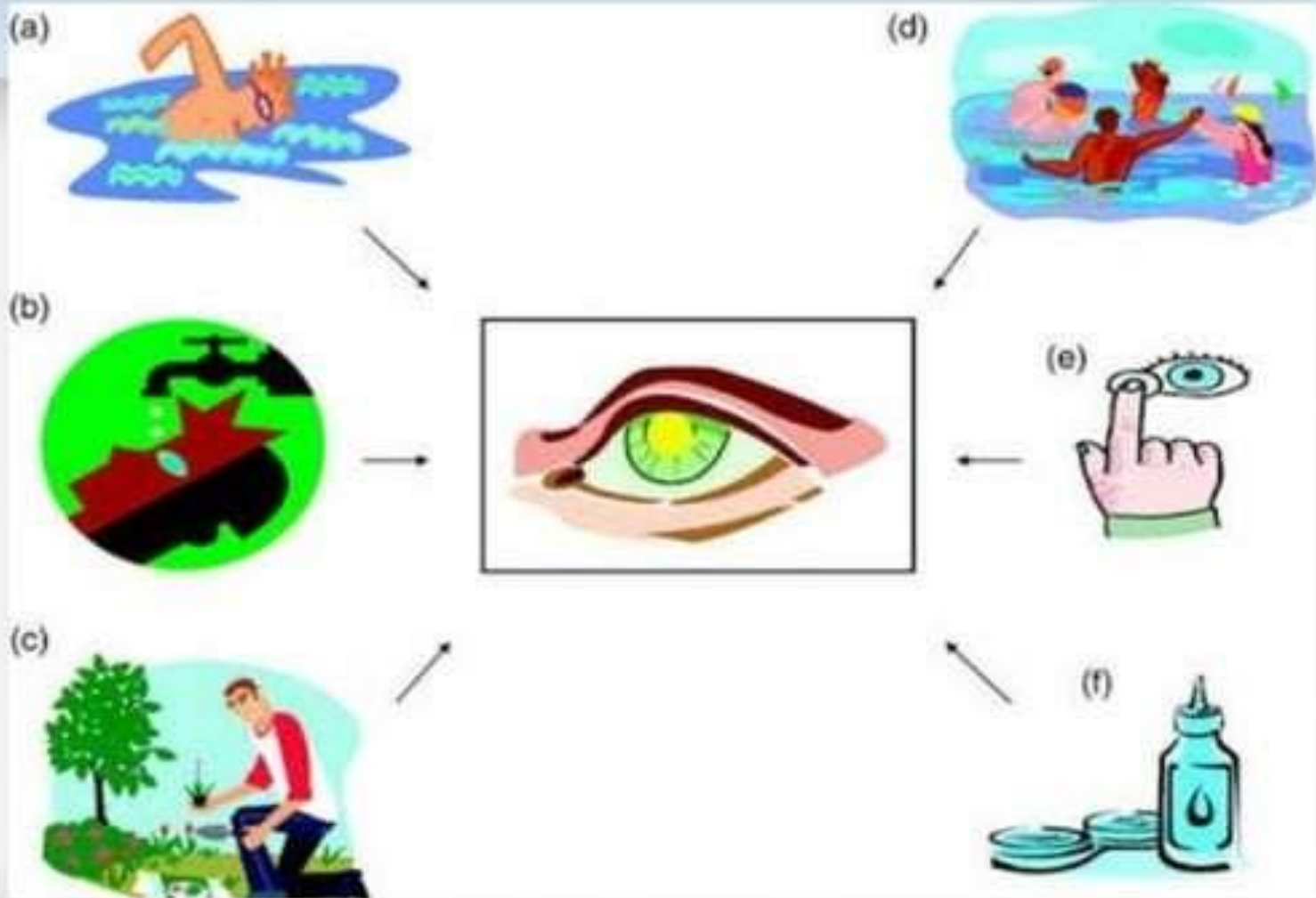
S. aureus grows on blood agar



N. Gonorrhoea grows on Chocolate Agar



Protozoal Corneal Ulcer





Protozoal Corneal Ulcer

Causative organism :

