Ocular Medication Administration

The objective of ocular medication delivery is maximizing the amount of medication that reaches the ocular site of action in sufficient concentration to produce a beneficial therapeutic effect. This is determined by the dynamics of ocular pharmacokinetics: absorption, distribution, metabolism, and excretion.

Aqueous solutions are most commonly used for the eye. They’re the least expensive medications and interfere least with vision. However, corneal contact time is brief because tears dilute the medication. Ophthalmic ointments have extended retention time in the conjunctival sac and a higher concentration than eye drops. The major disadvantage of ointments is the blurred vision that results after application. In general, eyelids and eyelid margins are best treated with ointments. The conjunctiva, limbus, cornea, and anterior chamber are treated most effectively with instilled solutions or suspensions. Contact lenses and collagen shields soaked in antibiotics are alternative delivery methods for treating corneal infections. Of all these delivery methods, the topical route of administration—instilled eye drops and applied ointments—remain the most common. Topical instillation, which is the least invasive method, permits self-administration of medication. It also produces fewer adverse reactions.

Preservatives are commonly used in ocular medications. Benzalkonium chloride, for example, prevents the growth of organisms and enhances the corneal permeability of most medications. However, some patients are allergic to this preservative. This may be suspected even if the patient had never experienced an allergic reaction to systemic use of the medication in question. Pharmacists can prepare eye drops without preservatives.

Some commonly used ocular medications

**Topical anesthetics:** Instill one or two drops before diagnostic procedures, such as tonometry and gonioscopy, and in minor ocular procedures, such as suture removal or conjunctival or corneal scrapings. Tell patients not to rub their eyes because this may damage their corneas. Never let patients take topical anesthetics home. Prolonged use can delay wound healing. An anesthetic is also used for severe eye pain so a patient can open her eyes for examination or treatment, such as eye irrigation for chemical burns.

**Mydriatics and cycloplegics:** Cycloplegic medications are administered to paralyze the iris sphincter. Instruct patients about the temporary effects of mydriasis on vision, such as glare and the inability to focus properly. Patients may not be able to read and shouldn’t drive. The effects of the various mydriatics and cycloplegics can last 3 hours to several days. Advise patients to wear sunglasses (most eye clinics provide protective sunglasses) and to have a responsible adult drive them home. Mydriatic and cycloplegic agents affect the central nervous system. Their effects are most prominent in children and elderly patients; assess these patients closely for symptoms, such as rise in blood pressure, tachycardia, dizziness, ataxia, confusion, disorientation, incoherent speech, and hallucination. These medications are contraindicated in patients with narrow angles or shallow anterior chambers and in patients taking monoamine oxidase inhibitors or tricyclic antidepressants.

**Medications used to treat glaucoma:** Therapeutic medications for glaucoma are used to lower intraocular pressure by decreasing aqueous production or increasing aqueous outflow. Because glaucoma calls for lifetime therapy, patients must be instructed regarding the medications’ ocular and systemic adverse effects.

**Corticosteroids and nonsteroidal anti-inflammatory drugs (NSAIDs):** The topical preparations of corticosteroids are commonly used in inflammatory conditions of the eyelids, conjunctiva, cornea, anterior chamber, lens, and uvea. In posterior segment diseases that involve the posterior sclera, retina, and optic nerve, the topical agents are less effective, and parenteral and oral routes are preferred.

The topical eye drop preparation is prepared in suspension; tell the