

Diagnosing and Treating Feline Herpes Virus (FHV-1)

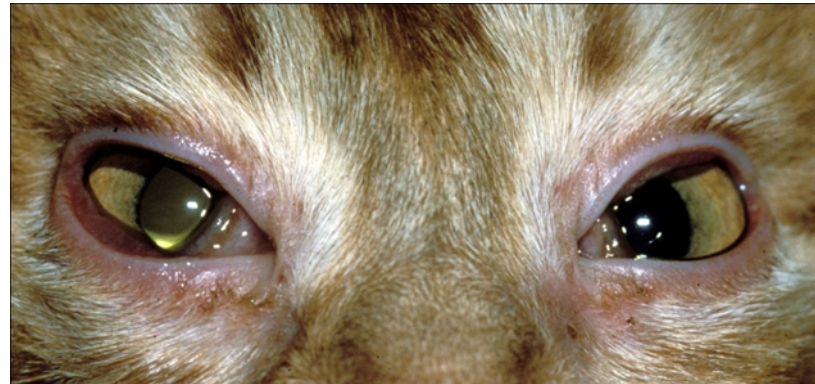
Vanessa Kuonen Cavens, DVM, MS, Diplomate, ACVO

MedVet Cincinnati

MedVet Dayton

Outline

- Pathogenesis of FHV-1
- Recognizing and Diagnosing FHV-1
 - History
 - Clinical Signs
 - Diagnostics Tests
- Treating FHV-1
- Sequelae of FHV-1
 - Sequestrum
 - Symblepharon
 - Bullous Keratopathy



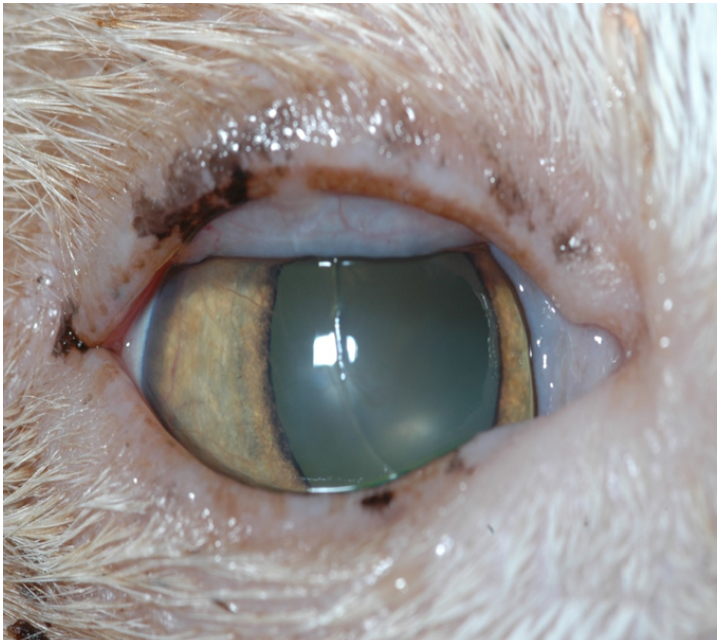
Pathogenesis of FHV-1

- Feline Herpesvirus- 1
- Pathogenesis
 - Infected as young kittens, can cause ophthalmia neonatorum
 - URT infection and concurrent conjunctivitis
 - FHV-1 becomes latent in trigeminal ganglion and cornea
 - Recurs in adulthood as a keratoconjunctivitis



Pathogenesis of FHV-1

- Infection is usually self-limiting and resolves in approximately 21 days
- Must inform clients that the disease may be controllable, but is not curable due to latency of virus in trigeminal ganglion
- Prognosis is guarded – herpes is forever!
- FeLV and FIV coinfection = worse prognosis

