- For clients with chronic lung disease, use measures to prevent respiratory infections. These include interventions to aid removal of respiratory secretions, such as adequate hydration, ambulation, deep-breathing and coughing exercises, and chest physiotherapy. Immunizations with pneumococcal pneumonia vaccine (a single dose) and influenza vaccine (annually) are also strongly recommended.
- When administering substances known to produce hypersensitivity reactions (penicillin and other antibiotics, allergy extracts, vaccines, local anesthetics), observe the recipient carefully for at least 30 minutes after administration. Have adrenergic and other emergency drugs and equipment readily available in case a reaction occurs.
- Use noninvasive interventions in addition to adrenergic medications when treating shock and hypotension. These include applying external pressure over a bleeding site to control hemorrhage and placing the patient in modified Trendelenburg position (patient supine with legs markedly elevated and head and shoulders only slightly elevated) to improve venous return and blood pressure.

Evaluation

- Observe for increased blood pressure and improved tissue perfusion when a drug is given for hypotension and shock or anaphylaxis.
- Interview and observe for improved breathing and arterial blood gas reports when a drug is given for bronchoconstriction or anaphylaxis.
- Interview and observe for decreased nasal congestion.

PRINCIPLES OF THERAPY

Drug Selection and Administration

The choice of drug, dosage, and route of administration depends largely on the reason for use. IV or SC epinephrine is the drug of choice in anaphylactic shock. Isoproterenol by oral inhalation may be used for producing bronchodilation. However, a selective beta$_2$ agonist is preferred because it causes less cardiac stimulation. Adrenergic drugs are given IV only for emergencies, such as cardiac arrest, severe arterial hypotension, circulatory shock, and anaphylactic shock. No standard doses of individual adrenergic drugs are always effective; the dosage must be individualized according to the client's response. This is especially true in emergencies, but it also applies to long-term use.

Use in Specific Situations

Because adrenergic drugs are often used in crises, they must be readily available in all health care settings (eg, hospitals, long-term care facilities, physicians' offices). All health care personnel should know where emergency drugs are stored.

Anaphylaxis

Epinephrine is the drug of choice for the treatment of anaphylaxis. It relieves bronchospasm, laryngeal edema, and hypotension. In conjunction with its alpha (vasoconstriction) and beta (cardiac stimulation, bronchodilation) effects, epinephrine acts as a physiologic antagonist of histamine and other bronchoconstricting and vasodilating substances released during anaphylactic reactions. People susceptible to severe allergic responses should carry a syringe of epinephrine at all times. Epipen and Epipen Jr. are prefilled, autoinjection syringes for self-administration of epinephrine in an emergency situation.

Victims of anaphylaxis who have been taking beta-adrenergic blocking drugs (eg, propranolol [Inderal]) do not respond as readily to epinephrine as those not taking a beta blocker. Larger doses of epinephrine and large amounts of IV fluids may be required. Adjunct medications that may be useful in treating severe cases of anaphylaxis include corticosteroids, norepinephrine, and aminophylline. Antihistamines are not very useful because histamine plays a minor role in causing anaphylaxis, compared with leukotrienes and other inflammatory mediators.

Cardiopulmonary Resuscitation

Epinephrine is often administered during CPR. Its most important action is constriction of peripheral blood vessels, which shunts blood to the central circulation and increases blood flow to the heart and brain. In the past it was considered the drug of choice to treat cardiac arrest. The most recent Advanced Cardiac Life Support (ACLS) guidelines for health professionals (2000) classify epinephrine as a class *indeterminate* for the treatment of defibrillation-resistant ventricular tachycardia and ventricular fibrillation during cardiac arrest. Class *indeterminate* means a treatment is promising but lacks research evidence of benefit. Vasopressin is the alternative pressor to epinephrine that may be used in this situation. Vasopressin is listed as class *IIb*, which means the usefulness of the drug is supported by fair to good research. Class *IIb* drugs are considered optional or alternative interventions by the majority of experts in treatment of cardiac arrest. When treating defibrillation-resistant ventricular tachycardia or ventricular fibrillation, vasopressin is given as a single dose of 40 units IV (see Chap. 23). Epinephrine is still considered the drug of choice to treat cardiac arrest in nonventricular tachycardia/fibrillation cases such as pulseless electrical activity (PEA) and asystole. Epinephrine is beneficial in these situations because it stimulates electrical and mechanical activity and produces myocardial contraction.

The specific effects of epinephrine depend largely on the dose and route of administration. The optimal dose in CPR has not been established. ACLS guidelines recommend epinephrine 1 mg IV every 3 to 5 minutes. If this fails, higher doses of epinephrine (up to 0.2 mg/kg) are acceptable, but not recommended. In fact, there is growing evidence that higher doses of epinephrine may be harmful.