

Management of corneal perforations

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Corneal perforations

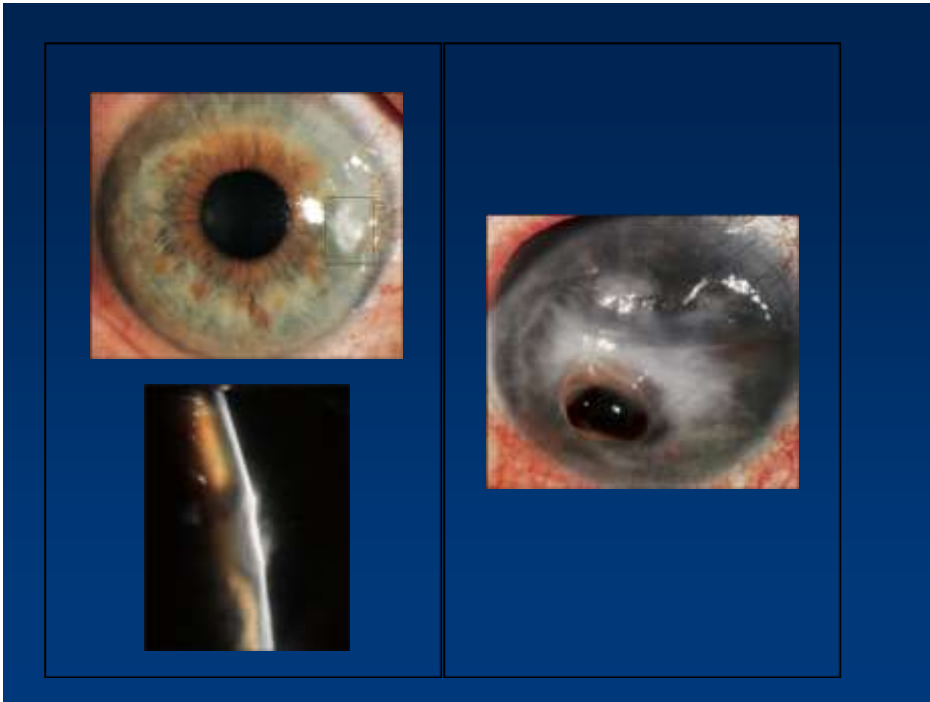
- Lead to devastating visual sequelae
- Ophthalmic emergencies
- Immediate recognition and intervention

Etiology

- Infection: 24-55% of all perforations
- Collagen vascular diseases: Usually peripheral
- Chemical injury: Alkali burns
- Thermal and UV injury
- Iatrogenic: PTG excision with MMC, topical NSAIDs/antibiotics
- Xerosis: Idiopathic, SJS, OCP, collagen disease
- Exposure: 7th nerve palsy, ectropion, TED
- Neurotrophic: Viral infections, PK, LASIK
- Corneal degenerations and ectasia: Terrien's, KCN, PMD

Terminology

- **Corneal ulcer**: Epi defect + stromal loss often with infiltration or necrosis
- **Descemetocoele**: Destruction of epi and stroma with only endothelium and DM remaining
- **Healed descemetocoele**: Thinned cornea to the level of DM but has epithelialized surface
- **Perforation**: Definite full thickness defect in the cornea



Clinical presentation

- Abrupt decrease in VA
- Pain
- Tearing
- Healthy eye/sick eye/Neurotrophic eye
- Patients at risk should be informed of the symptoms

Clinical presentation

- Precautions: minimal squeezing/manipulation/drops
- Shallow/flat AC
- Positive Seidel test
- Uveal prolapse: may plug the defect
- Hypotony
- Sometimes signs are subtle: Infectious ulcers with dense infiltrate
- Impending perforation: DM folds radiating from ulcer base

Preoperative management

- Infection: systemic antibiotics for 48-72 hrs
- Plastic shield
- C & S

Treatment options

- Tissue adhesives
- Patch graft
- PK
- AMT

Tissue adhesives

Cyanoacrylate glue:

- Used since late 1960's
- Effective, easy to use
- 1-2 mm defects
- Histoacryl/Nexacryl/Dermabond/Iso-Dent
- Commercial superglue



