EXERCISE INDUCED ASTHMA TESTING AND SPIROMETRY

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DEFINITION OF ASTHMA

Asthma is a chronic inflammatory respiratory disorder characterized by airflow limitation in response to a variety of stimuli, it is usually reversible either spontaneously or with treatment

TRIGGERS OF ASTHMA

There are 7 major triggers of Asthma:

1. Allergens
2. Infections
3. Exercise
4. Pungent smelling substances
5. Emotions – psychomatic
6. Drugs
7. Extreme temperatures

EPIDEMIOLOGY OF ASTHMA

- The worldwide incidence of Asthma varies between 10% – 15% of the adult population
- For children the incidence is higher, up to 30%
- Certain countries have exceptionally high incidence of Asthma including Barbados, where the incidence is up to 24% in the adult population.
- Barbados is the most easterly of the Caribbean Islands and the effect of the Sahara dust plays a major role

- Exercise-induced asthma is a narrowing of the airways in the lungs that is triggered by strenuous exercise.

- It causes shortness of breath, wheezing, coughing and other symptoms during or after exercise

EXERCISE-INDUCED ASTHMA

- The preferred term for this condition is exercise-induced bronchoconstriction.

- This term is more accurate because the exercise induces narrowing of airways (bronchoconstriction), but is not the root cause of asthma.

- Among people with asthma, exercise is likely just one of several factors that can induce breathing difficulties

EXERCISE-INDUCED ASTHMA CONT'D

Signs and symptoms of exercise-induced bronchoconstriction may begin during or a few minutes after exercise , and may persist for 30 minutes or longer if left untreated:

- Coughing
- Wheezing
- Shortness of breath
- Chest tightness or pain
- Fatigue during exercise
- Poorer than expected athletic performance
- Feeling out of shape even when you're in good physical shape
- Avoidance of activity (a sign primarily among young children)

CAUSES

People who experience exercise-induced bronchoconstriction, strenuous exercise sets in motion molecular events that result in inflammation and the production of mucus in the airways

CAUSES CONT'D

Factors that may increase the risk of the condition or act as triggers include:

- Cold air
- Dry air
- Air pollution
- High pollen counts
- Chlorine in swimming pools
- Respiratory infections or other lung disease
- Activities with extended periods of deep breathing, such as long-distance running, swimming or soccer

SPIROMETRY

- This is the Gold Standard for the diagnosis of Asthma. Important indices FeV1, PeF and FeF 25-75%
- The diagnosis of Asthma is made by reversibility of obstructive airway disease on Spirometry by an increase of at least 12% post bronchodilation with SABA such as Ventolin
- The most reliable is the change in FeV1
- Spirometry is useful in determining the course and control of the disease, and usually is repeated yearly to monitor asthma control

EXERCISE CHALLENGE TESTS

You will run on a treadmill or use other stationary exercise equipment that increases your breathing rate.

The exercise needs to be intense enough to trigger symptoms you have experienced. If needed, you might be asked to perform a real-life exercise challenge, such as climbing stairs

The FeV, must decline by 20% for a positive challenge test

ALTERNATE CHALLENGE TESTS cont'd

Again, Spirometry tests before and after the challenge test provide information about changes in lung function. These challenge tests include the following:

- Methacholine challenge
- Eucapnic voluntary hyperventilation (EVH) challenge
  Combination of inhaled gas oxygen, carbon dioxide and nitrogen
- Mannitol Challenge – dried mannitol powder.

A drop in FeV by 20% with the agent at a particular dose is a positive test, and is called the provocation dose

RULING OUT OTHER CONDITIONS

Other conditions with symptoms similar to those of exercise-induced bronchoconstriction:

- Vocal cord dysfunction
- Allergies
- Lung disease
- Irregular heartbeats (arrhythmia) or other heart conditions
- Gastroesophageal reflux disease

DRUGS

Short-acting beta agonist (SABAs) are inhaled drugs that help open airways. These are the most commonly used and generally most effective pre-exercise medications

Long-term control medications

- Long-term control drug in addition to dialy use of a pre-exercise medication , to manage underlying chronic asthma or to manage symptoms when pre-exercise treatment alone isn't effective.

- These medications, usually taken daily, include the following:
  - Inhaled Corticosteroids
  - Combination inhalers
  - Leukotriene modifiers

LIFESTYLE

Steps you can take to prevent or minimize symptoms of exercise-induced bronchoconstriction include the following:

- Do a 10-minute warm-up that varies in intensity before you begin regular exercise
- Breathe through your nose to warm and humidify the air before it enters your lungs
- Wear a face mask or scarf when exercising, especially in cold, dry weather

LIFESTYLE CONT'D

- If you have allergies, avoid triggers. For example, don't exercise outside when pollen counts are high
- Avoid strenuous exercise if you have a cold or other respiratory infection
- Exercise regularly to stay in shape and promote good respiratory health

ALTERNATIVE MEDICATION

1. A low salt diet

2. Fatty fish such as salmon, and tuna

3. Fish oil supplement

3. Fruits and vegetables rich in Vitamin C orange, broccoli, leafy vegetables

4. Vitamin C supplements

Goals Of Asthma Management

- The goals for successful management of asthma are to:
  - Achieve and maintain control of symptoms
  - Maintain normal activity levels, including exercise
  - Maintain pulmonary function as close to normal as possible
  - Prevent asthma exacerbations
  - Avoid adverse effects from asthma medications
  - Prevent asthma mortality

Exercise Induced Asthma Testing and Spirometry

Mortality in asthma is the result of severe airflow limitation resulting in suffocation of the patient

It only takes 4 minutes of lack of Oxygen to cause death in humans at normal temperature