

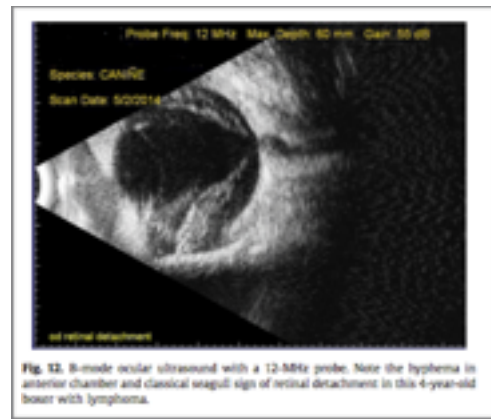
Hyphema in Small Animals

1. Appearance of hyphema can help determine cause
 - **Clotted** is more likely to be traumatic or infectious
 - **Un-clotted** is more likely secondary to a bleeding disorder
 - BUT if neoplasia, retinal detachment or secondary to congenital causes the appearance of the blood varies

Table 1
Etiologies of Hyphema

Trauma
Blunt force trauma
Penetrating eye wounds
Vehicular trauma and animal fights
Proptosis
Gunshot wounds
Coagulopathies
Acquired (i.e., rodenticide intoxication, thrombocytopenia, immune-mediated, DIC, drug toxicity, and infection)
Inherited or congenital
Bleeding disorders
Thrombocytopenia
Anemia
Drug induced
Infectious agents (i.e., ehrlichiosis, FeLV, and FIV)
Neoplasia
Neoplasia
Primary (i.e., ocular melanoma and adenoma)
Secondary (i.e., lymphoma, hemangiosarcoma, multiple myeloma, and transmissible venereal tumor)
Infectious diseases
Tick borne (i.e., Rocky Mountain spotted fever and ehrlichiosis)
Bacterial (i.e., brucellosis and leptospirosis)
Fungal (i.e., aspergillosis)
Other (i.e., protothecosis)
Systemic hypertension
Renal failure
Protein-losing nephropathy
Hyperthyroidism
Hyperadrenocorticism
Pheochromocytoma
Diabetes mellitus
Congenital anomalies
Collie eye anomaly
Persistent hyaloid artery
Vitreoretinal dysplasia
Retinal detachment
Primary
Secondary (i.e., trauma, infectious diseases, inflammation, neoplasia, systemic hypertension, and congenital anomalies)
Anterior uveitis
Neoplasia
Immune-mediated
Infectious disease
Chronic glaucoma

2. It is very important to evaluate the structures caudal to the iris for possible underlying causes as well as retinal detachment but this is often not possible with moderate to severe hyphema
 - **Ultrasound** is very useful to look for masses and evaluate retina in these cases



3. Newer/more controversial treatments:

1. Injection (into the eye) of **tissue plasminogen activator**
 - If injected in the first 72 hrs of clot formation can help get rapid resolution
 - This treatment is somewhat controversial
 - Only indicated if recurrence of bleeding is unlikely
2. Use of anti-fibrinolytics (Aminocaproic Acid/TCA)
 - This particular article does not go into details of the treatment as there is only one case report (that I couldn't find) of use, and states it is too expensive for canine use
 - In humans has been studied more extensively in traumatic hyphema
 - May reduce frequency of re-bleeding
 - Can be used both systemically and topically (although particular ocular formulation was used)

