



GUIDELINES FOR PEDIATRICIANS

Exercise-Induced Asthma

Issue 13

American Academy
of Pediatrics



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Exercise-induced asthma (EIA) is one of the most common medical conditions affecting individuals participating in physical activities. Exercise may be the only trigger of asthma symptoms in some patients. It occurs in 70% to 90% of patients with chronic asthma, and may be the only sign that persistent asthma is not adequately controlled. For most patients, EIA should not limit participation or success in vigorous activities.

Diagnosis

- EIA usually occurs during or minutes after vigorous activity, reaches its peak 5 to 10 minutes after stopping the activity, and usually resolves in another 20 to 30 minutes.
- EIA should be suspected in any young person complaining of cough, shortness of breath, chest pain or tightness, wheezing, or endurance problems during or shortly after vigorous exercise. More subtle signs include a perception of poor physical conditioning, fatigue, or a lack of interest in exercise (or in physical education classes at school).
- History can be used to help exclude cardiac disease, vocal cord dysfunction, or muscle disorders that could present with fatigue. Physical examination is frequently normal within 60 minutes of exercise. Chest radiography and laboratory work are generally not helpful.
- The most commonly used method of diagnosis is a combination of a suggestive history and an empiric challenge with a bronchodilator before exercise. Relief of symptoms after use of the bronchodilator helps confirm the diagnosis. Questioning for other symptoms between bouts of exercise should then be used to rule out undiagnosed chronic asthma.
- An exercise challenge can be used to establish the diagnosis. The test can be done in a laboratory setting or as an office-based test. The challenge should increase and maintain the baseline heart rate to 80% of maximum for 4 to 6 minutes. A 15% decrease in PEF (peak expiratory flow) or FEV₁ (measurements taken before and after exercise at 5-minute intervals for 20 to 30 minutes) is compatible with EIA.

Treatment: Nonpharmacologic

- 1) EIA is believed to be caused by cooling and drying of inspired air during exercise, so any intervention (wearing ski masks or scarves, moving practice indoors, etc) that warms or humidifies inspired air may be helpful.
- 2) The underlying pathology of EIA involves the release of inflammatory mediators from mast cells. After release, time is needed to restock those mediators. This time is referred to as the "refractory period." A vigorous warm-up for 15 minutes, to the point of mild wheezing, followed by a cooling down until asymptomatic, allows some athletes to enter this refractory period and resume vigorous exercise with minimal symptoms, although inhaled medications are usually still needed.

Treatment: Pharmacologic

- 1) First line: A short-acting, β_2 -agonist, used shortly before exercise, or as close to exercise as possible, may be helpful for 2 to 3 hours. This is the mainstay of treatment for EIA, and is often the only treatment needed. Long acting beta agonists are not indicated for acute exacerbations.
- 2) Mast-cell stabilizers: Cromolyn used shortly before exercise has shown a protective effect in some patients. Lack of adverse effects is an advantage, but positive effects are not seen in all patients.
- 3) Increase use of long-term control medications may be necessary if symptoms occur with usual activities or exercise. Long-term control with anti-inflammatory medications (ie, inhaled corticosteroids, leukotriene-inhibitors) can reduce airway responsiveness, and this is associated with a reduction in the frequency and severity of EIA.

Important: Competitive athletes must disclose the medication they use and adhere to standards set by the US Olympic Committee. A complete, easy-to-use list of prohibited and approved medications can be obtained from the US Olympic Committee's Drug Control hotline (1-800-233-0393).

Resource: National Asthma Education & Prevention Program (NAEPP)
www.nhlbi.nih.gov/guidelines/asthma/asthmafullrpt.pdf

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Asthma is very common, affecting up to 15% of all children. About 90% of children with a history of asthma will have exercise-induced asthma (EIA). With careful testing, EIA has been diagnosed in almost 10% of all Olympic athletes, many of whom didn't even realize they had the disease.