Acanthamoeba

Definitive sign :

Perineural infiltrates (radial keratoneuritis)

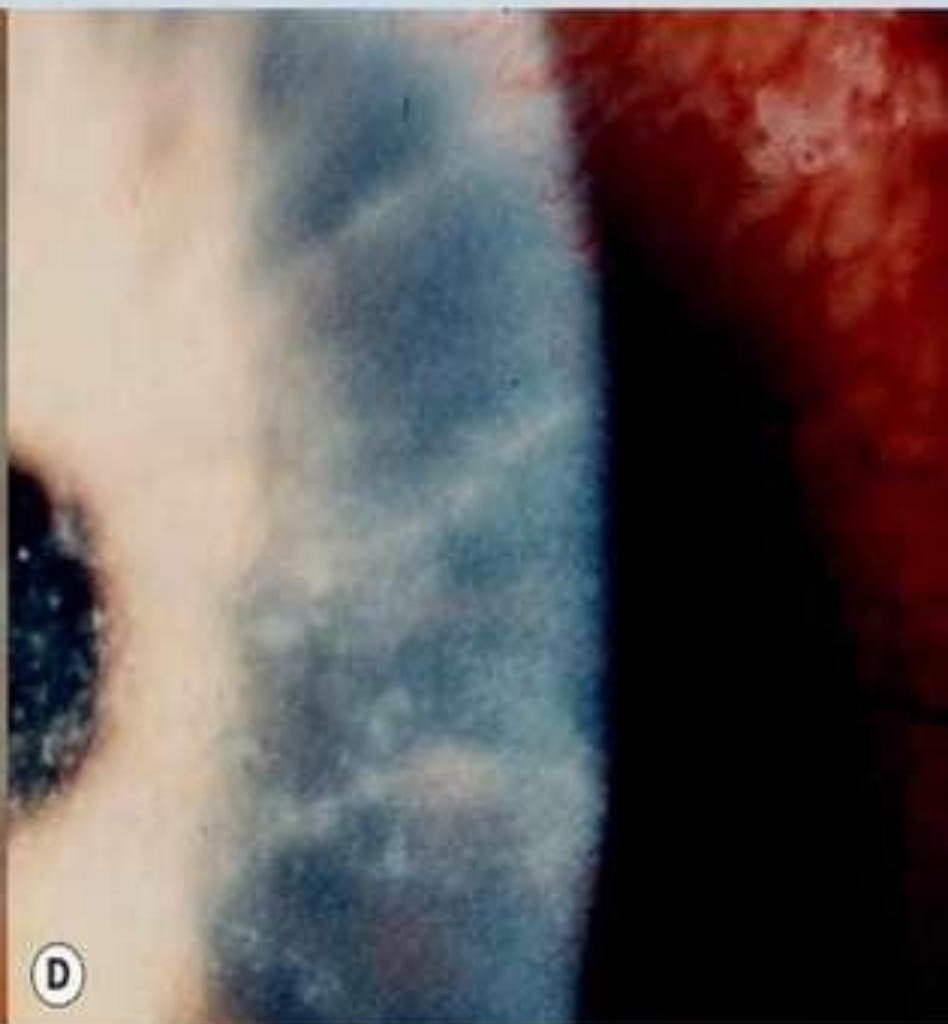
Investigations :

- Corneal scraping for –
 - Calcofluor white stain
 - Gram stain
 - Giemsa stain
- Culture and sensitivity :
 - Non-nutrient agar seeded with dead E. coli





Protozoal Corneal Ulcer





Complication

Complications of corneal ulcer can be described under two headings :

1. Before perforation
2. After perforation





Before perforation :

- Anterior uveitis
- Hypopyon
- Secondary glaucoma
- Descemetocoele
- Corneal scarring
 - Nebula
 - Macula
 - Leucoma