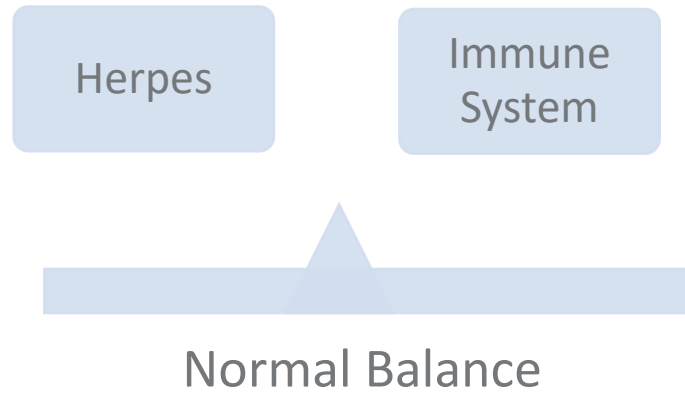


Pathogenesis of FHV-1

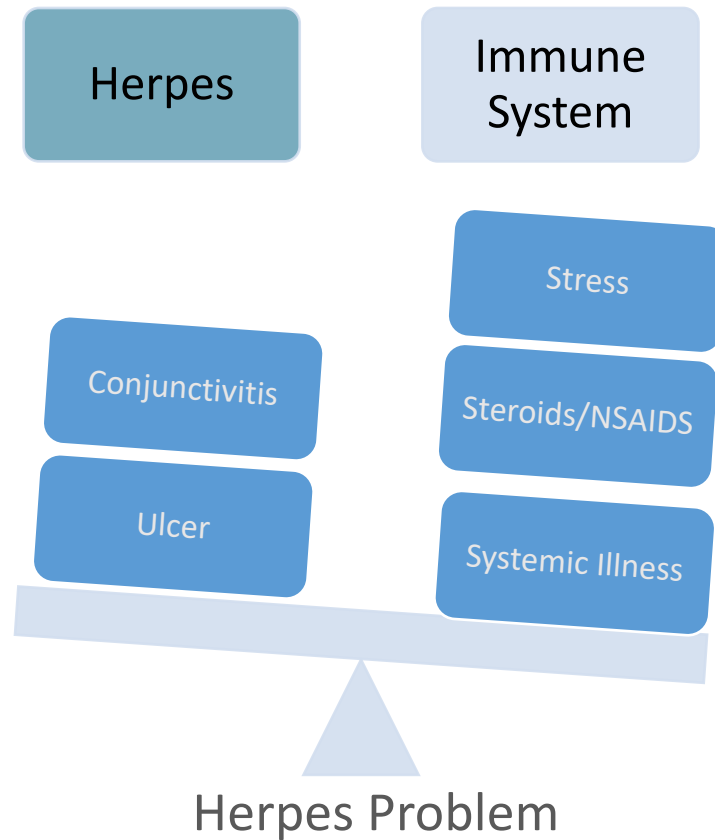
- 90% of cats are seropositive for FHV-1
- In over 80% of cats the FHV-1 virus remains latent in the trigeminal ganglion and half of these will manifest with the disease
- Exposed as kittens, virus reactivates when immune system decompensates – stress, disease, age, immunosuppressive drugs
- Flare ups are usually unilateral



Pathogenesis of FHV-1



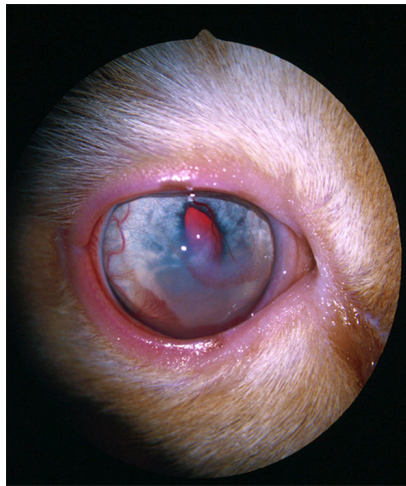
Pathogenesis of FHV-1



Pathogenesis of FHV-1

Mechanisms of Corneal Disease

- Direct cytopathic effect on epithelium
- Dendritic lesions that do not reach basement membrane
- Stromal damage unrelated to viral replication
 - Immune response to viral antigen
 - Can be associated with topical corticosteroids, topical NSAIDs, grid keratotomy, or diamond burr keratectomy



Recognizing and Diagnosing FHV-1

- Clinical History
- Clinical Signs
- Diagnostic Tests

Recognizing and Diagnosing FHV-1

Clinical History

Anything that affects the immune system function will allow the herpes virus to flare up

Stress

- Emotional: new pet, moving, visitor, renovation, hospitalized

Underlying Disease

- Diabetes, Kidney Dz, Asthma, IBD, Heart Dz, Neoplasia

Immunosuppression

- Any type of steroid therapy
- Topical NSAID
- Chemotherapy

Recognizing and Diagnosing FHV-1

Clinical Signs

Ocular Discharge

- Red/brown or serous

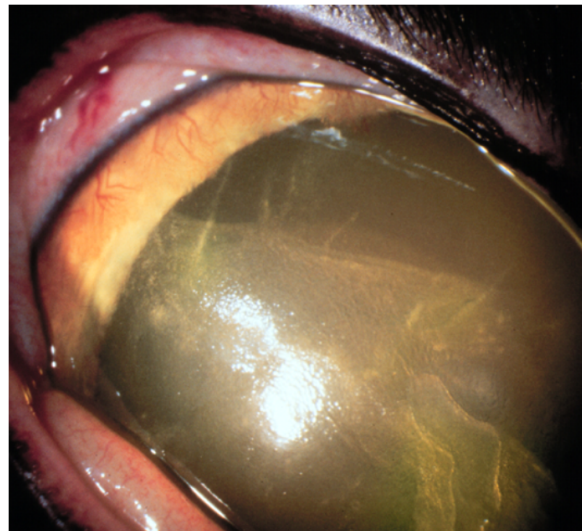
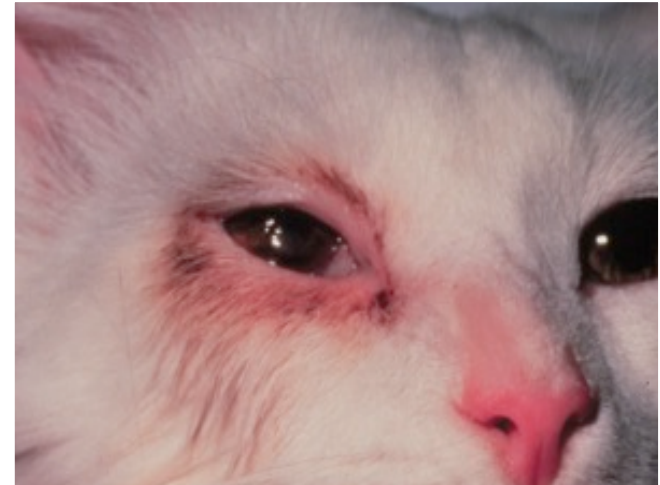
Conjunctivitis

- Chemosis, hyperemia, blepharodema

Dendritic Ulcers

Geographic Ulcers

Keratitis



Recognizing and Diagnosing FHV-1

Diagnostic Tests

Corneal/conjunctival cytology

- Rule out bacterial infection & eosinophilic keratoconjunctivitis
- Dx: intranuclear inclusion bodies

Immunofluorescent antibody test

- Lacks sensitivity

Virus isolation (gold standard)

Nested PCR – expensive, false positives and false negatives occur, 5% of normal cats will be positive

Assume it is present!