Table 2
Treatment of Hyphema

Drug class and names	Disorder and use	Dose and frequency
Topical corticosteroids Prednisolone acetate suspension 1% Dexamethasone solution 0.1%	Uveitis or inflammation	1 Drop in affected eye(s) 4-6 times daily
Topical parasympatholytics Atropine 1%	Uveitis or inflammation Used for the prevention of posterior synechiae and iris bombe Stabilize blood-aqueous barrier Decreased ciliary body spasms	1 Drop in affected eye(s) 2-3 times daily • Frequency should be reduced once dilation of pupil has occurred to prevent development of glaucoma
Topical NSAIDs (controversial) Flurbiprofen 0.03% Diclofenac 0.1%	Uveitis or inflammation	1 Drop in affected eye(s) 3-4 times daily • Use of topical and systemic NSAIDs is controversial because they may interfere with platelet function
Systemic corticosteroids Prednisone	Uveitis or inflammation	1 mg/kg/day • Check for contraindications in patients • Rule out disease processes such as lymphoma before prescribing
Systemic NSAIDs (controversial) Carprofen Deracoxib Aspirin Robenacoxib (cats)	Uveitis or inflammation	Carprofen: Dogs: 2 mg/kg PO every 12 hours Deracoxib: Dogs: 1-2 mg/kg PO every 24 hours Aspirin: Dogs: 10-15 mg/kg PO every 8-12 hours Cats: 10 mg/kg PO every 48-72 hours Robenacoxib: Cats: 1 mg/kg PO once daily for 3 days
Fibrinolytics Tissue-plasminogen activator (TPA) E-aminocaproic acid (EACA)	Blood, fibrin, or clot dissolution	TPA: 25-75 µg intracamerally EACA: Not regularly recommended

NSAID, nonsteroidal anti-inflammatory drugs; PO, orally.

QUESTIONS:

1. In which of the following patients could treatment with tissue plasminogen activator be considered:
 - A. 7 year old female spayed mastiff with hyphema secondary to immune mediated thrombocytopenia
 - B. 13 year old male castrated domestic short hair cat with hypertensive retinopathy and secondary retinal detachment
 - C. 3 year old male castrated Boston terrier with hyphema secondary to blunt force trauma to the head

2. Corticosteroids are frequently used in patients with hyphema to decrease inflammation as well as prevent further bleeding by inhibiting fibrinolysis. In which patients are topical corticosteroids contraindicated?

3. Parasympatholytics are often used topically in patients with hyphema to prevent formation of posterior synechiae and iris bombe, as well as reduce ciliary body spasm. In which patients should Atropine drops be avoided?

4. A 3 year old male castrated labrador retriever presents to you with hyphema which his owners noted 6 hours previously. He has otherwise been well at home although has been in the yard unsupervised during the day for the last week. He is BAR with a normal TPR and no abnormalities noted on general physical exam. On ophthalmic exam you note a moderate to severe amount of non-clotted blood in the anterior chamber OU. No overt corneal abnormalities are noted. You are unable to perform a retinal exam due to the volume of blood present. What initial tests would you like to perform in this patient to narrow your differential diagnoses. List three and include reasoning.

ANSWERS:

1. In which of the following patients could treatment with tissue plasminogen activator be considered:
 - D. 7 year old female spayed mastiff with hyphema secondary to immune mediated thrombocytopenia
 - E. 13 year old male castrated domestic short hair cat with hypertensive retinopathy and secondary retinal detachment
 - F. **3 year old male castrated Boston terrier with hyphema secondary to blunt force trauma to the head**

2. Corticosteroids are frequently used in patients with hyphema to decrease inflammation as well as prevent further bleeding by inhibiting fibrinolysis. In which patients are topical corticosteroids not recommended? **Corneal penetration/ulceration**

3. Parasympatholytics are often used topically in patients with hyphema to prevent formation of posterior synechiae and iris bombe, as well as reduce ciliary body spasm. In which patients should Atropine drops be avoided? **Glaucoma**

4.
 - **PT/PTT** - rule out primary coagulopathy e.g. rodenticide
 - **Blood smear** - look primarily at platelet count to rule out thrombocytopenia, also assess WBC for left shift etc
 - **Fluorescein staining** - further evaluate for penetrating injuries to cornea
 - **+/- ultrasound** - look for retinal detachment, mass
 - **+/- IOP** - evaluate for uveitis vs glaucoma