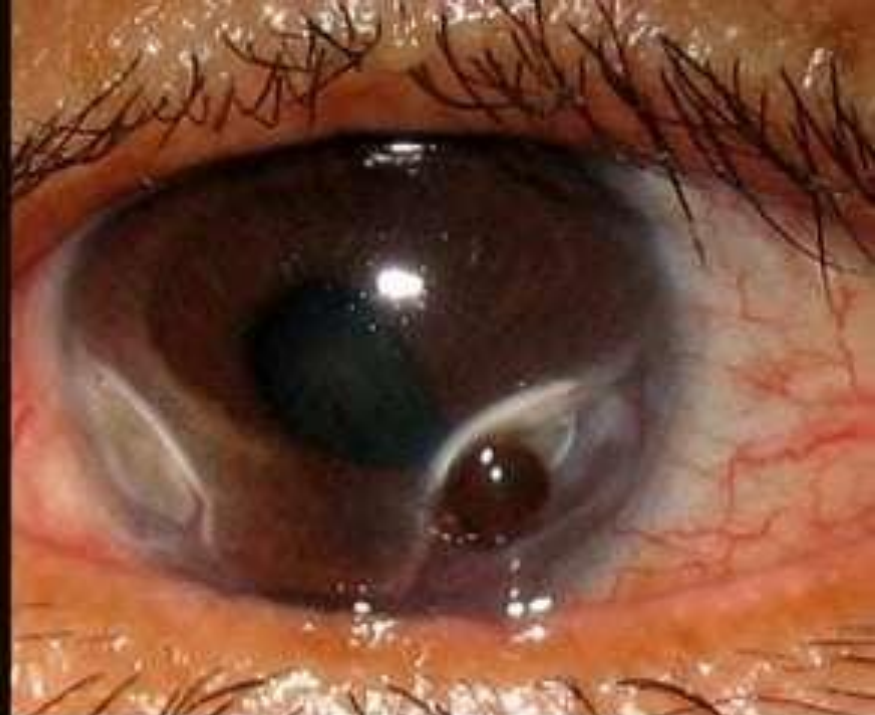
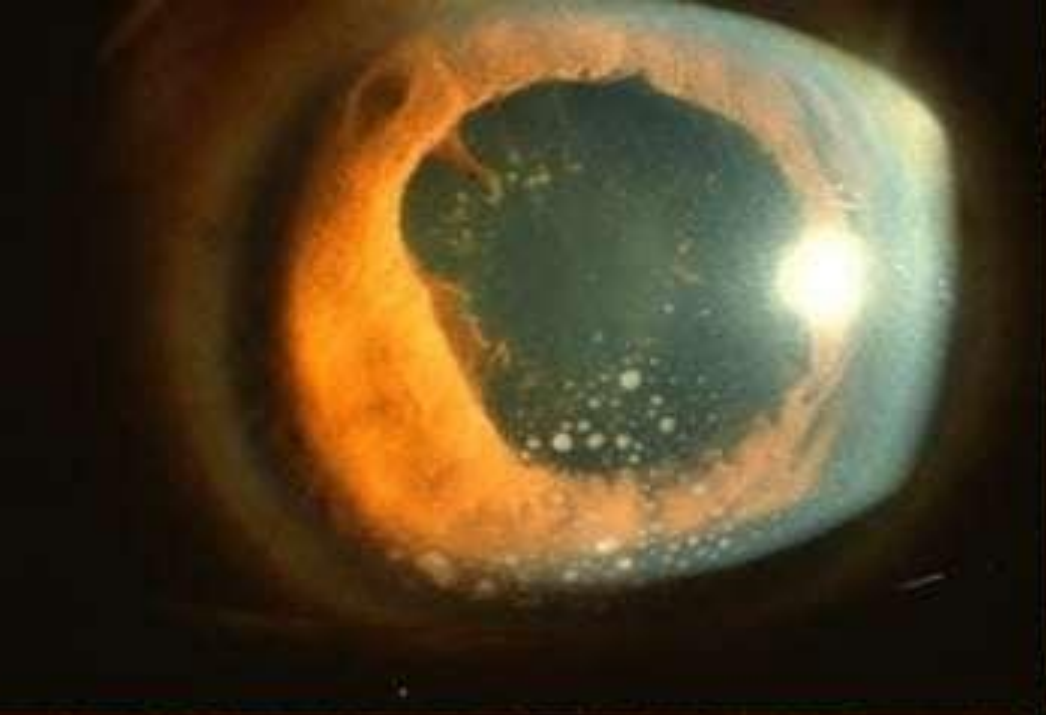