Treating FHV-1

- Antiviral therapy
- Acute treatment
- Chronic treatment

Treating FHV-1

Antiviral Therapy

- Antivirals slow virus replication so immune system can regain control
- Famciclovir: 125 to 250mg PO BID
 - 90mg/kg PO TID
 - No known toxicity in cats
- Idoxuridine 0.1% BID
 - Compounded; available in sol or oint
- Cidofovir 0.2 to 0.5% BID
 - Compounded; available in sol

Treating FHV-1

Antiviral Therapy

- L-lysine 250 to 500 mg PO BID
 - Competitive inhibition of arginine; decreases viral replication
 - Efficacy is in question
 - Not an antiviral!
 - Not effective for current outbreak/flare up; used to decrease likelihood of future outbreaks and make them less severe

Treating FHV-1

Acute Treatment: Conjunctivitis

- Topical antiviral BID
 - Maintain for 2 to 4 weeks after clinical signs resolve
- Topical antibiotic Bid to QID
 - Maintain for 1-2 weeks after clinical signs resolve
 - Ofloxacin
 - Terramycin (oxytetracycline/polymyxin B)
- +/- Topical tear replacer BID to QID
 - May decrease risk for symblepharon



Treating FHV-1

Acute Treatment: Conjunctivitis

- Oral Antibiotic
 - Add when significant mucoid discharge; marked chemosis or upper respiratory component
 - Azithromycin 10mg/kg PO SID for 3 weeks
 - Doxycycline 10mg/kg PO SID for 3 weeks
 - Pradofloxacin
 - Treats chlamydia, mycoplasma, and bartonella

Treating FHV-1

Chronic Treatment: Conjunctivitis

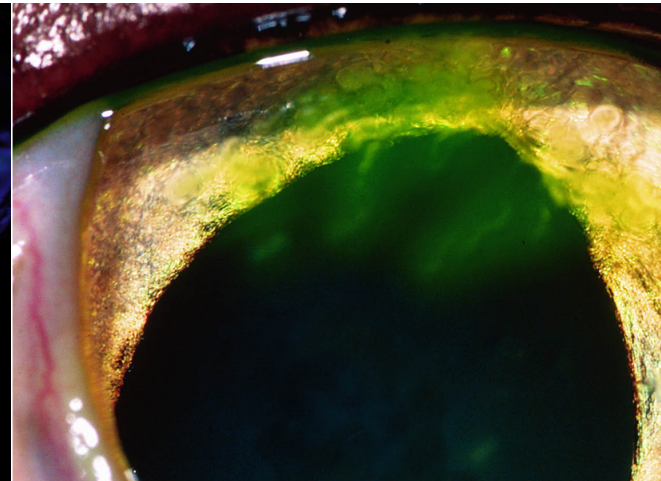
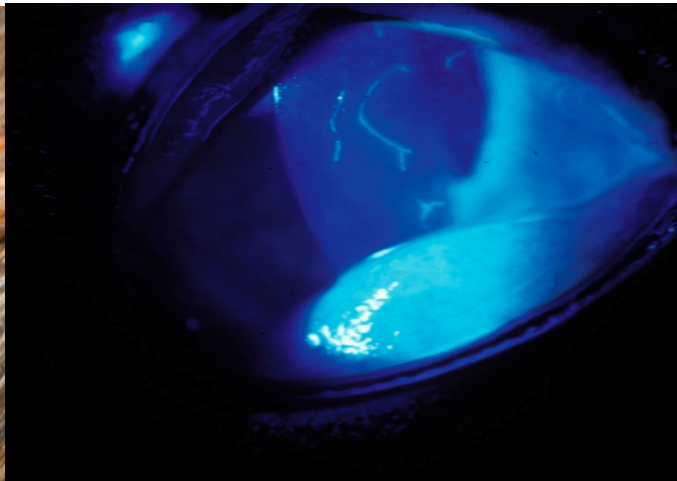
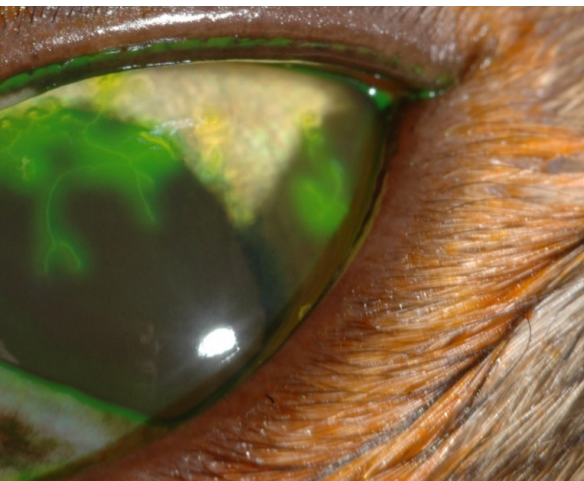
- Taper viral medications slowly so immune system can reestablish control
 - Phone updates every 1 to 3 months and decrease frequency of medication based on symptoms
 - May increase medication frequency or restart prior to known stressor
 - May maintain topical antiviral SID to BID long-term if underlying health conditions or require ongoing immunomodulating drug therapy



Treating FHV-1

Dendritic Ulcer

- Epithelial defects along the path of superficial corneal nerves



Treating FHV-1

Geographic Ulcer Treatment

- Superficial corneal debridement
- NEVER perform a superficial grid keratotomy or burr keratectomy in a cat! Can cause sequestrum
- Contact lens placement or 5% sodium chloride ointment (BID to TID)
- Ofloxacin or terramycin (BID to TID); antiviral BID
- +/- Azithromycin 10mg/kg PO SID
- +/- Soft E-collar
- +/- Atropine SID
- If not healed in 2 weeks, repeat debridement and continue topical therapy
- Treatment can be frustrating!

