EXERCISE-INDUCED ASTHMA

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Dominique Wilkins, Amy Van Dyken, Jerome "The Bus" Bettis, Dennis Rodman, and Jackie Joyner-Kersee are elite athletes who have competed and succeeded at the highest levels in their respective sports.

These phenomenal athletes share another common distinction; they all have exercise-induced asthma. In spite of the inherent challenges posed by their disease process, these athletes have been able to excel at an extremely high level by receiving proper training, supervision and medical management.

WHAT IS EXERCISE-INDUCED ASTHMA AND WHY DOES IT OCCUR?

Exercise-induced asthma is asthma that is triggered by vigorous and strenuous physical exertion. Approximately 80% of the 30 million Americans with asthma develop symptoms with exercise. Surprisingly, approximately 10 to 15% of athletes without true asthma develop symptoms with exercise. As such, many experts refer to the process as exercise-induced bronchospasm (narrowing of the airway).

Although the exact cause is unknown, the prevailing thought is that rapid changes in temperature and humidity cause the bands of smooth muscle that surround the tubes of the lung to constrict, a process known as bronchoconstriction. During normal breathing, inhaled air is warmed and humidified as it passes through the nasal passages. During exercise, people tend to breathe rapidly through their mouth, and the inhaled air tends to be cooler and drier when entering the lungs. In susceptible people, the rapid change in temperature and humidity results in a loss of heat and/or water from the surface of the lungs that leads to broncho-constriction and causes symptoms.

WHAT ARE THE SYMPTOMS OF EXERCISE-INDUCED ASTHMA?

The symptoms of exercise-induced asthma typically begin within 5 to 15 minutes of exercise and usually peak approximately 10 minutes after exercise is discontinued.

The symptoms include:

- Cough
- Wheeze
- Shortness of breath
- Chest tightness or pain
- Fatigue during exercise
- Poor exercise endurance
- Exercise avoidance (particularly in school-aged children)

Certain factors worsen or trigger exercise-induced asthma symptoms including cold air, dry air, high pollen counts, air pollution/smog, concurrent respiratory infections, and chemical exposure (such as chlorine in pool water).

WHAT ARE THE RISK FACTORS FOR EXERCISE-INDUCED ASTHMA?

Exercise-induced asthma can occur in persons of any age or fitness level. People who participate in cold weather aerobic sports are most likely to develop symptoms. In fact, elite athletes who compete in cold weather sports have the highest incidence of exercise -induced symptoms. As a group, cold weather Olympians share not only exceptional fitness levels, but a disproportionate tendency to wheeze with exercise. An estimated 1 in 6 Olympians who competed in the 2010 Winter Olympics in Vancouver possessed a formal diagnosis of asthma.

Risk factors for exercise-induced asthma include:

- Pre-existing diagnosis of asthma
- Exposure to pollen and pollution during exercise
- Smoking/exposure to second hand smoke
- Exposure to chemical triggers
- Participation in aerobic sports
- Exercising in cold, dry air
- Being a child (generally are more active than adults)

Conversely, exercise-induced symptoms are less common in anaerobic sports such as weight lifting and less aerobic warm weather sports like golf.

HOW IS EXERCISE-INDUCED ASTHMA DIAGNOSED?

The evaluation for exercise-induced asthma starts with a comprehensive history and physical examination. A number of other medical conditions including deconditioning (being out of shape), underlying heart disease, other lung disorders, allergic rhinitis and vocal cord dysfunction can mimic asthma. In order to fully investigate the exact issues, the clinician will ask a number of questions including:

What are the symptoms?

- When did the patient first notice symptoms?
- In addition to exercise, what other triggers elicit symptoms?
- What factors worsen symptoms?
- What factors improve symptoms?
- What medication does the patient take?
- Has patient ever been diagnosed with allergies or asthma?
- With what other medical conditions has the patient been diagnosed?
- Does a family history of asthma exist?

The physical examination will target the ears, eyes, nose, throat, chest, lungs, abdomen and extremities. Following the physical examination, testing is usually performed to assess lung function at baseline and following exercise. Several tests accurately measure lung functions including office spirometry, impulse oscillometry, formal pulmonary functions, and methacholine challenge. The most common test to evaluate exercise -induced asthma is an exercise challenge. During an exercise challenge, lung functions are measured before and after exercise. Following 6 to 8 minutes of vigorous exercise (running outside or on a treadmill), lung functions are repeated. Patients with exercise -induced asthma will develop a 15% or greater fall in a measure of lung function, the FEV1 (the volume of air exhaled in 1 sec) following exercise challenge. Following diagnosis, a treatment regimen is then prescribed.

WHAT ARE THE TREATMENT OPTIONS FOR EXERCISE-INDUCED ASTHMA?

The goal of therapy is to prevent the symptoms of exercise-induced asthma and to enable an athlete's participation in sport at all intensity levels. Athletes should not be prevented from participation based exclusively upon a diagnosis of asthma. The management plan includes both non-pharmacologic and pharmacologic therapies.

Non-pharmacologic measures include:

- **Increasing physical conditioning**
- **Warming up for 10 minutes prior to strenuous exercise**
- **Avoiding aeroallergens and pollutants while exercising**
- **Breathing through nasal passageways during exercise**
- **Keeping mouth and nose covered during exercise in cold weather**
- **Cooling down gradually after strenuous exercise**

Fortunately, most patients with exercise-induced asthma can control symptoms by using 2 puffs of a reliever medication 15 to 30 minutes prior to exercise. The most popular therapy, medications known as short acting beta agonists, includes albuterol (Ventolin, ProAir, Proventil), levalbuterol (Xopenex), and pirbuterol (Maxair auto haler). These medications can prevent symptoms for up to four hours after administration. For patients who have symptoms that are not completely controlled by short acting beta agonists, daily controller medications are prescribed.

These medications are taken on a daily basis and include:

- Inhaled corticosteroids (Flovent, Asmanex, QVar, Pulmicort, Alvesco)
- Leukotriene modifiers (Singulair, Accolate, Zyflo)*
- Long acting beta agonists (Serevent, Foradil)
- Combination inhalers (Advair, Symbicort, Dulera)

Because all medications have side effects in addition to their benefits, the therapy should be tailored to the individual needs of the athlete. The goal of therapy is to maximize physical performance while minimizing side effects.

CONCLUSION

Exercise induced asthma is an important condition that afflicts approximately 15% of the population. Athletes of all ages and fitness levels are susceptible, from the professional NBA superstar to the weekend warrior. With proper diagnosis and therapy, these athletes can perform at their highest level without activity limitations or side effects from medications.

* Long acting beta agonists should always be taken only in combination with an inhaled corticosteroid

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