



## NONSTEROIDAL MEDICATIONS FOR ASTHMA MANAGEMENT

By Doug Gardenhire MS, RRT-NPS

In the last several issues of FOCUS, inflammation of the airway has been discussed in regard to the use of corticosteroids. This month, we will present the nonsteroidal drug group, which includes mast cell stabilizers, antileukotrienes and monoclonal antibodies. Here, we will discuss using nonsteroidal agents as an alternative to the use of corticosteroids or as additional agents to reduce the use of corticosteroids.

**The general indication for clinical use of nonsteroidal agents is prophylactic management of asthma**

The indication for clinical use of nonsteroidal agents is prophylactic management of asthma. These agents are recommended as alternatives to inhaled corticosteroids. Nonsteroidal agents may be recommended as alternatives for young infants due to their favorable safety profiles. Antileukotrienes and monoclonal

antibodies can be used to decrease the use of corticosteroids.

### **Mast Cell-stabilizing Agents**

*Cromolyn sodium* - Cromolyn sodium, also known as Intal, is an agent used as a prophylactic in the treatment of asthma. Although it may not be utilized as often in clinical practice, it is an alternative in the treatment of asthma. The anti-inflammatory, mast cell-stabilizing effect of cromolyn has led to uses other than asthma prophylaxis, including use in allergic rhinitis formulated as a nasal solution. Orally, it has been used to treat mastocytosis, diarrhea, abdominal pain, headaches, nausea and itching. There are also uses for the agent that are not linked to its anti-inflammatory effect.

Researchers have reported that cromolyn sodium provides protection against the cough often seen as a side effect with use of angiotensin-converting enzyme (ACE) inhibitors. Cromolyn sodium significantly improved cough scores in 90 percent of the patients studied. Cough was not completely suppressed in any of the patients. Cromolyn was observed to cause a striking decrease in sickle cell percentage in nine African children with severe sickle cell disease. Improvement was seen within 24 hours after administration of the single dose. The reduction is hypothesized to be due to the blocking of calcium-activated potassium channels that play a major part in water loss and erythrocyte dehydration.

The liquid ampoule or vial contains 20 mg in 2 mL of aqueous solution ( percent strength). This solution can be nebulized in any

small reservoir device powered by compressed air that will produce suitably small particles of 3  $\mu\text{m}$  to 5  $\mu\text{m}$ . Additional diluent will be needed for most nebulizers to function well. The metered dose inhaler is the most easily carried device and employs lower doses than the nebulized solution, 800 mcg/actuation.

Cromolyn is available as a 4-percent solution for treatment of seasonal and perennial allergic rhinitis. As with the inhaled solution, protection requires prior administration, although the drug does not need to be taken outside of seasonal exposure to allergens. The solution is delivered by means of a metered pump spray device.

*Nedocromil Sodium* - Nedocromil is marketed as Tilade in an MDI formulation. Nedocromil is considered a second-generation mast cell-stabilizing agent and is a cromolyn-like drug in its action and clinical use. As with cromolyn sodium, nedocromil sodium is indicated as prophylactic therapy in the management of asthma. The drug is a controller, not a reliever, has no bronchodilator properties, and is not indicated for use in the reversal of acute bronchospasm.

Nedocromil is available as an MDI, with 1.75 mg/actuation. The recommended dosage by MDI for maintenance therapy in asthma is two inhalations four times a day.

### **Antileukotriene Agents**

The name leukotriene is based on the fact that these molecules were originally isolated from leukocytes, and the carbon backbone has three double bonds in series, termed a triene. Two of these agents (zafirlukast and montelukast) attach to and block the receptor for leukotrienes, and a third agent (zileuton) inhibits the synthesis of leukotrienes.

*Zileuton* - Zileuton, also known as Zylflo CR, extended release, is an orally active inhibitor of 5-LO. This drug is indicated for the prophylaxis and chronic treatment of asthma and is approved for use in adults and children 12 years of age or older. It is considered as a controller agent rather than a reliever and has no indication for use in an acute asthma episode. Zileuton is available in a single-tablet strength of 600 mg. The recommended dosage for asthma is two 600-mg tablets, twice daily, for a total daily. Zileuton is taken at meals and at bedtime.