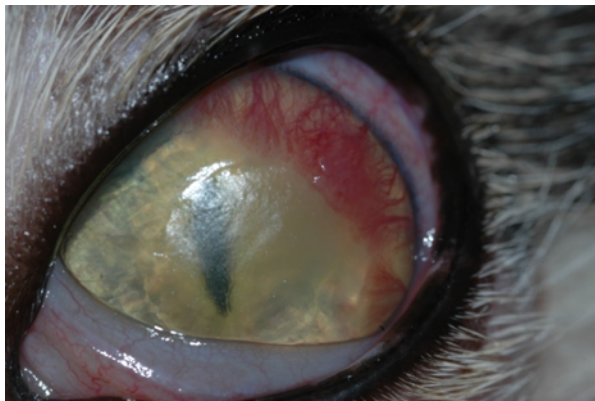
Treating FHV-1

Geographic Ulcer Treatment

J Am Vet Med Assoc 2001 Mar 1;218(5):733-5

Non-healing corneal ulcers in cats: 29 cases (1991-1999) La Croix et al.

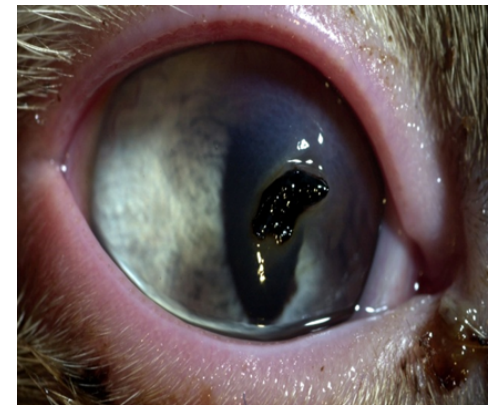
- mean healing debridement only: 30 days
- mean healing debridement & grid: 42 days
- 4/13 developed a sequestrum post-grid



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Contact Lenses

Ophthalmic Res. 2009;42(2):64-72. Epub 2009 May 27.

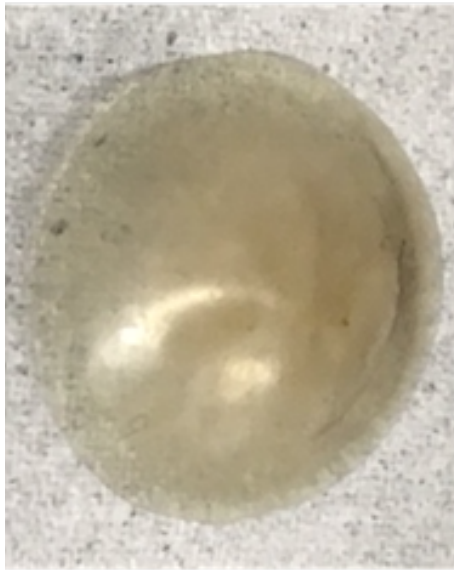
Evaluation of succinylated collagen bandage lenses in corneal healing by the expression of matrix metalloproteinases (MMP-2 and MMP-9) in tear fluid.

Hadassah J, Bhuvaneshwari N, Rao U, Sehgal PK.

CONCLUSION: Bandage contact lenses significantly reduce symptoms of irritation and discomfort while maintaining visual acuity, controlling inflammation, and reflex tearing.

Contact Lenses

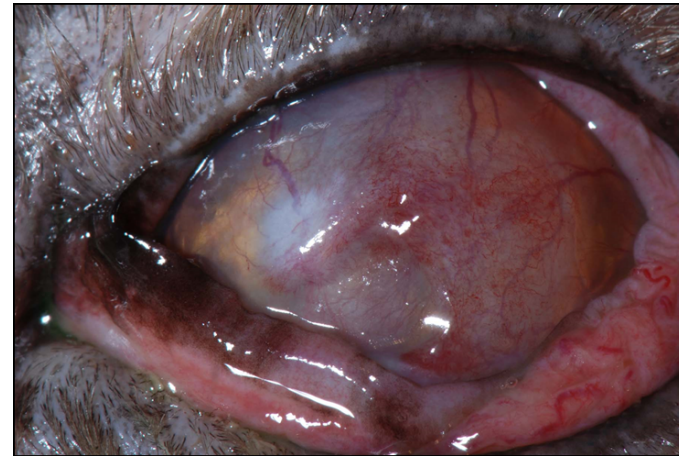
- Contacts will sometimes absorb brown pigment from cornea/tears
- Maybe they prevent sequestrum from developing secondary to a chronic corneal ulcer



Treating FHV-1

Stromal Keratitis: Treatment

- Secondary Immune mediated response to virus
- Chronic herpes patients
- Inflammatory cell infiltrate and vascularization in the stroma
- Intact epithelium at this stage
- Often associated with previous corticosteroid treatment
- Treat with a topical antiviral BID



