

Topical Review

Hyphema: Considerations in the Small Animal Patient

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Classification, diagnosis, and treatment of hemorrhage into the anterior chamber of the eye, or hyphema, can be a challenging and frustrating process for many practitioners, especially in emergency situations. This review outlines an inclusive list of causes, diagnostics, and treatments for traumatic and nontraumatic hyphema in both canine and feline patients. The review is tailored to small animal practitioners, especially in emergency practice, and is designed to provide concise but thorough descriptions on investigating underlying causes of hyphema and treating accordingly.

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Introduction

Hyphema, blood in the anterior chamber of the eye, usually occurs following damage to and bleeding of the retinal or uveal vasculature.^{1,2} The blood may be characterized in several different ways: clotted or unclotted, free or associated with fibrin or hypopyon, and by the amount of the anterior chamber volume it occupies³ (Fig 1). Hyphema can be the result of numerous disease processes that may disrupt the blood-ocular barrier, including trauma, coagulopathies, neoplasia, infectious diseases, systemic hypertension, congenital anomalies, uveitis, retinal detachments, and immune-mediated diseases.^{1,4} Severe sequelae to hyphema commonly include cataract formation, phthisis bulbi, secondary glaucoma, corneal blood staining, and posterior synechiae.² Although there are many known traumatic and nontraumatic causes of hyphema, finding the underlying cause and treating the condition can still be rather difficult, especially in emergency situations. This review highlights the most common etiologies associated with hyphema and provides guidelines to approach hyphema both diagnostically and therapeutically.

Etiologies

Trauma

Blunt force head trauma and penetrating eye wounds are some of the most common veterinary emergencies, typically caused by vehicular accidents and animal fights. These patients may present with severe clinical signs such as skull fractures or inappropriate mentation or more inconspicuous clinical signs, such as hyphema. Protection by the bony orbit and soft tissues surrounding the eye

reduces the chance of hyphema, although trauma directly in the area of the orbit or soft tissues may result in damage to the globe and uveal tissues⁴⁻⁶ (Fig 2). A study investigated traumatic ocular proptosis in 84 dogs and cats and included patients suffering from dog bites, vehicular accidents, animal fights, and unknown trauma. Hyphema was the second most common ocular finding in cats presenting for ocular proptosis, and was found in some of the more severe canine cases.⁶ Hyphema is generally considered to be a poor prognostic indicator in patients with proptosis, resulting in enucleation in most cases. Another study investigated traumatic hyphema in animals and found they had suffered gunshot wounds, canine bites, vehicular impacts, feline scratches, and blunt trauma from a closing door, a horse kick, a high-rise fall, and a rock thrown from a lawn mower. These cases had hyphema that inhibited ophthalmic examination beyond the iris, and ocular ultrasonography was performed to investigate other ocular abnormalities.⁵ This is especially important because retinal detachment can result from blunt force trauma to the eye and lead to hyphema.

Traumatic hyphema is relatively easy to diagnose, especially with an adequate history and thorough physical and ophthalmic examination. When traumatic hyphema is suspected, other diagnostics including radiography, ultrasonography, and bloodwork are recommended to investigate other possible injuries resulting from the traumatic event.

Coagulopathies and Bleeding Disorders

Systemic bleeding disorders commonly responsible for causing hyphema include thrombocytopenia, hemolytic and nonhemolytic anemia, and clotting disorders. Although inherited coagulopathies are seen infrequently in emergency situations, acquired



Fig. 1. Anterior chamber containing unclotted blood. Unclotted hyphema often indicates continued bleeding or lack of the ability to form a clot. (Image courtesy of Ellen Belknap.)

coagulopathies present more commonly as an emergency. Coagulopathies result from disruptions of the intrinsic, common, or extrinsic clotting pathways, and are generally classified as primary or secondary hemostatic conditions. Primary hemostatic defects usually result in petechiae (Fig 3) and ecchymoses, whereas secondary hemostatic defects typically result in large or major hemorrhages, usually into body cavities or larger organ systems.⁷ Any disturbance in the clotting cascade may cause hyphema or hemorrhage into the eye.