Hepatic transaminase enzymes should be measured and evaluated before initiation of treatment, once a month for the

All 43 of our distance learning sleep courses have been approved by the American Association of Sleep Technologists (AAST) Continuing Education Credit (CEC) Review Committee. (AAST CEC Program Number 758-782.)



## 160 courses and growing Over 500 contact hours

*One stop shopping for continuing education and career advancement exclusively for healthcare professionals*

**Courses online, by email or delivered right to your door in:**

- Respiratory
- Sleep Studies
- Home Care
- JCAHO Recommended Topics
- Nursing
- General Healthcare
- OSHA Required
- Diversity Issues

**Complete Your Continuing Education Requirements Anytime, Anywhere  
- The Common Sense Approach to Learning -**

**CIRCLE READER CARD # 34**

first three months, and every two to three months thereafter for the first year, with periodic monitoring for longer term therapy. If clinical signs of liver injury (right upper quadrant pain, nausea, fatigue, lethargy, pruritus, jaundice or flu-like symptoms) develop, the drug should be discontinued.

**Zafirlukast** - Zafirlukast, also known as Accolate, is a synthetic asthma prophylactic agent. It is indicated for the prophylaxis and chronic treatment of asthma and has been approved for use in those 5 years of age or older. This drug inhibits asthma reactions induced by exercise, cold air, allergen and aspirin. Zafirlukast is taken as an oral tablet, 10 mg, twice a day for children 5 to 11 years of age, and 20 mg, twice daily in adults and children 12 years and older. Food reduces the bioavailability of the drug, and it should be taken at least 1 hour before or 2 hours after eating.

**Montelukast** - Montelukast, or Singulair, is an orally active leukotriene receptor antagonist. It is indicated for the prophylaxis and chronic treatment of asthma (a controller) and has no bronchodilating effect for use in acute asthma treatment. Montelukast is also approved for allergic rhinitis. Montelukast is the only one of the three currently available antileukotriene agents that is approved for use in children as young as 6 month of age.

Montelukast has been shown to have clinical efficacy in treating mild to moderate asthma and exercise-induced bronchoconstriction. Montelukast is available as a 10-mg tablet, as 4- and 5-mg chewable cherry-flavored tablets, and as a 4-mg packet of granules. Dosing is as follows:

- Adults and adolescents  $\geq$  15 years: One 10-mg tablet daily, taken daily
- Pediatric patients 6 to 14 years: One 5-mg chewable tablet daily, taken daily

- Pediatric patients 2 to 5 years: One 4-mg chewable tablet daily, or one 4-mg packet of oral granules daily
- Pediatric patients 12 months–5 years: One 4-mg packet of oral granules taken every evening
- Pediatric patients 6 months–5 years: One 4-mg packet of oral granules taken daily for allergic rhinitis

The drug can be taken with or without meals. Bioavailability when taken orally is not altered by a standard meal. The oral granules can be directly poured in the mouth of the child or can be mixed with liquid or soft food. Baby formula, breast milk, applesauce, ice cream, and soft foods, such as carrots and rice, were used in studies. The manufacturer suggests only these should be used.

### **Monoclonal Antibodies**

Omalizumab, also known by the trade name Xolair, is a subcutaneously injected monoclonal antibody. This drug is indicated for the treatment of moderate to severe asthma in adults and adolescents 12 years of age and older that have a positive skin test or in vitro reactivity to a perennial aeroallergen. Xolair is listed in the NAEPP III report as a viable option in treating uncontrolled asthma.

Omalizumab is available as a powder that must be reconstituted; after reconstitution it has a concentration of 150 mg/1.2 mL. Dosing occurs every two or four weeks and is dependent on the weight and serum IgE level of the patient.

*Douglas S. Gardenhire is a veteran therapist, author, educator and lecturer and the Director of Clinical Education in the Respiratory Care Program at Georgia State University.*