Sequelae of FHV-1

- Symblepharon
- Corneal Sequestrum
- Bullous Keratopathy



Sequelae of FHV-1

Symblepharon

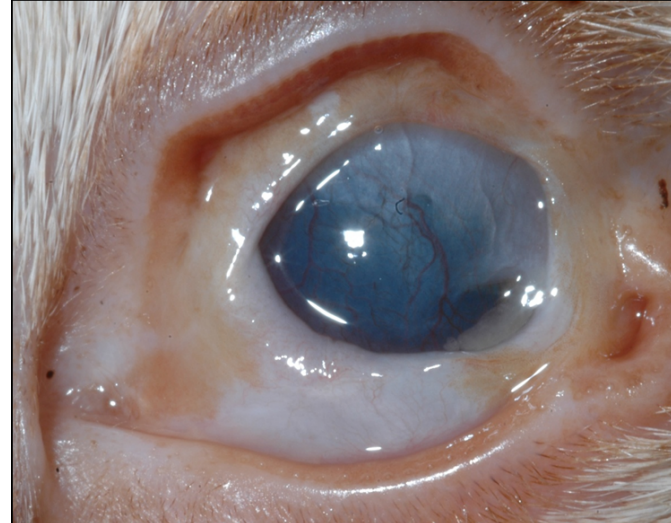
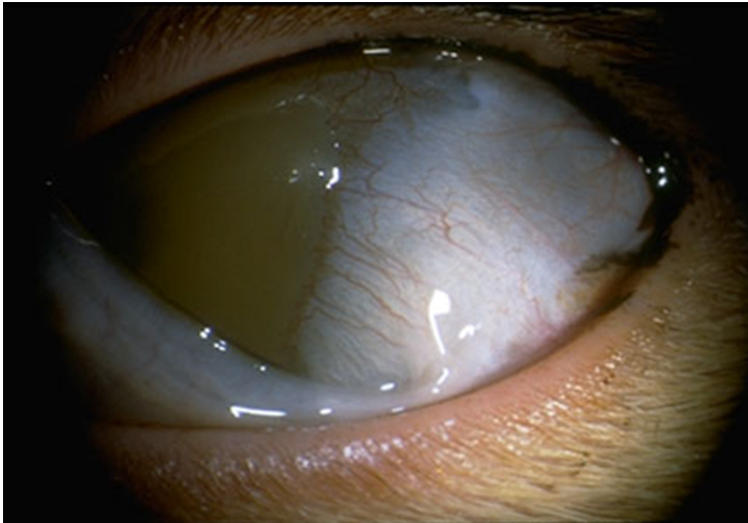
- Occurs in kittens with significant conjunctivitis
- Develops when ulcerated conjunctiva adheres to ulcerated cornea; or ulcerated conjunctiva sticks to itself
- Usually permanent
- Vision impairment
- May occlude nasolacrimal puncta
- May create shallow dorsal or ventral fornix
- May shorten palpebral fissure
- Third eyelid may have permanent protrusion



Sequelae of FHV-1

Symblepharon

- Most adhesions are permanent
- Surgery is sometimes an option
 - Risk of recurrence depending on location
 - Third eyelid can be removed if protruding and not attached to cornea



Sequelae of FHV-1

Cornea Sequestrum

- Axial light brown/black area
- Can be raised causing irritation



Sequelae of FHV-1

Cornea Sequestrum

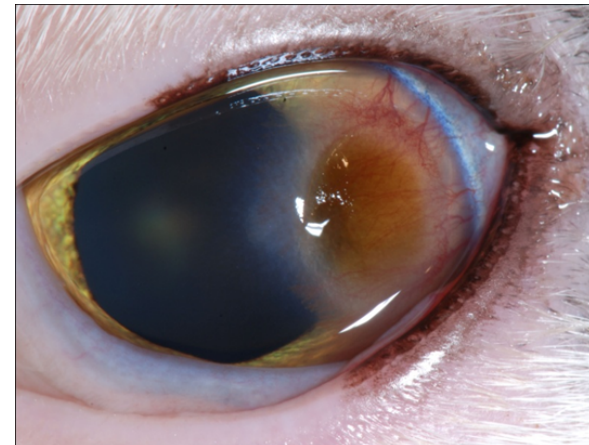
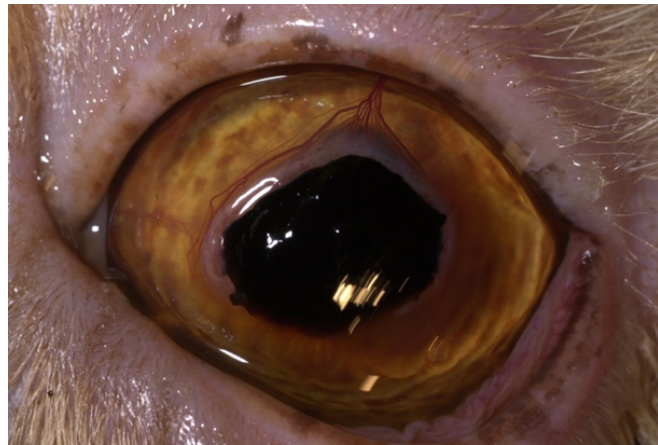
- Brachycephalics/Multifactorial Etiology
 - Feline Herpes
 - Chronic exposure/corneal drying
 - Medial canthal entropion and trichiasis
 - Axial cornea = least sensitive
 - More sensitive in other head conformation