Knowledge about asthma is essential for understanding EIA. Picture the lungs as an upside-down tree, with the main airway in the neck (the trachea) being the trunk of the tree, and the tiny air sacs in the lungs as the leaves of the tree. Asthma is a "twig" problem, involving the airways deep in the lung. These airways have a thin lining (the same membrane that lines the nose and throat) and an outer layer of muscle to control their size. When the airway is irritated (or "triggered"), the muscles contract, and the lining swells and makes extra mucus. With mild airway narrowing, this causes cough and chest tightness; with more severe swelling, wheezing, cough, and respiratory distress develop.

Many things can trigger an attack in a child with asthma. Colds and cigarette smoke are the strongest triggers, but exercise is one of the most common. Within 5 to 10 minutes of starting vigorous exercise, cough and difficulty breathing develop and can last for the duration of the exercise and up to 60 minutes thereafter. Sometimes, an inability to perform as well as they feel they should is the only symptom children have. No one knows what causes EIA, but a combination of cooling and drying of the airway is suspected. Sports performed in cold and/or dry weather (cross-country skiing, running, cycling) are more likely to provoke an attack than swimming or indoor (climate-controlled) sports.

Parents and coaches should suspect EIA when a child complains of cough, difficulty breathing, chest tightness, or wheezing either during or after exercise. Close attention should be paid to the presence of cough or any chronic respiratory symptoms between bouts of exercise, because EIA is frequently a sign of undiagnosed chronic asthma, which would be treated differently.

Special laboratory testing (pulmonary function testing with an exercise challenge) can be done to confirm the presences of EIA, but most doctors simply use a trial of inhaled medication before exercise to make the diagnosis. If symptoms are controlled, medications can be continued. For individuals with asthma, increased use of long-term control medications may be necessary if symptoms occur with usual activities or exercise. Long-term control of EIA with anti-inflammatory medications (inhaled corticosteroids or leukotriene-inhibitors) can reduce the frequency and severity of EIA. ***For most patients, EIA should not limit participation or success in vigorous activities.***

Other points to consider:

- 1) Air that is cold and/or dry can trigger wheezing. In certain sports, a scarf or ski mask worn during exercise will help to warm and humidify air, alleviating symptoms. However, these are often not acceptable to athletes, except in certain sports (skiing, for example).
- 2) By warming up for 15 minutes (to the point of mild wheezing), followed by a cool down to normal breathing, many athletes can resume vigorous exercise for up to 2 more hours with minimal symptoms (refractory period). However, medications still need to be taken to control mild symptoms.
- 3) Competitive athletes must disclose the medication they use and adhere to standards set by the US Olympic Committee. A complete, easy-to-use list of prohibited and approved medications can be obtained from the US Olympic Committee's Drug Control hotline (1-800-233-0393).

Medications Used to Treat EIA – Acute Control (Consult your prescribing physician for exact dosage & usage)

Type of Medicine	How Given	Effects	Side Effects
Short Acting Beta ₂ agonists	By inhaler, frequently with a spacer, used shortly before exercise (or as close to exercise as possible)	Rapidly relieve bronchospasm, may be helpful for 2 to 3 hours	Tremors, nervousness, rapid heart beat
Mast cell stabilizers	By inhaler, 30 to 60 minutes before exercise	Act to decrease swelling and inflammation in the airway	Bad taste, cough, nausea, abdominal pain

Medications for Long Term Control (Consult your prescribing physician for exact dosage & usage)

Type of Medicine	How Given	Effects	Side Effects
Long Acting Beta Agonists (e.g. Salmeterol)	By inhaler, frequently with a spacer	NO RAPID ACTION – NOT USED TO TREAT ACUTE SYMPTOMS. May prevent EIA attacks for 10 to 12 hours	Tremors, nervousness, rapid heart beat
Inhaled corticosteroids	By inhaler, daily	No rapid action; work long-term to relieve inflammation	Sore throat, yeast infections in the mouth or esophagus
Leukotriene inhibitors	By tablet, once or twice a day	No rapid action; work long-term to relieve inflammation	May not work for all patients

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