

## Answer to Ophthalmproblem *continued from page 319*

### 2. Hyphema

Hyphema is the accumulation of blood in the anterior chamber (AC). Most hyphemas are classified as traumatic, and occur as a result of blunt trauma to the eye inducing a pressure wave that tears vessels in the iris or ciliary body. Most cases occur in young males and are related to fights or sports injuries.<sup>1</sup> Hyphemas might also occur during or following intraocular surgery. Rarely, spontaneous hyphemas occur in association with ocular pathology, such as iris neovascularization, uveitis, and neoplasms.<sup>2</sup>

### Management

Patients with ocular trauma must undergo a complete history and ocular examination, as blunt ocular trauma can cause a number of ocular problems other than hyphema. These include, but are not limited to, corneal abrasions, traumatic cataract, retinal detachment, globe rupture, retrobulbar hematoma, and orbital blowout fracture. While taking the patient's history, it is necessary to elicit information on the mechanism and timing of the injury, associated ocular diseases, medications (eg, antiplatelet agents and anticoagulants), and the presence of hematologic abnormalities such as sickle cell disease or bleeding diathesis. Patients should also be asked about ocular symptoms such as vision loss, pain, photophobia, and diplopia.

A full ocular examination is imperative and should include assessments of visual acuity, confrontation visual fields, diameter and reactivity of the pupils, extraocular movements (restriction might imply an orbital blowout fracture), and intraocular pressure (IOP) via tonometry. Physical examination of the eye and surrounding structures should be performed. During the examination, an effort should be made to identify any injuries that would warrant immediate ophthalmologic attention. For example, a proptotic eye with surrounding ecchymoses might be a sign of retrobulbar hematoma, while a positive Seidel test result and low IOP would indicate a ruptured globe. Pressure should not be exerted on the eye if an open globe is suspected; in these cases, a shield should be placed over the affected eye and an urgent ophthalmology consultation arranged. If present, hyphema is usually readily visible to the naked eye as a layered clot within the AC. (The blood will layer in relation to the patient's position.) Sometimes only a few red blood cells are circulating in the AC (termed *microhyphema*), in which case the diagnosis can only be made using a slit lamp. The primary care physician should note the severity of the hyphema in terms of percentage or height of blood in the AC. An attempt to visualize the fundus with direct ophthalmoscopy is an option; however, this is often difficult in patients with ocular trauma. In some

cases, an ophthalmologist might need to perform a gentle B-scan ultrasound to exclude complications such as vitreous hemorrhage or retinal detachment. If an intraocular foreign body or orbital fracture is suspected, an x-ray or computed tomography scan can be ordered. As well, all patients of African-American descent should be screened for sickle cell disease or trait, which affects both management and prognosis.<sup>3</sup>

Blood in the AC can cause several potentially serious complications. The most common of these is elevation of IOP due to obstruction of the trabecular meshwork (ie, the aqueous drainage system) by red blood cells, fibrin, and other debris. Approximately one-third of individuals will have IOP elevation at some point during their treatment.<sup>4</sup> Uncontrolled IOP for several days can cause irreversible damage to the optic nerve, as well as optic atrophy. For this reason, IOP must be frequently monitored by an eye specialist during the course of the hyphema. Secondary hemorrhage (rebleeding) is also relatively common, occurring in about 18% of patients,<sup>5</sup> and occurs between 3 and 5 days after the initial bleed.<sup>1</sup> Other potential complications include corneal blood staining, posterior synechiae, peripheral anterior synechiae, and secondary glaucoma, all of which can impair vision.<sup>3</sup>

### Treatment

Ideally, all hyphema cases should be assessed by an ophthalmologist on an urgent basis, regardless of their cause. Treatment for all patients includes maintaining an upright position in an atraumatic environment. The risk of rebleed is greatest in the first week from time of injury or previous rebleed. Strenuous activities must be avoided during this time frame, or longer if blood remains in the AC. This might mean hospitalization in select cases, such as those involving children or when child abuse is suspected. Patients should have a shield applied to the eye, and rest with the head of the bed elevated at 30 to 45 degrees to help speed absorption.<sup>1,2</sup> Atropine 1% eye drops twice daily are prescribed to dilate the iris and hopefully stabilize any friable blood vessels and their associated clots.<sup>3</sup> If necessary, patients can be given acetaminophen (with or without codeine) to achieve pain relief; acetylsalicylic acid or nonsteroidal anti-inflammatory medications should be strictly avoided owing to their effects on bleeding.

If IOP is elevated, first-line treatment is usually topical  $\beta$ -blockers or carbonic anhydrase inhibitors. Prostaglandins are generally avoided owing to their inflammatory effects. Topical carbonic anhydrase inhibitors must be used with extreme caution in patients with sickle cell disease or sickle cell trait owing to the possibility of induced changes in the pH of the AC and the resultant increased risk of sickling. If the pressure remains high, systemic medications such as acetazolamide

or osmotic agents (eg, mannitol) can be added. Traditionally, oral antifibrinolytics such as aminocaproic acid or tranexamic acid have been shown to decrease the likelihood of rebleeding in some studies.<sup>5</sup> However, studies have shown no difference in the rebleed rates in patients with or without the use of tranexamic acid; as such, antifibrinolytics are no longer considered a criterion standard of care.<sup>6</sup> Surgical management, such as AC paracentesis and wash-out, is generally reserved for severe cases in which the IOP remains persistently elevated or the cornea begins to stain; approximately 5% of patients will need surgery.<sup>7</sup>

The prognosis of traumatic hyphema is generally good, with most cases resolving within a week as the blood is reabsorbed from the AC. Factors that might predict a poorer prognosis include more severe hyphema, the presence of other ocular injuries, and the occurrence of rebleeding or other complications.

### Recommendations

Blunt ocular trauma might cause a variety of potentially serious injuries to the eye, including hyphema.

Management of hyphema includes pupillary dilation, IOP monitoring, and maintenance of an atraumatic, upright environment. In general, hyphema warrants urgent ophthalmologic referral owing to the potential for sight-threatening complications.



**Drs Johnson** and **Schweitzer** are residents and **Drs ten Hove** and **Sharma** are associate professors in the Department of Ophthalmology at Queen's University in Kingston, Ont.

#### Competing interests

None declared

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