Sequelae of FHV-1

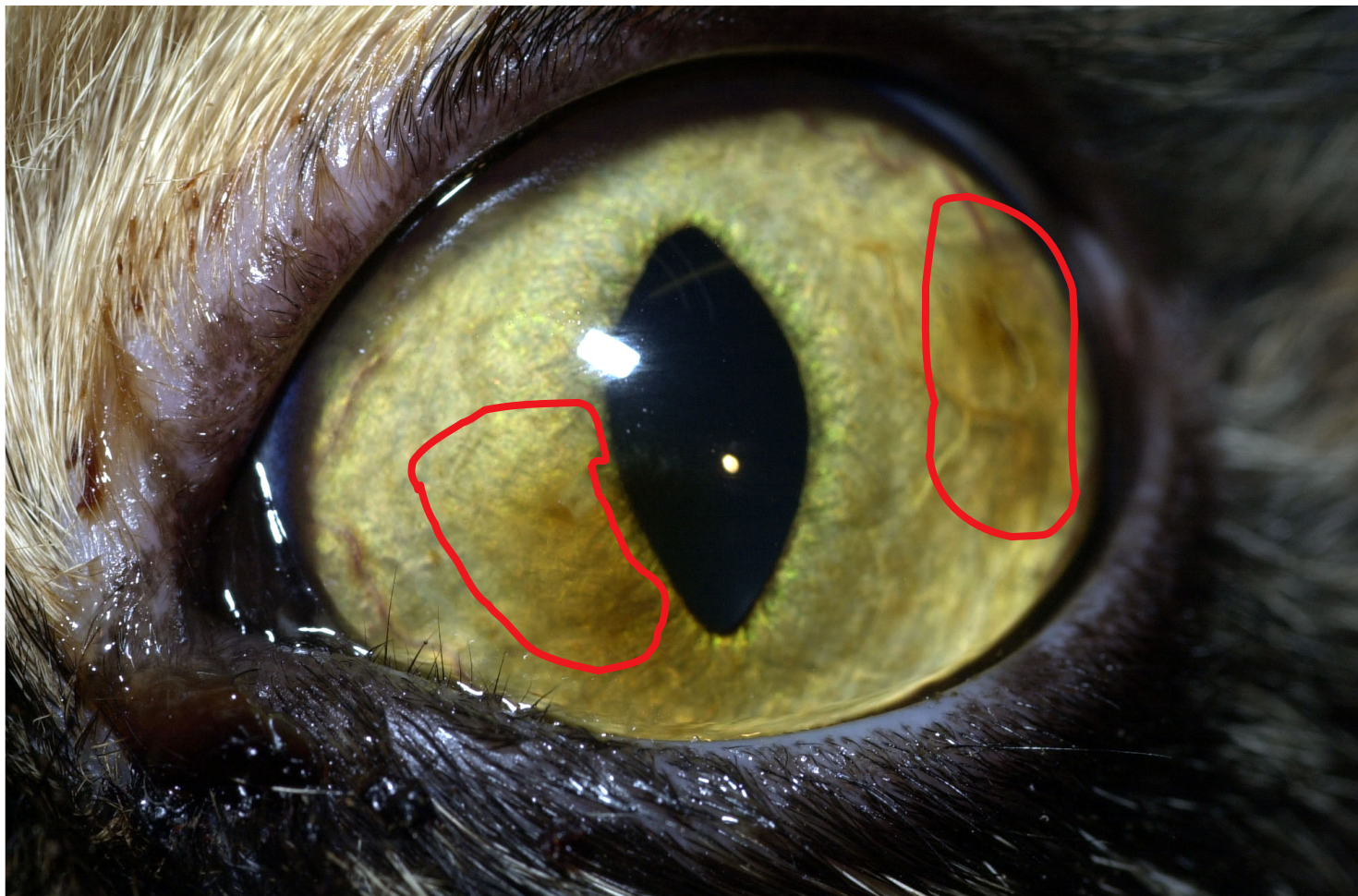
Cornea Sequestrum

- Some are vascularized
- May be surrounded by an ulcer or a sequelae of a corneal ulcer
- History of topical steroid or a grid keratotomy or burr keratotomy



Sequelae of FHV-1

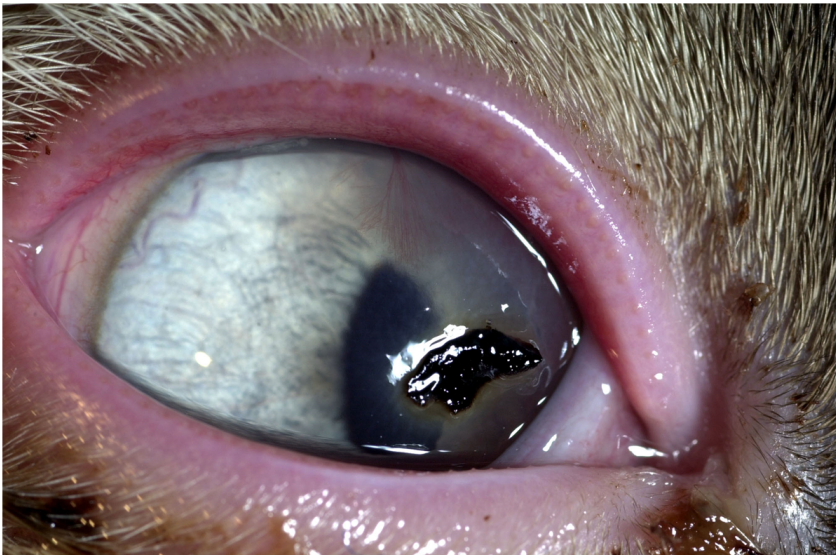
Cornea Sequestrum



Sequelae of FHV-1

Cornea Sequestrum

- Medical Treatment Options:
 - Ofloxacin or Terramycin BID to TID
 - Antiviral BID
 - +/- 5% sodium chloride ointment BID
 - Sloughing can take weeks to months
 - May be constant source of pain and irritation for the patient
 - Depth is unpredictable, may leave deep defect or rupture

