Table 3-1 Examples of Commercially Available Large Volume Injections (*Continued*)

Ringer's and dextrose injections in VIAFLEX plastic containers
Ringer's and 5% dextrose injection, USP
Lactated Ringer's and 5% dextrose injection, USP
Sodium chloride injections
0.45% Sodium chloride injection, USP in VIAFLEX plastic container
0.9% Sodium chloride injection, USP. VIAFLEX plastic container, 150 mL
0.9% Sodium chloride injection, USP. VIAFLEX plastic container, 250 mL
0.9% Sodium chloride injection, USP. VIAFLEX plastic container, 500 mL
3% Sodium chloride injection, USP in VIAFLEX plastic container
5% Sodium chloride injection, USP in VIAFLEX plastic container
0.9% Sodium chloride injection, USP
0.9% Sodium chloride injection, USP. VIAFLEX plastic container, 1000 mL
Sodium chloride injections in mini-bag plastic containers
0.9% Sodium chloride injection, USP in VIAFLEX plastic container quad pack
0.9% Sodium chloride injection, USP in VIAFLEX plastic container single pack
0.9% Sodium chloride injection, USP in VIAFLEX plastic container multi pack

Source: From Ref. 1.

Nutritional Proteins

These are synthetic amino acids, ranging from 2.5% to 10% concentrations of a mixture of L-amino acids, nearly all of the 20 main types of amino acids. A wide variety of products are available and usage depends on patient situation (starvation, renal and/or hepatic failure) and level of stress (e.g., trauma, infection, degree of illness, and burns). Computers are used to calculate final formulation requirements.

Fatty (Lipid) Emulsions

Large volume emulsions serve as a source of nutrient fat for patients under parenteral nutritional therapy. Emulsions are composed of soybean oil (usually 10–20%), water (pH usually around 8), egg yolk phosopholipid (1.2%) that serves as the emulsifying agent/stabilizer, and glycerin (2.5%) for isotonicity adjustment.

Peritoneal Dialysis

Dialysis solutions require large volumes of glucose (dextrose) (0.5–4.25%) to remove waste such as urea and potassium from the blood, as well as excess fluid, when the kidneys are incapable of this (i.e., in renal failure). Peritoneal dialysis works on the principle that the peritoneal membrane that surrounds the intestine can act as a natural semipermeable membrane, and that if a specially formulated dialysis fluid is instilled around the membrane then dialysis can occur, by diffusion. Excess fluid can also be removed by osmosis, by altering the concentration of glucose in the fluid.

Irrigating Solutions

There are a variety of irrigating solution formulations, containing various components such as electrolytes and some organics (e.g., glutathione in BSS Plus ophthalmic irrigating solution). Irrigating solutions differ from injectable solutions with respect to the package closure. Injectable solutions are sealed with a rubber closure where the only entry point is through the rubber closure via a needle or injection spike. Irrigating solutions are closed with a screw cap that is twisted open just like a soda screw cap. Irrigating solutions, like injectable solutions, must be sterile, pyrogen, and particulate free.

INJECTION CATEGORIES

There are six main categories of injectable products:

1. Solutions ready for injection
2. Dry, soluble products ready to be combined with a solvent prior to use
3. Suspensions ready for injection
4. Dry, insoluble products ready to be combined with a vehicle prior to use