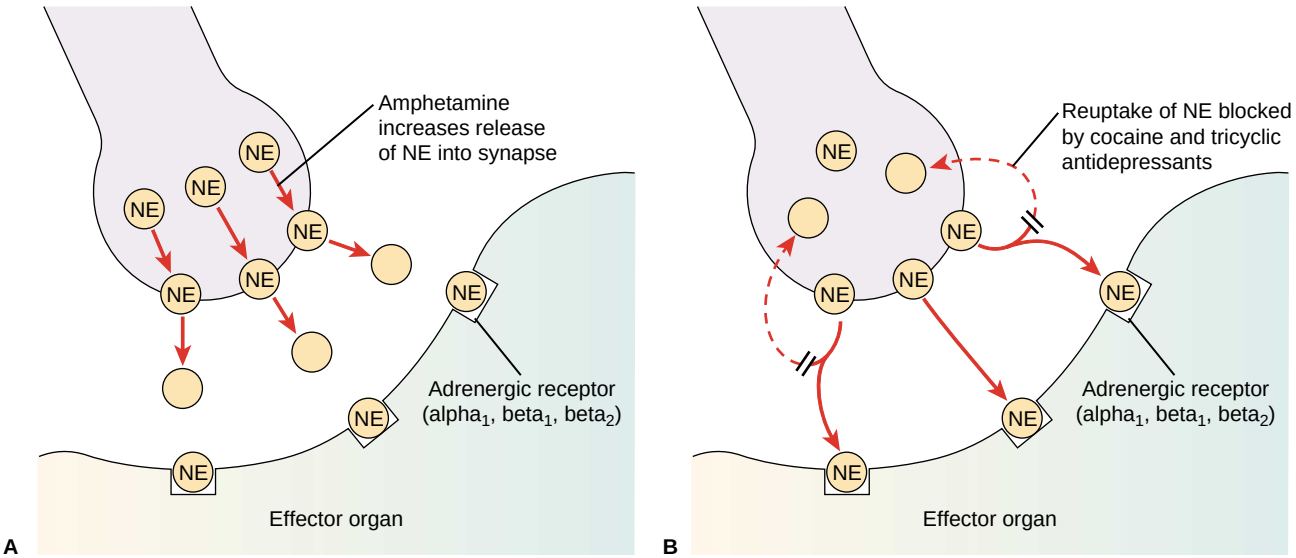

Figure 18–2 Mechanisms of indirect adrenergic drug action. Stimulation of postsynaptic alpha$_1$, beta$_1$, and beta$_2$ receptors results from adrenergic medications that act indirectly, increasing the release of norepinephrine (NE) into the synapse (A) or inhibiting the reuptake of norepinephrine from the synapse (B).

In cardiac arrest and Stokes-Adams syndrome (heart block), they may be given as cardiac stimulants. In hypotension and shock, they may be given to increase blood pressure. In hemorrhagic or hypovolemic shock, the drugs are second-line agents that may be used if adequate fluid volume replacement does not restore sufficient blood pressure and circulation to maintain organ perfusion.

In bronchial asthma and other obstructive pulmonary diseases, the drugs are given as bronchodilators to relieve bronchoconstriction and bronchospasm. In upper respiratory infections, including the common cold and sinusitis, they may be given orally or applied topically to the nasal mucosa for decongestant effects.

In allergic disorders, the drugs are given for vasoconstricting or decongestant effects to relieve edema in the respiratory tract, skin, and other tissues. Thus, they may be used to treat allergic rhinitis, acute hypersensitivity (anaphylactoid reactions to drugs, animal serums, insect stings, and other allergens), serum sickness, urticaria, and angioneurotic edema. Other clinical uses include relaxation of uterine musculature and inhibition of uterine contractions in preterm labor. They also may be added to intraspinal and local anesthetics to prolong anesthesia. Topical uses include application to skin and mucous membranes for vasoconstriction and hemostatic effects, and to the eyes for vasoconstriction and mydriasis.

Contraindications to Use

Contraindications to using adrenergic drugs include cardiac dysrhythmias, angina pectoris, hypertension, hyperthyroidism, and cerebrovascular disease because stimulation of the sympathetic nervous system worsens these conditions. Adrenergic drugs are also contraindicated for persons with narrow-angle glaucoma because they result in mydriasis, closure of the filtration angle of the eye, and increased intraocular pressure. Hypersensitivity to an adrenergic drug or any component (some preparations contain sulfites, to which some people are allergic) is also a contraindication for their use. Adrenergic drugs are contraindicated with local anesthesia of distal areas with a single blood supply (e.g., fingers, toes, nose, ears) because of potential tissue damage and sloughing from vasoconstriction. They should not be given during the second stage of labor because they may delay progression. The drugs should be used with caution in clients with anxiety, insomnia, and psychiatric disorders because of their stimulant effects on the central nervous system (CNS) and in older adults because of their cardiac- and CNS-stimulating effects.

INDIVIDUAL ADRENERGIC DRUGS

Epinephrine (Adrenalin) is the prototype of adrenergic drugs. When it is given systemically, the effects may be therapeutic or adverse, depending on the reason for use and route of administration. Specific effects include:

1. Increased systolic blood pressure, due primarily to increased force of myocardial contraction and vasoconstriction in skin, mucous membranes, and kidneys
2. Vasodilation and increased blood flow to skeletal muscles, heart, and brain
3. Vasoconstriction in peripheral blood vessels. This allows shunting of blood to the heart and brain, with increased perfusion pressure in the coronary and cerebral