Corneal Ulcers
Why Some Just Won't Heal.....

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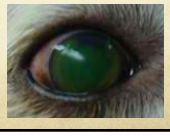
Corneal Ulcers

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

Corneal ulcers

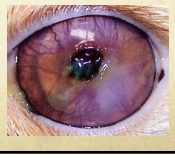
- Simple, non-complicated, non-infected, superficial
  - Examples: grooming, playing, after surgery
  - A simple ulcer should heal in 3-5 days
  - Treatment:
    - Broad-spectrum topical antibiotic q8hr
    - Topical atropine q24hr
    - +/- Oral pain medication (NSAID or tramadol)
    - E-collar at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



Non-healing Corneal ulcers

Non-healing, superficial, non-infected

- 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)

Superficial defects of the corneal epithelium that are characterized by nonadherent epithelium forming redundant epithelial ulcer boarders

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

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 8hr (Remend, Optixcare, dilute Adequan, other similar product)
- Topical atropine solution q24hr
- Systemic pain medication (NSAID +/- tramadol)
- Systemic anti-collagenase (doxycycline 5mg/kg q12hr)
- E-collar at all times

Corneal debridement / keratotomy

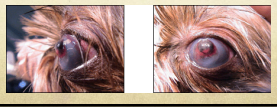
- Topical anesthesia +/- sedation
- Corneal debridement – be aggressive ! You cannot remove too much epithelium. Use multiple dry applicators (epithelium will stick better to the cotton)
- Corneal grid keratotomy – use a 25g needle to lightly "etch" the cornea stroma in a grid-like pattern (every 1mm). Extend grid marks1mm 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 keratectomy – use a diamond-burr to "polish" the anterior stroma; 3.5mm tip

Treatment "supplements"

- Doxycycline: protease-inhibiting properties, as well as promotes corneal re-epithelialization through upregulation of growth factors, such at 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 378-6
- Hyaluronic acid (HA) protects and stimulates the collagen matrix of the corneal stroma
  - Remend® Corneal Repair Drops
  - Adequan (often preservative free equine) dilute 50% with artificial tears
  - Other topical HA containing lubricants, such as Optixcare, I-Drops, etc.

Severe Ulcers

- Infected, stromal loss, perforation risk, consider referral
  - Often difficult without slip lamp to accurately judge lesion depth
  - Painful, yellow/green mucoid discharge; lesion often has yellow corneal infiltrate +/- hypopion
  - 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



Severe corneal ulcers

- Infected corneal ulcer
  - Aerobic culture and sensitivity (3-5 days) – most common agents are: Staph, Strep, and Pseudomonas
  - Quick reference: in-house cytology (rods vs. cocci)
  - Broad spectrum antibiotics (pending culture)
    - Topical neopolygram & ofloxacin 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

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

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 mainta a proper corneal seal

Questions