CORNEAL ULCERS



UPTAKE OF FLUORESCEIN TO THE CORNEA

SIMPLE/UNCOMPLICATED ULCER

Simple, superficial ulcers should heal within 5-7 days or sooner.

Treatment consists of supportive medical therapy:

1. **Topical antimicrobial therapy**
   - Broad spectrum, minimal epithelial cell toxicity best
   - Consider using **OphtaPRIME®** as a pre-treatment to facilitate antibiotic action
2. **Ocular lubricant**
   - e.g. **Remend® 0.75 Corneal Gel** @ 1-2 drops twice daily
3. **Analgesia**
   - Oral NSAIDs +/- opioids
   - Topical atropine (0.5-1%) if iridial spasm present – use no more than BID for 1-2 days. Care in small patients due to systemic SEs. Care in KCS (will reduce tear production)
   - Avoid topical anaesthetics (epitheliotoxic) and corticosteroids (delayed healing/corneal melting due to induction of host collagenolytic enzymes)
4. **Elizabethan collar to prevent self-trauma if indicated**
5. **Preventative anti-collagenase therapy** in any patient with identified risk factors (see "Melting ulcer: risk factors") e.g. **Stromease®** @ 2 drops, 3-4 times daily

PROGRESSION IN SIZE/DEPTH

NOT HEALED WITHIN EXPECTED TIME FRAME

CORNEAL ULCER

- Clinical signs – lacrimation, photophobia, blepharospasm, conjunctival erythema, corneal opacity (due to corneal oedema), vascularisation of cornea +/- anterior uveitis (miotic pupil, aqueous flare, iris synechiae, change in iris colour, decrease in IOP initially)



Aetiology:

- Primary – SCCED (spontaneous chronic corneal epithelial defect), corneal degeneration, punctate keratitis
- Secondary - Structural (distichiasis, trichiasis, ectopic cilia, lagophthalmos, other eyelid abnormalities), foreign body, trauma, viral (feline herpes virus), quantitative or qualitative tear film deficiencies, corneal irritants (heat, smoke, acid, alkalis), neurological disease (neurotrophic keratopathy, facial nerve paralysis)
- Bacterial or fungal keratitis likely requires corneal damage to allow colonisation

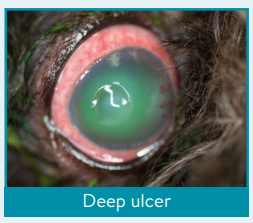
SCCED? RECHECK WITH FLUORESCEIN

COMPLICATED ULCER

- Check for persistent underlying aetiology and treat as appropriate (see box above)
- Resistant bacterial infection? Swab for C&S
- Deep or melting ulcer

STROMAL OR MELTING ULCER

- Clinical appearance – opaque/gelatinous/irregular cornea, stromal loss, variable pain as sensation may have been lost with significant destruction of cornea
- Stromal collagenolysis caused by excess of host and bacterial MMPs (i.e., collagenase and proteinase enzymes)
- If bacterial infection present, *Pseudomonas* and *Streptococcus spp* are commonly implicated (N.B. ulcers can degrade even if sterile!)


Deep ulcer

- Descemetocele - lack of fluorescein uptake at deepest part of ulcer (the Descemet's membrane of the corneal endothelium does not take up stain and is the remaining layer of cells before perforation)

Medical treatment (ideally done in a hospital setting)

1. **Anti-collagenases**
   - Topical N-acetylcysteine **(Stromease®)**
   - Other, non-licenced options: serum eye drops/EDTA/tetracyclines
2. **Topical antimicrobial therapy**
   - In house corneal cytology will prove useful (rods vs cocci) to help guide initial antibiotic choice whilst awaiting C&S
   - Consider adding in systemic antibiosis with good ocular penetration (e.g., cephalexin) if there is risk of corneal perforation
   - Consider using **OphtaPRIME®** as a pre-treatment to facilitate antibiotic action
3. **Analgesia** (see uncomplicated ulcer)
4. **Prevention of further ocular trauma**

NOTES:

- Topical treatments should be applied q30-60mins initially, monitor appearance of eye q3 hours (without fluorescein staining). If improvement after 12-24 hours frequency can be reduced in a staged manner until treatment given q4-6 hours without deterioration
- Apply different drops 10-20minutes apart (leave 30 minutes after administration of an ointment). Do not apply ointment if there is globe rupture

Surgical intervention

Referral or surgical management should be actioned when:

- Any ulcer ≥50% of stromal depth
- Descemetocele
- Area of keratomalacia that enlarges/deepens despite aggressive medical management

UNDERRUNNING OF FLUORESCEIN UNDER EPITHELIUM

SCCED ULCER (SPONTANEOUS CHRONIC CORNEAL EPITHELIAL DEFECT)