After perforation :

- Anterior synechiae
- Iris prolapse
- Adherent leucoma
- Complicated cataract
- Subluxation of the lens
- Anterior staphyloma
- Endophthalmitis
- Phthisis bulbi







Treatment of Corneal Ulcer





General measures

- Hospital admission
- Discontinuation of contact lens wear
- Using eye shield/dark glass
- Improvement of nutrition (Vit-C)





Bacterial Corneal Ulcer

Local Therapy :

- **Antibiotic monotherapy :**
 - Fluoroquinolone
- **Antibiotic duotherapy :**
 - Combination of two fortified antibiotics :
cephalosporin + aminoglycoside
- **Cycloplegics :**
 - Cyclopentolate
 - Homatropine
 - Atropine





Systemic antibiotic therapy :

Indication :

- Potential for systemic involvement
 - Ceftriaxone
 - Cefotaxime
 - Ciprofloxacin
 - Amoxicillin + Clavulinic acid
- Severe corneal thinning
 - Ciprofloxacin
 - Tetracycline/ Doxycycline
- Hypopyon
- Scleral involvement





Fungal Corneal Ulcer

Local Therapy :

- Removal of the epithelium
- Topical antifungal
 - Amphotericin B
 - Econazole
 - Natamycin
 - Fluconazole
 - Clotrimazole
 - Voriconazole





- Cycloplegics
- Subconjunctival injection
- Anterior chamber washout





Systemic Therapy :

- Antifungals :
 - Voriconazole 400 mg twice daily for 1 day
then, 200 mg twice daily
 - Itraconazole 200 mg once daily
then reduced to 100 mg once daily
 - Fluconazole 200 mg twice daily
- Tetracycline/ Doxycycline





Viral Corneal Ulcer

Topical Therapy :

- Antiviral :
 - Aciclovir 3% ointment - five times daily
 - Ganciclovir 0.15% gel - five times daily
- Antibiotic prophylaxis
- Topical steroids
- Cycloplegics





Systemic Therapy :

- Oral antiviral
 - Aciclovir
200–400 mg five times daily for 5–10 days
 - Famciclovir
 - Valaciclovir
- Interferon monotherapy





Local care :

- Debridement of ulcer
- Care of skin lesions
 - aciclovir cream five times daily
- IOP control





Protozoal Corneal Ulcer

- Debridement of involved epithelium
- Topical amoebicides
 - Polyhexamethylene biguanide
 - Hexamidine
 - Propamidine
- Topical antibiotic
- Topical steroid
- Control of pain
- Therapeutic Keratoplasty





Management of apparent treatment failure :

- Frequent instillation of fortified aminoglycosides
- Review of antibiotic regimen
- Re-scraping and additional staining
- Corneal biopsy





Treatment of Complication

Management of perforation :

- Tissue adhesive glue with BCL
- Corneal patch graft
- Occlusive surface repair techniques
- Penetrating keratoplasty





- **Management of endophthalmitis**
- **Visual rehabilitation :**
 - Keratoplasty
 - Rigid contact lens
 - Cataract surgery





Tissue adhesive glue





Keratoplasty



Gundersen Conjunctival flap



Conclusion

- Timely diagnosis and proper management of corneal ulcer can save the valuable vision of the patient





THANK

YOU



**ANY
QUESTION**

