UNIVERSITY OF MARYLAND SPORTS MEDICINE
Asthma Medication Metered Dose Inhaler (MDI)
Policies and Procedures

Asthma Introduction

Asthma is chronic inflammation of the airways leading to bronchospasm. In 50-85% of asthmatics, exercise will exacerbate asthma symptoms. Exercise-induced bronchospasm (EIB) usually occurs during or minutes after vigorous activity, reaches its peak in 5-10 minutes after stopping activity, and usually resolves in 20-30 minutes.

Asthma Medications

Depending on the severity of asthma, medications can be taken on an as-needed basis (prn) or regularly to prevent or decrease breathing difficulty. Most of the medications fall into two major groups:

- quick relief medications; and
- long-term control medications.

Quick Relief Medications-

Quick relief medications are used to treat asthma symptoms or an asthma episode. The most common quick relief medications are the short-acting beta-agonists that relieve asthma symptoms by relaxing the smooth muscles around the airways. Common beta-agonists include Proventil and Ventolin (albuterol), Maxair (pirbuterol), and Alupent (metaproterenol). Atrovent (ipatroprium), an anticholinergic, is a quick relief medication that opens the airways by blocking reflexes through nerves that control the smooth muscle around the airways. Steroid pills and syrups, such as Deltasone (prednisone), Medrol (methylprednisolone), and Prelone or Pediapred (prednisolone) are very effective at reducing swelling and mucus production in the airways; however, these medications take 6-8 hours to take effect.

Long Term Medications-

Long-term control medications are used daily to maintain control of asthma and prevent asthma symptoms. Intal (cromolyn sodium) and Tilade (nedocromil) are long-term control medications which help prevent swelling in the airways. Inhaled steroids are also long-term control medications. In addition to preventing swelling, they also reduce swelling inside the airways and may decrease mucus production. Common inhaled steroids include Vanceril, Vanceril DS, Beclovent, and Beclovent DS (beclomethasone), Azmacort (triamcinolone), Aerobid (flunisolide), Flovent (fluticasone) and Pulmicort (budesonide). Leukotriene modifiers are medications that can help reduce daily symptoms. They may reduce swelling inside the airways and relax smooth muscles around the airways. Common leukotriene modifiers include Accolate (zafirlukast), Zyflo (zileuton) and Singulair (muntelukast). Another longterm control medication, Theophylline, relaxes the smooth muscle around the airways. Common theophyllines in oral form include Theo-Dur, Slo-Bid, Uniphyl and UniDur. Serevent (salmeterol), in inhaler form, is also a long-term control medication. As a long-acting betaantagonist, it opens the airways in the lungs by relaxing smooth muscle around the airways. There are combination salmeterol and cantrostrol inhaled medications (Advair) that are available.

Inhaled Medications

Inhaled medications are delivered directly to the airways, which is useful for lung disease. Aerosol devices for inhaled medications may include the metered-dose inhaler (MDI), MDI with spacer, breath activated MDI, dry powder inhaler or nebulizer. The most commonly used inhaled medications are delivered by the MDI, with or without the spacer. There are few side-effects because the medicine goes right to the lungs and not to other parts of the body. It is critical that the patient use the prescribed MDI correctly to get the full dosage and benefit from the medication. Unless the inhaler is used in the right manner much of the medicine may end up on the patient's tongue, the back of their throat, or in the air. Use of a spacer or holding chamber helps significantly with this problem and their use is strongly recommended. A spacer is a device that attaches to a MDI and holds the medication in its chamber long enough for the patient to inhale it in one or two slow deep breaths. This eliminates the possibility of inadequate medicine delivery from poor patient technique.

Using a Metered Dose Inhaler (MDI)-

University of Maryland Sports Medicine personnel may assist a student-athlete in the use of a prescribed MDI as follows:

1) Remove the cap from MDI and hold the inhaler upright
2) Shake the inhaler
3) Tilt patient head back slightly and have patient breathe out
4) Open mouth with inhaler 1-2 inches away (or mouth to spacer mouthpiece if spacer available)
5) Press down on the inhaler to release the medication as patient starts to breathe in slowly
6) Patient breathes in slowly for 3-5 seconds
7) Patient holds breath for 10 seconds to allow the medication to reach deeply into the lungs
8) Repeat puffs as prescribed; waiting 1 minute between puffs may permit the 2nd puff to go deeper into the lungs

If possible, Sports Medicine personnel should auscultate breath sounds and measure peak expiratory flow rate (PEFR) prior to and after MDI administration.

Emergency Care for Severe Asthma-

Patients involved in a life-threatening asthma exacerbation will experience a combination of the following: shortness of breath (>30 respirations/min.), mental status changes (anxious, confused, combative, drowsy), inability to speak in sentences, sweaty and unable to lie down. If the patient is not responding to or is unable to properly use their MDI, the University of Maryland Sports Medicine Staff should:

1) Call EMS and the Team Physician
2) Begin BLS protocol (ABCs and begin CPR if indicated)
3) Calculate pulse, respirations, and blood pressure
4) Maintain a patent airway
    a. Suction any secretions if available and the patient is unresponsive
    b. Administer oxygen therapy at *15 liters / minute* with a non-rebreather device if available
5) Administer epinephrine / Epi-pen *(refer to Epi-Pen Policies and Procedures)* if indicated
6) Continue with oxygen therapy (if available) and ongoing assessments
7) Transport patient to nearest medical facility

Training-

University of Maryland Sports Medicine personnel should complete a training session every calendar year including, but not limited to:

- Review of signs and symptoms;
- Review of emergency medical care procedures for asthma;
- Review of the proper use of a MDI with and without a spacer;

Approval-

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