- AKA Boxer/indolent/chronic superficial/refractory ulcer or canine recurrent erosions
- Clinical signs: see 'corneal ulcer' -ocular discomfort variable, loose edges of epithelium surrounding denuded corneal stroma (shown by underrunning of fluorescein stain)
- Can persist for weeks to months
- More common in middle aged-older dogs
- Brachycephalics over-represented

Treatment

1. **Debridement of loose epithelium**
   - Instil topical local anaesthetic
   - Dry cotton bud + grid/punctate keratotomy* **OR** diamond burr debridement*
2. **Topical antimicrobial therapy**
   - Consider using **OphtaPRIME®** as a pre-treatment to facilitate antibiotic action
3. **Anti-collagenase therapy due to risk of melting (see below)**
   - **Stromease®** @ 2 drops, 3-4 times daily
4. **Analgesia** (see uncomplicated ulcer)
5. **Ocular lubricant e.g. hyaluronic acid**
   - Provides comfort and reduces disruption of migrating corneal epithelial cells by blinking
   - e.g. **Remend® 0.75 Corneal Gel** BID
6. **Elizabethan collar as required**

NOTES:

- Recheck every 7-14 days
- Repeat debridement at 2-3 week intervals if required or refer for superficial keratectomy

*not in cats (risk of forming corneal sequestrum)

MELTING ULCERS: RISK FACTORS

Keratomalacia (corneal melting) develops as a complication of an existing corneal ulcer and can occur at any time point following diagnosis. Keratomalacia should be considered in any ulcer that has progressed in size or depth! Secondary bacterial infection is commonly (but not always) implicated.

Risk factors for the development of keratomalacia include:[1,2]

- Brachycephalic conformation: up to 64% of melting ulcers in dogs are found in brachycephalic breeds
- Pre-existing ocular surface disease (e.g., KCS, lipid degeneration, SCCED, endothelial degeneration, trichiasis)
- Use of topical steroids on the cornea
- Recent general anaesthesia
- Concurrent systemic disease (diabetes mellitus, hypo/hyperadrenocorticism, hypothyroidism, chronic skin diseases)
- Recent ocular surgery (e.g., keratotomy)
- Chemical injury to the cornea

Further considerations:

- Monitoring at risk ulcers should be done more frequently (q24-48 hours)
- Corneal cytology can be useful to identify microscopic evidence of keratomalacia (neutrophils, rods, cocci)
- Pre-emptive, adjunctive treatment with topical anti-collagenases should be considered from day 1 in at risk ulcers (e.g., **Stromease®** @ 2 drops, 3-4 times daily)

✚ USEFUL INFORMATION

DÔMES PHARMA
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TARGET: COMPLICATED OR AT RISK ULCERS STROMEASE®

- Contains 25mg/ml N-acetylcysteine
- Ready-made, anti-collagenase eye drop in a 5ml bottle
- No special storage requirements, with 3 year shelf life
- Unlike serum, does not reduce efficacy of topical antibiotics[3]



TARGET: SUPERFICIAL ULCERS REMEND® 0.75 CORNEAL GEL

- Contains 0.75% cross-linked hyaluronic acid
- Aids corneal healing through the facilitation of cell migration
- Easy to use, 3ml dropper bottle
- Apply 1-2 drops twice daily, as required

STROMEASE® AND REMEND® ARE PART OF THE CORNEAL FOCUS RANGE. SEE MORE AT DOMESPHARMA.CO.UK

CFR-034-A3

Reference: 1. Tsvetanova, A., Powell, R. M., Tsvetanov, K. A., Smith, K. M., & Gould, D. J. (2021). Melting corneal ulcers (keratomalacia) in dogs: A 5-year clinical and microbiological study (2014-2018). Veterinary ophthalmology, 24(3), 265–278 **2.** Guyonnet, A., Desquilbet, L., Faure, J., Bourguet, A., Donzel, E. and Chahory, S. (2020), Outcome of medical therapy for keratomalacia in dogs. J Small Anim Pract, 61: 253-258. 3. Kubai MA, et al (2024) Topical blood products modulate the effects of ophthalmic antibiotics against common bacterial pathogens in dogs with infectious keratitis. Front. Vet. Sci. 11:1417842.

Stromease® 25 mg/ml eye drops, solution for dogs and cats contains Acetylcysteine. Legal category POM-V. For the supportive treatment of corneal ulcers in dogs and cats. Please refer to the product packaging and leaflets for information about side effects, precautions, warnings and contraindications. ® Registered trademarks of Dômes Pharma group companies. Remend® products are topical hygiene products for animals
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