

drug through the tube or catheter. The unit can be presterilized and prefilled using a filling tube.

With the Alzet pump, the drug reservoir is a liquid solution inside an impermeable collapsible polyester bag coated with a layer of an osmotically active salt. It is sealed within a rigid structure coated with a semipermeable membrane. As the salt dissolves, it creates an osmotic pressure gradient, and the drug compartment is reduced in volume, forcing the drug solution out. The delivery rate can be changed by changing the drug concentration (3).

VAGINAL ADMINISTRATION

Intravaginal Drug Delivery System

Vaginal administration of drugs, especially hormones, has several advantages, including self-insertion and removal, continuous drug administration at an effective dose level, and good patient compliance. The continuous release and local absorption of drug minimize systemic toxicity that may result from oral peak-and-valley drug administration.

In a polymeric vaginal drug delivery system, such as a resilient medicated vaginal ring, shown in Figures 20.5 and 20.6 or a copper-containing intrauterine contraceptive device, the drug may be uniformly distributed throughout the polymeric matrix. Upon administration and when in contact with vaginal fluids, the drug will slowly dissolve and migrate out of the device. Drug inside the device will diffuse toward the surface along a concentration gradient, resulting in a long-acting drug delivery system. Mirena (levonorgestrel-releasing intrauterine system) consists of a T-shaped polyethylene frame with a steroid reservoir (hormone elastomer core) around the vertical stem. It is designed to prevent pregnancy for up to 5 years (4).

Intrauterine Progesterone Drug Delivery System

The Progestasert System shown in Figure 20.7 slowly releases an average of 60 mg of progesterone per day for 1 year after insertion.



FIGURE 20.5 Estring (estradiol vaginal ring) commercial package. The ring is enclosed in a foil pouch inside the carton.

The continuous release of progesterone into the uterine cavity provides local rather than systemic action. Two hypotheses for the contraceptive action have been offered:



FIGURE 20.6 The Estring (Pharmacia & Upjohn), a polymeric vaginal drug delivery system. (Courtesy of Pharmacia & Upjohn.)