Corneal Ulcers

Why Some Just Won’t Heal.....

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Corneal Ulcers

- Three basic types of corneal ulceration
  - Simple, uncomplicated, non-infected, superficial
  - Non-healing, non-infected, superficial
  - Infected, stromal loss, +/- perforation risk

Corneal Ulcers

- Simple, non-complicated, non-infected, superficial
  - Examples: grooming, playing, after surgery
  - A simple ulcer should heal in 3-5 days
  - Treatment:
    - Broad-spectrum topical antibiotic q8hr
    - Topical atropine q24hr
    - +/- Oral pain medication (NSAID or tramadol)
    - E-collar at all times

Non-healing Corneal Ulcers

- Commonly Boxers and elderly dogs
- May be secondary to mechanical or anatomic problems
  - Consider breed, age, and other systemic diseases
  - Eyelash/cilia abnormalities (ectopic cilia, distichia)
  - Eyelid abnormalities (entropion, ectropion, masses)
  - Exposure and blink reflex abnormalities
  - Tear film abnormalities
  - Foreign bodies
  - Feline sequestrum

SCCED (superficial chronic corneal epithelial defect)

- Treatment:
  - If SCCED (superficial chronic corneal epithelial defect), corneal debridement and grid keratotomy
  - Topical broad spectrum antibiotic solution q8hr (neopolygram or tobramycin)
  - Topical hyaluronan product q8hr (Remend, Opticare, dilute Adequan, other similar product)
  - Topical atropine solution q24hr
  - +/- Oral pain medication (NSAID or tramadol)
  - Systemic pain medication (NSAID or tramadol)
  - Systemic anti-collagenase (doxycycline 5mg/kg q12hr)
  - E-collar at all times

SCCED (superficial chronic corneal epithelial defect)

Superficial defects of the corneal epithelium that are characterized by non-adherent epithelium forming redundant epithelial ulcer borders

Often associated with anterior stromal defects including a thin, hyalinized acellular stromal zone and an abnormal nerve plexus

Requires disruption of the anterior corneal stroma to expedite healing
Corneal debridement / keratotomy
- Topical anesthesia +/- sedation
- Corneal debridement - be aggressive! You cannot remove too much epithelium. Use multiple dry applicators (epithelium will stick better to the cotton)
- Corneal grid keratotomy - use a 25g needle to lightly "etch" the cornea stroma in a grid-like pattern every 1mm. Extend grid marks 1mm outside of the corneal lesion
- Corneal punctate keratotomy - use a 20g needle to make multifocal, anterior stromal "partial thickness punctures" in the anterior stroma (0.5-1mm apart)
- Corneal burr keratotomy - use a diamond-burr to "polish" the anterior stroma; 3.5mm tip

Severe Ulcers
- Infected, stromal loss, perforation risk, consider referral
- Often difficult without slit lamp to accurately judge lesion depth
- Painful, yellow/green mucoid discharge; lesion often has yellow corneal infiltrate +/- hypopyon
- Infections can lead to perforation within 24 hours
- General rule of thumb: >30% of the cornea stroma needs to be intact in order to heal a lesion with aggressive medical management without perforation
- <30%: immediate surgical intervention is warranted

When medical therapy is failing......
- Ideally, do not use a third eyelid flap - cannot visualize the globe; may be beneficial for support once the infection is controlled
- Temporary lateral tarsorrhaphy
  - Horizontal mattress suture, 5-0 suture (nylon, silk, prolene)
- Tissue glue
  - Provides tectonic support and has antibacterial properties; will perforate the globe when setting if too fragile

Treatment “supplements”
- Doxycycline: protease-inhibiting properties, as well as promotes corneal reepithelialization through upregulation of growth factors, such as TGF-B and transcription factors.
- In vivo effects of adjunctive tetracycline treatment on refractory corneal ulcers in dogs
  JAVMA, August 15th, 2010; Vol 237, Pages 17-6
- Hyaluronic acid (HA) protects and stimulates the collagen matrix of the corneal stroma
  - Remend® Corneal Repair Drops
  - Adequan® (often preservative free; dilute 50% with artificial tears)
  - Other topical HA containing lubricants, such as Optiquear, Idrops, etc.

Severe corneal ulcers
- Infected corneal ulcer
- Aerobic culture and sensitivity (3-5 days) - most common agents are: Strep, Strep, and Pseudomonas
- Quick reference: inhouse cytology (rods vs. cocci)
- Broad spectrum antibiotics (pending culture)
  - Topical neomycin & polymyxin q2hr for 48hr; then 4/6hr; may also consider a late generation fluoroquinolone alone instead (such as moxifloxacin)
  - Systemic marbofloxacin or enrofloxacin & doxycycline
  - MMPs and serine proteinases inhibitor serum q2hrs for 48hr; then 4-6hr
  - Anti-inflammatory
    - Topical NSAID (flurbiprofen q12-24hr) - safe but use with some caution; only if severe concurrent uveitis exists
    - Systemic NSAID (preferred) or corticosteroid
  - Pain management
    - Topical atropine q24hr
    - Systemic tramadol q6hr (5mg/kg)
    - Acepromazine if needed for sedation
    - E-collar at all times; no neck leads; limit activity

Surgical Intervention
- Conjunctival flap
  - Provides both tectonic and vascular support
  - Types: 360 degree, pedicle, bridge
- Drawback - scar formation
- Corneal/scleral transposition
  - Advances normal cornea into axial defect for improved visual axis
  - Minimal scarring, but does not provide immediate vascular support
- Corneal transplant
  - Often required for large perforations in order to maintain a proper corneal seal

When medical therapy is failing......
Questions