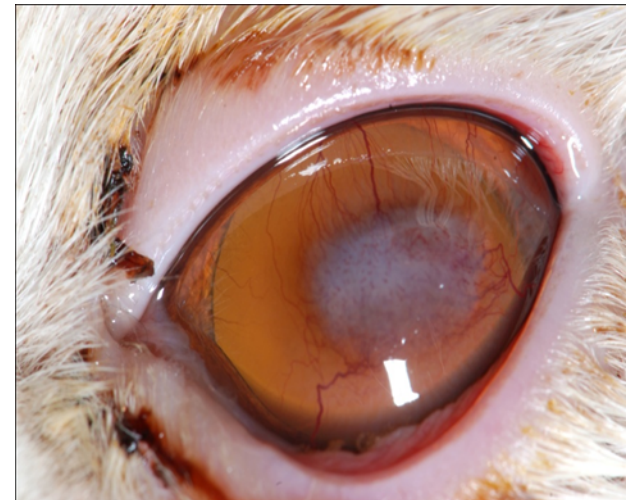




Sequelae of FHV-1

Corneal Sequestrum

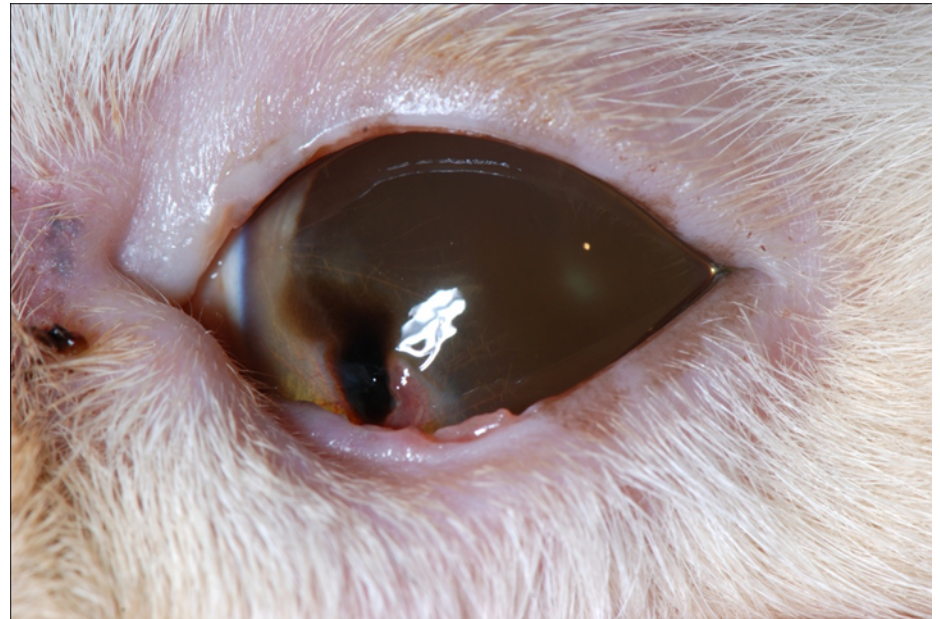
- Sloughed Sequestrum



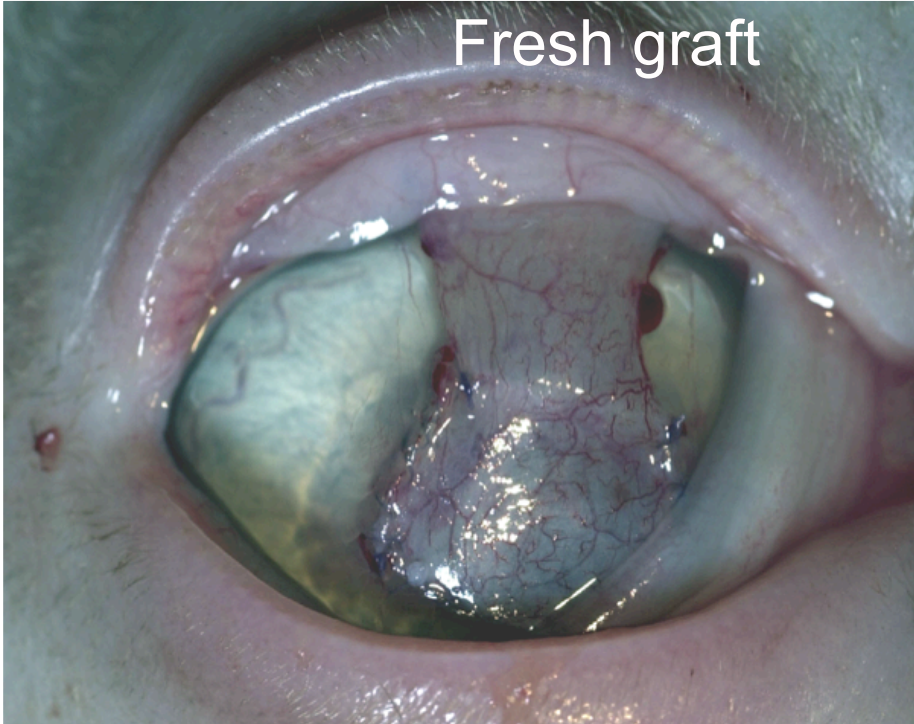
Sequelae of FHV-1

Corneal Sequestrum

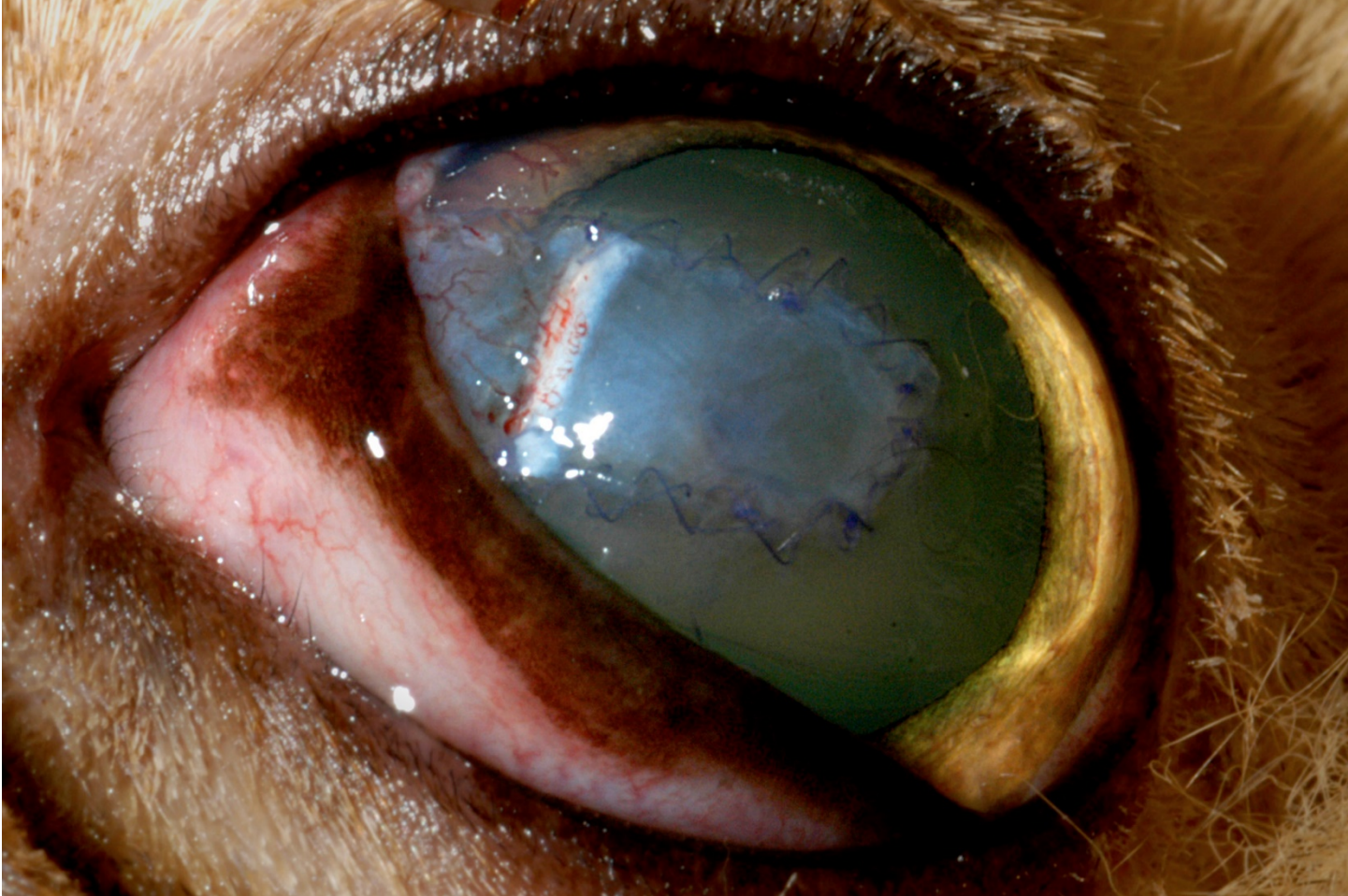
- Surgical Options: provide more rapid healing
 - Superficial Keratectomy
 - Place contact lens unless graft is indicated
 - May require conjunctival graft if > 50% depth
 - Nearly impossible to gauge depth pre-op
 - Corneoconjunctival Transposition



Conjunctival Pedicle Graft



Corneaoconjunctival Transposition



Sequelae of FHV-1

Cornea Sequestrum

- Prognosis
 - Recurrence is always possible
 - Post-keratectomy
 - Post-conjunctival flap
