

canals. However, one side effect of prostaglandins is that they change the pigmentation of the iris and thus the color of the eye.

Other medications decrease IOP by reducing the flow of aqueous humor. These agents include alpha and beta blockers, carbonic anhydrase inhibitors, and osmotic diuretics.

- **Alpha blockers.** Alpha blockers such as apraclonidine HCl (Iopidine) and brimonidine tartrate (Alphagan P) dilate blood vessels in the eye and have a mild effect on the cardiovascular and respiratory systems. They treat glaucoma by decreasing the production of and increasing the drainage of aqueous humor.
- **Beta blockers.** Beta blockers such as betaxolol HCl (Betoptic S) and timolol maleate (Istalol) also work by decreasing the production of intraocular fluid. In low dosages, beta blockers affect the eye but do not have a systemic effect. If they do enter the cardiovascular system, these drugs can constrict the bronchi, slow the heart rate, and cause hypotension. These systemic effects can be minimized by closing the eyes following application to prevent the drops from entering the tear drainage duct.
- **Carbonic anhydrase inhibitors.** Medications such as acetazolamide (Diamox and Sequels) decrease IOP by reducing the production of intraocular fluid. They can be administered topically or systemically, although systemic use is reserved for patients who do not respond to the topical medications.
- **Osmotic diuretics.** This class of medications, which include glycerin (Osmoglyn, Ophthalmic Solution), are used for eye surgery to decrease the amount of aqueous humor rapidly.

Although the cause is not clear, glaucoma is more prevalent among patients with hypertension, diabetes, migraines, nearsightedness, farsightedness, and patients of advanced age.

Medications for Eye Irritations and Infections

Minor eye injury and irritation can be treated with local anesthetics, antimicrobials, nonsteroidal anti-inflammatory drugs (NSAIDs), and glucocorticoids. The local anesthetics include tetracaine (Pontocaine 0.5% solution) and proparacaine (Ophthaine, Ophthetic 0.5% solution). The antimicrobials typically used are gentamicin, tobramycin, and erythromycin. The NSAIDs are ketorolac tromethamine 0.5% solution (Acular) and nepafenac 0.1% suspension (Nevanac). The glucocorticoids include dexamethasone (Maxidex suspension, Decadron solution and ointment) and hydrocortisone acetate (Hydrocortone). All of these medications can be administered as drops or salves or by injection. For milder irritations and injuries, the medications, such as eye lubricants, simply soothe the outer eye. For more serious irritations and injuries such as keratitis (an inflammation of the cornea caused by irritation or microbial infection), the medications must penetrate beyond the surface. Ophthalmic glucocorticoids should not be used for long-term treatment because they can suppress the immune response.

Anti-infectives are used for eye infections. Similar to infections elsewhere in the body, eye infections must be treated swiftly and completely. One of the most common infections of the eye is conjunctivitis (pinkeye), and it is treated with an antibiotic such as gentamicin ophthalmic ointment. Eye infections can spread to other parts of the body, especially if patients rub their eyes with their fingers and then touch another part of the body. Meticulous hand washing is important, and patients should be advised to not rub the infected eye. Another common eye infection is a stye. A stye is a bacterial infection in an oil gland in the eyelid that causes a painful red bump. Persistent or multiple styes are usually treated with topical ophthalmic antibiotics or oral antibiotics such as doxycycline (Vibramycin, Oracea, Adoxa).



CRITICAL THINKING

How would you instruct the patient to administer eye medications to prevent the spread of infection?

Medications for Eye Examinations

Some drugs are used to make it easier for a health-care professional to examine the eyes. Cycloplegic mydriatics, for example, relax ciliary muscles and dilate the pupils so the examiner can peer into the eye.