Bacterial Corneal ulcer

pathogens which can invade the intact corneal epithelium

- Neisseria gonorrhoea
- Neisseria meningitidis
- corynebacterium diphtheriae
- Haemophilus aegyptius
- Listeria species

Stages of corneal ulcer

1. stage of progressive infiltration
2. Stage of active ulceration
3. Stage of regression
4. Stage of cicatrization.

Stage of progressive infiltration

- on the area with breached corneal epithelium - binding of bacteria to host receptors in the epithelium
- infiltration PMNL and lymphocytes
- Necrosis of the tissue

Stage of active ulceration

- Necrosis & sloughing of the epithelium, Bowman's membrane, Stroma
- sides & floor of the ulcer show gray infiltration & sloughing
- Hyperemia of circumcorneal vessels
- vascular congestion of iris & ciliary body
- ulceration may further progress by lateral extension or deeper penetration.

Stage of regression

- Infection is controlled
- host defence mechanisms (humoral antibody production & cellular immune defences)
- line of demarcation around ulcer
- Superficial vascularisation.
- Healing begin

Stage of cicatrization

- Healing continue
- Epithelialization
- fibrous tissue beneath epithelium laid by corneal fibroblast & endothelium of new blood vessels.
- Degree of scarring varies
- If ulcer is superficial, involves only epithelium - no scar

Bowman's membrane, few superficial stromal lamellae
↳ Nebula

1/3rd of stroma → Macula

1/3 of stroma → Leucoma

C/F

Bacterial corneal ulcer
- purulent corneal ulcer without hypopyon
- Hypopyon corneal ulcer

Symptoms
- Pain & FB sensation
- watering from the eye
- Photophobia
- Blurred vision
- Redness of eye

Signs
- Swelling of lids
- Blepharospasm
- Conjunctiva - chemosed
  hyperemia
  Ciliary congestion
- Corneal ulcer
  - grayish white infiltrate
    ↓
    Epithelial defect
    ↓
    Stromal edema

characteristics of well established bacterial corneal ulcer
- yellowish white area
  - oval or irregular
- Margins sudden & over hanging
- Floor - necrotic material
- Stromal edema around ulcer

Characteristic features
- Staph aureus, strep. pneumoniae
  - oval, yellowish white densely opaque ulcer, surrounded by clear cornea
- Pseudomonas
  irregular, greenish mucopurulent exudate, liquefactive necrosis, ground glass appearance surrounding ulcer, ulcers may associated with hypopyon, even perforate within 48 to 72 hrs.
- Enterobacteriaceae (E. coli, Proteus
  shallow ulcer
  greyish white
  Ring shaped corneal infiltrate

Anterior chamber

Hypopyon - sterile
(until descemet's membrane is intact)

- Iris - muddy colour
- pupil - small (toxic iritis)
- IOP - Raised (inflammatory glaucoma)

Hypopyon corneal ulcer

- Pneumococcus
  - ulcer is called "ulcer serpens"
- other organisms staphaureus, strepto, Gonococci, moraxella, pseudomonas pyocyanea.

Source of infection: chronic dacrocystitis

Predisposing factor: - Highly virulent organisms
- Resistance of the tissue

More in → old debilitate or alcoholic subjects

Mechanism

Bacterial toxin
↓
iritis
↓
leaking of leucocytes from the vessels
↓
Granulate to the bottom of ant. chamber
↓
ulcerative process controlled
Hypopyon got absorbed.

C/F

Symptoms

same

Initial stage: little pain

Signs

same

Characteristic features

Ulcus serpens: yellowish disc shaped ulcer occuring near the center of cornea.

- ulcer has the tendency to creep over the cornea in a serpiginous fashion.
- violent conjunctivitis
- Hypopyon increase in size
  ↳ 2° glaucoma
- great tendency for early perforation

Mx of hypopyon

Same as for bacterial corneal ulcers

Special

- 2° glaucoma → 0.5 % Timolol b.d eye drops & oral acetazolamide

Complications of corneal ulcer

- Toxic iridocyclitis
- ↑ glaucoma
- Descemetocoele
- Perforation of corneal ulcer
- Corneal scarring

↓

Sequelae

- Prolapse of iris
- Subluxation or ant dislocation of lens
- Ant capsular cataract
- Corneal fistula
- purulent uveitis, endophthalmitis, panophthalmitis
- Intraocular haemorrhage
  - uveal or choroidal haemorrhage

Mx of corneal ulcer

A. Clinical evaluation

- History taking
- General Exam°
- Ocular Exam°

- Diffuse light Exam° – Gross lesions of lids, conjunctiva, cornea testing for sensations.
- Regurgitation test & syringing
  - lacrimal sac infection
- Biomicroscopic Exam°

fluorescein filter paper – ulcer area stains brilliant green

- Site, size, shape, depth, margin, floor, vascularisation, KP in base of cornea
- Depth & contents of ant chamber
- Colour & pattern of iris
- Condition of lens

B. Laboratory investi

Routine

Hb, TLC, DLC, ESR, Blood sug complete urine & stool Exam°

Microbiological investigation

Material - scraping the base & margins of the corneal ulcer using spatula

- Gram & Giemsa stain
- culture on blood agar - aerobic organism

Treatment

Tx of uncomplicated corneal ulcer

- Definitive Tx
- Non specific supportive therapy
- physical & general measures

1. Definitive Tx

a. Topical antibiotics

Initial therapy (before the results of C&S arrives)

- combination therapy to cover Gram +ve & Gram -ve organisms

frothied cefazoline

Subsequent therapy

- No need to change if response is good
- poor response - antibiotics based on C&S

b. Systemic antibiotics

cephalosporin + Aminoglycoside

→ N. gonorrhea & N. Meningitis

- IM ceftriaxone + IV Penicillin G + Topical fluoroquinolone

Non-specific supportive therapy

a. cyclopegic drugs

1% Atropine

or

2% Homatropine

b. systemic analgesics & antiinflammatory drugs

Paracetamol
Ibuprofen

3. physical & general measures

- Hot fomentation
- Dark goggles
- Rest, good diet, fresh air

Tx of non-healing corneal ulcer

1. Removal of any known cause of non-healing ulcer

2. Mechanical debridment of ulcer
   - scraping floor with spatula

3. Cauterisation of ulcer
   - carbolic acid
   - 10-20% trichloroacetic acid

4. Bandage soft contact lens

5. Penetrating

Tx of impending perforation

1. No strain
2. Pressure bandage
3. Lowering of IOP
   - Acetazolamide + I.V mannitol, oral glycerol, 0.5% Timolol - paracentesis simultaneously
4. Tissue adhesive glues
   - Cyanoacrylate
5. Bandage soft contact lens
6. Conjunctival flap
7. Amniotic membrane transplantation
8. Penetrating therapeutic keratoplasty

Tx of perforated corneal ulcer

- Tissue adhesive glue
- Conjunctival flap
- Bandage soft contact lens
- Therapeutic Keratoplasty - Tectonic (Best option)