In emergency cases, acquired coagulopathies from anticoagulant rodenticide intoxication are diagnosed frequently. Anticoagulant rodenticides, known to cause deficiency in vitamin K coagulation factors (II, VII, IX, and X), are the most commonly reported rodenticide toxicities in multiple studies.^{8,9} Without these factors, coagulation is severely impaired and results in multiple clinical signs related to hemorrhage, including hyphema.⁸ Other possible causes of coagulopathies include neoplasia (hemangiosarcoma and lymphoma), infectious diseases, snake and insect bites, and any other condition that may cause disseminated intravascular coagulation.^{7,8,10}

Thrombocytopenia is the most common cause of spontaneous bleeding in dogs and can be the result of decreased platelet production, increased platelet destruction, increased platelet consumption, and increased platelet sequestration.⁷ The most common etiologies of thrombocytopenia involve platelet destruc-



Fig. 2. An “8-ball” appearance of hyphema following vehicular trauma. The hyphema has a blue or black appearance, which is typical of clot formation and may lead to secondary glaucoma. The cornea is perforated at the medial limbus and there is severe exophthalmos due to retrobulbar and subconjunctival hemorrhage. A corneal ulcer has developed owing to globe exposure.



Fig. 3. Petechiae present in a patient with immune-mediated thrombocytopenia. It is important to perform a full physical examination on any patient presenting for hyphema because subtle findings of petechiae or ecchymoses may prompt further investigation of underlying systemic coagulation disorders. (Image courtesy of Andrew Mackin.)

tion and include immune-mediated, sepsis-related, and drug-related thrombocytopenia as well as inflammatory and infectious causes.^{7,11} As is the case in humans, ocular disorders are reported in cases with thrombocytopenia in small animals, especially with infectious and neoplastic diseases. The prevalence and severity of ocular lesions with thrombocytopenia cases have been found to be more significant than ocular lesions associated with anemia cases.¹¹ Because platelets play such a vital role in primary hemostasis, a platelet deficiency can easily lead to ocular hemorrhage, including hyphema and subconjunctival, retinal, or intravitreal hemorrhage (Fig 4). Secondary ocular diseases, such as glaucoma or uveitis, often follow these bleeding events.¹¹ Determination of the etiology of thrombocytopenia is important, as treatment of immune-mediated thrombocytopenia involves the use of glucocorticoids, which can inhibit diagnosis of underlying disease processes such as lymphoma. Glucocorticoids at immunosuppressive dosages can also worsen certain infectious diseases.^{8,12} For these reasons, further investigation of thrombocytopenia should be performed in all patients presenting with hyphema to properly manage the underlying cause.

Patients experiencing moderate to severe anemia may also present with retinal hemorrhages and hyphema. When the patient

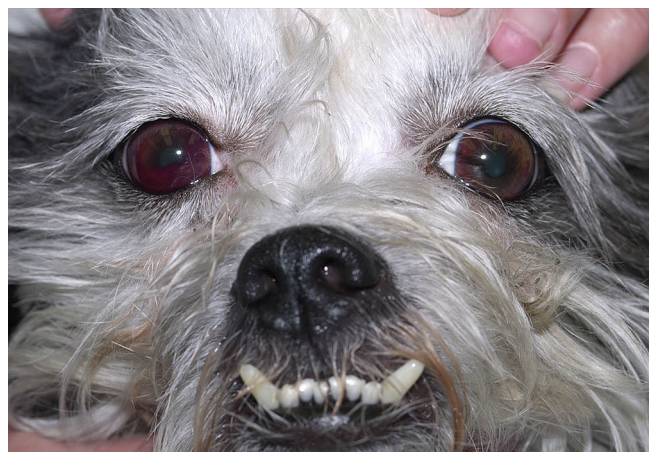


Fig. 4. Shih Tzu with immune-mediated thrombocytopenia. The right eye has hyphema and aqueous flare. Platelet disorders are a common cause of hyphema especially if vasculitis is present or the platelets are extremely low. (Image courtesy of Andrew Mackin.)

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