 - Post-sloughed/medical management
 - Long Term Antiviral Drop

4 months post-op

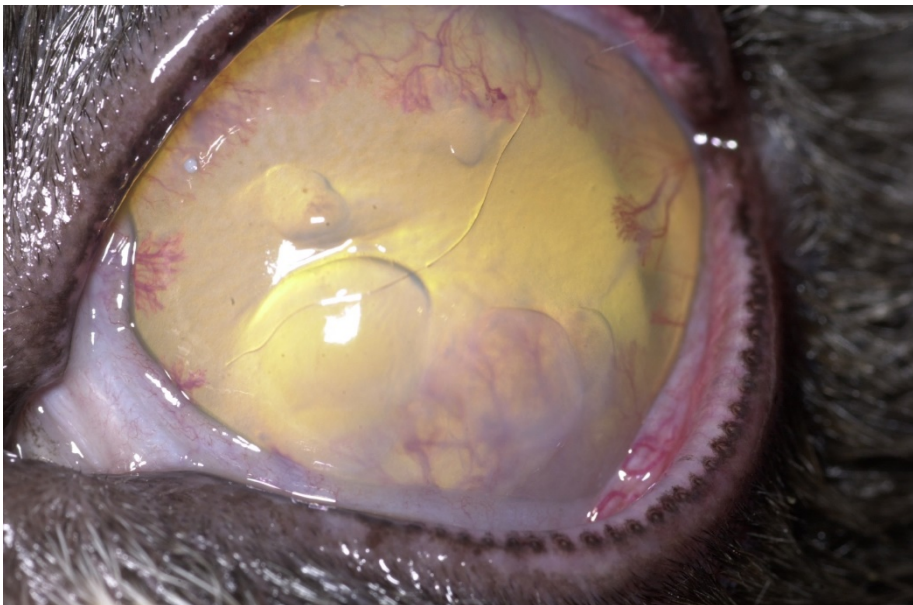


Sequelae of FHV-1

Bullous Keratopathy

- Fluid build up in the corneal stroma
- Herpes virus related
- Often concurrent steroid uses for underlying disease

4 months post-op



Sequelae of FHV-1

Bullous Keratopathy

- Medical Treatment
 - 5% sodium chloride ointment TID
 - Idoxuridine or Cidofovir BID
 - Famciclovir PO BID
- Surgical Treatment
 - Conjunctival pedicle graft
 - Third eyelid flap
- Antiviral drop long-term



Final Take-Home Messages

- Herpes, Herpes, Herpes
- NEVER perform grid keratotomy or burr keratectomy on a cat!
- NEVER use topical steroids or a topical NSAID!



Questions?

