terbutaline (Brethaire, Brethine, Bricanyl); they are mainly used as needed. A long-acting agent, such as formoterol (Foradil) or salmeterol (Serevent), is used to control asthma.

Additionally, epinephrine (Adrenalin) is given as a subcutaneous injection in episodes of severe dyspnea associated with asthma. This acts as a bronchodilator and opens up the airways when other drugs do not create the desired response in an emergency situation. Other forms are found in multidose inhalers (MDIs) as a part of a combination of drugs to help with milder asthma attacks.

Decongestants

Decongestants cause the blood vessels in the nasal mucous membranes to constrict, thus reducing nasal passage drainage. They are available as nasal sprays and oral medications that are combined with different medications to treat cold and allergy symptoms. The main decongestant medications include phenylephrine (Dimetapp, Neo-Synephrine, PediaCare, Sudafed PE Quick Dissolve, Triaminic) and pseudoephedrine (Chlor-Trimeton, Contac Cold, Drixoral, Triaminic). Use of the topical form provides immediate relief of nasal mucosal swelling and congestion. These medications must be used on a short-term basis only, to avoid rebound congestion problems. They should never be given to children younger than 2 years old. In addition, because many of these medications are mixed with antipyretics and analgesics in cold and allergy remedies, dosages of medications such as acetaminophen and ibuprofen need to be monitored closely, to avoid overdose situations.

Glucocorticoids

Glucocorticoids suppress the immune system, which means inflammation is decreased. When the risk of asthma exacerbation increases (e.g., pollen counts are high), medications such as beclomethasone (Vanceril, Beclovent), budesonide (Pulmicort), flunisolide (Aerobid), fluticasone (Flovent), mometasone furoate (Asmanex), and triamcinolone (Azmacort) are usually taken daily in an oral or inhaled form as prophylaxis, but they are not used for acute episodes. To treat acute asthma episodes or other respiratory illnesses such as croup, short periods of oral steroids such as dexamethasone sodium phosphate (Decadron, Dexone), prednisone (Deltasone, Orasone, Prednicot), prednisolone (Orapred), and methylprednisolone (Medrol) may be prescribed in an oral form. In severe acute episodes, medications such as methylprednisolone (Solu-Medrol) may be used in an intravenous form in much higher doses, to dilate the airways and allow respirations to ease.

As discussed previously (see Chapter 17), glucocorticoids should be taken only in the short term. If taken for more than 10 days, oral glucocorticoids may have severe adverse effects resulting from immune system suppression. Medications in this class should be taken at the lowest effective dose for the least amount of time as possible.

Mucolytics

Mucolytics liquefy very thick lung secretions so the secretions can be excreted through coughing. These drugs do this by changing the composition of the mucus. Combined with expectorants, mucolytic agents help remove irritating substances from the lungs. Acetylcysteine (Mucomyst) is an example of a mucolytic. This type of drug is most commonly used as an aerosol treatment in patients with cystic fibrosis. This genetic disease causes the respiratory secretions to be extremely thick and difficult to cough up. With frequent daily mucolytics as part of their respiratory care, these patients are able to remove the secretions through coughing and thus decrease the occurrence of lung infections.

Oxygen

O_2 is used as therapy for low oxygenation, or **hypoxia.** Long-term use includes management of COPD; acute use is needed to treat dyspnea and carbon monoxide poisoning. O_2 can be delivered by nasal cannula, mask, endotracheal tube, hood, or tent.

O_2 is considered a drug, and there must be an order to administer it. It is important not to give more O_2 than ordered. For instance, patients with COPD tend to retain CO_2. This leads to higher than normal levels of CO_2 and lower than normal levels of O_2 in the blood (Fig. 18-3). Normally, the body reacts to higher levels of CO_2 by prompting the lungs to breathe more deeply and rapidly to exhale the excess CO_2. In patients with COPD, however, the body has adapted to the long-term higher levels of CO_2, so these patients have lowered O_2 levels as the trigger to breathe. Giving a patient with COPD more O_2