17 Special Solutions and Suspensions

OBJECTIVES

After reading this chapter, the student will be able to:

1. Describe ophthalmic, nasal, and inhalation drug delivery
2. List drugs that are typically administered by each of these drug delivery methods
3. Explain the advantages/disadvantages of using one of these drug delivery methods over oral administration
4. Describe the use of the various pharmaceutical adjuvants, which are employed in the formulation of these dosage forms
5. Differentiate between the various types of contact lens products and appropriate care products, which are employed for each
6. Explain the proper administration of each of these drug delivery systems
7. Explain how patients can misuse/abuse these products intentionally or unintentionally

Pharmaceutical dosage forms and drug delivery systems applied topically to the eye, nose, or ear can include solutions, suspensions, gels, ointments, and drug-impregnated inserts. This chapter builds on the general considerations of solutions and suspensions presented in Chapters 13 and 14 by describing additional requirements of these dosage forms when designed specifically for ophthalmic, nasal, or otic use.

OPHTHALMIC DRUG DELIVERY

Pharmaceutical preparations are applied topically to the eye to treat surface or intraocular conditions, including bacterial, fungal, and viral infections of the eye or eyelids; allergic or infectious conjunctivitis or inflammation; elevated intraocular pressure and glaucoma; and dry eye due to inadequate production of fluids bathing the eye. In treating certain ophthalmic conditions, such as glaucoma, both systemic drug use and topical treatments may be employed.

The normal volume of tear fluid in the cul-de-sac of the human eye is about 7 to 8 µL (1–4). An eye that does not blink can accommodate a maximum of about 30 µL of fluid, but, when blinked, can retain only about 10 µL (2). Because the capacity of the eye to retain liquid and semisolid preparations is limited, topical applications are administered in small amounts, liquids dropwise, and ointments as a thin ribbon applied to the margin of the eyelid. Larger volumes of liquid preparations may be used to flush or bathe the eye.

Excessive liquids, both normally produced and externally delivered, rapidly drain from the eye. A single drop of an ophthalmic solution or suspension measures about 50 µL (based on 20 drops/mL), so much of an administered drop may be lost. The optimal volume to administer, based on eye capacity, is 5 to 10 µL (1). Microliter-dosing medication