Tissue adhesives

Cyanoacrylate glue:

- Immediate restoration of globe integrity
- Avoid/delay PK or other surgical procedures
- Non infected impending perforation
- Antibacterial activity
- 33-44% required no additional intervention

Tissue adhesives

Method of application

- Topical anesthetic
- Debridement (epi, infiltrate)
- Dry thoroughly, apply glue (bimanual)
- May apply fluid to help glue solidify
- Just the right amount
- Apply more if leak persists or remove and reapply
- BCL (Flattest BC)



Tissue adhesives

Postoperative management:

- Examine 1 hour after, 1 day and 1 week
- Topical aqueous suppressants/ topical antibiotics/PFATs
- Shield
- Systemic antibiotics (even if sterile perforation)
- Admission if infection
- ER precautions after d/c
- Reglue if dislodged
- Replace BCL as needed

Tissue adhesives

Follow up:

- When to remove glue?
- Visual rehabilitation

Complications:

- GPC
- Cataract/glaucoma
- Retinal toxicity

Patch graft

- Temporary or permanent measure
- 5mm or less perforation
- Ideally, should not interfere with visual axis
- Lamellar or full thickness

Patch graft

Preop preparation:

- Admission
- Systemic/topical antimicrobials
- Gentle B-scan (Choroidal detachment)

Patch graft

Surgical technique:

- GA
- Outline ulcer area with small trephine (skin biopsy punch)
- Conj peritomy, scleral dissection (peripheral ulcers)
- Deepen mark using blade
- Cut along trephine mark (partial or full thickness)
- Remove all necrotic tissue
- Preparation of donor button (same or slightly larger size)
- Secure using interrupted 10/0 nylon sutures
- Form AC with BSS and check for watertightness

Patch graft



Patch graft

Postop care:

- Topical steroids??
- Topical antimicrobials
- IV antibiotics
- +/- topical anti glaucoma
- Graft clarity is not as essential as therapeutic PK

Penetrating keratoplasty

Large perforations (>5mm)

Preop preparation:

- Admission
- Systemic/topical antimicrobials
- Gentle B-scan (Choroidal detachment)

Penetrating keratoplasty

Surgical technique:

- Determine trephine size (smallest size incorporating perf and ulcerated area)
- OVD to form AC
- Mark with a trephine, deepen using a blade and finish cut with scissor (Path and C/S)
- Iris and lens management
- AC wash with antibiotics
- Preparation of donor button
- Secure using interrupted 10/0 nylon sutures (at least 16)
- Form AC with BSS and check for watertightness

Penetrating keratoplasty



Penetrating keratoplasty



Penetrating keratoplasty

Postop care:

- Topical steroids??
- Topical antimicrobials
- IV antibiotics
- In some cases, grafts are allowed to fail intentionally
- Topical anti glaucoma

Medical management

- Cases not amenable for surgery
- Aggressive antibiotics and lubricants
- Perforation may self seal
- Pupillary dilatation forms the AC and may plug a perforation

Prevention of corneal perforation

Bandage CL:

- Persistent epi defects and descemetoceles

Conj flaps:

- In eyes with poor visual potential
- Not suitable for perforation (leak will lead to failure)
- Chronic non healing ulcers in anesthetic corneas

Prevention of corneal perforation

- **Amniotic membrane transplantation:**
 - Initially introduced to heal persistent epi defects
 - Used successfully for descemetocelles and perforations
 - With or without tissue adhesives (fibrin glue)

Prevention of corneal perforation

Tarsorrhaphy:

- Exposure, xerosis and neurotrophic keratopathy
- Descmetocelles (Smooth tarsal surface)
- Temporary or permanent

Conclusion

- Prevention of descemetocoele formation and perforation is a major goal of ulcer treatment
- Imminent or frank perforation is an emergency
- Once perforation, must restore structural integrity of the globe
- Tissue glue is the safest, quickest and most effective means of sealing small perforations
- Visual rehab can be attempted later with grafting/anterior segment reconstruction

Thank you