



## 1. Medical Condition

### **ASTHMA**

#### **Introduction**

Asthma is a syndrome of the respiratory airways typified by recurrent episodic symptoms. These may include variable airflow obstruction that is reversible, either spontaneously or with treatment, the presence of airway hyper-reactivity and chronic airway inflammation. These features represent increasing problems for the active competitive athlete in whom exercise-induced asthma (EIA) or exercise-induced bronchoconstriction (EIB) may present. A broad comprehensive definition of these conditions is currently favored. Exercise induced asthma (EIA) infers symptoms provoked directly by exercise, whereas exercise induced bronchoconstriction (EIB) represents reduced lung function after provocation by an exercise test or occurring during self-induced exercise even in the absence of a previous asthma diagnosis. It should also be noted that hyperventilation alone may induce bronchospasm.

## 2. Diagnosis

### **A. Medical history**

- A history of asthma may include a family history of allergies, hay fever or eczema. Individuals may also describe a personal history of childhood respiratory problems, rhinitis, allergic conjunctivitis or dermatitis. In these cases, the development of asthma may be part of an atopic predisposition, however asthma might also develop in otherwise healthy individuals. There may also be a history of persistent cough following a respiratory tract infection, frequent "colds" without fever, or specific seasonal influences and intermittent nocturnal symptoms. Alternatively, symptoms may be entirely activity induced.
- In sport, examples of potential provocation include variations in ambient temperature, endurance training and exposure to swimming pool chemicals.

## B. Diagnostic criteria

The diagnosis of asthma demands the synthesis of medical history with respiratory symptoms, physical examination and appropriate laboratory or field tests.

Airway hyper-responsiveness is a continuum and the minimum criteria for the diagnosis of asthma are not known. However, recurrent symptoms of bronchial obstruction such as chest tightness, wheeze and cough provoked by hyperventilation, exercise or other stimuli, are a diagnostic prerequisite for asthma or EIA in athletes. Laboratory tests alone are not sufficient for the diagnosis.

The symptoms of asthma should be verified by the evidence of the reversibility of airflow obstruction and interpretation of the test results by a respiratory physician may be required in difficult cases.

**A physical examination** is important to:

1. Confirm a diagnosis and exclude mimics such as hyperventilation syndrome, vocal cord adduction, exercise induced laryngomalacia or heart failure.
2. Assess the severity of airflow obstruction at rest.
3. Identify factors that might place a patient at risk of poor outcome.
4. Identify co-morbidities that may complicate management, (eg sinusitis, gastroesophageal reflux).

### **Laboratory Testing**

The most objective indicator of asthma severity is the measurement of airflow obstruction by spirometry. The PEF and the FEV<sub>1</sub> yield comparable results although FEV<sub>1</sub> is clearly a more sensitive measure of airflow. Consequently, the latter is the best reference.

Specific cut-off points for spirometry are recommended in the accompanying references. Many elite athletes have levels of lung function outside normal predicted values and therefore normal lung function could be a sign of airway obstruction. A carefully kept peak flow diary should be established to allow the clinician to chart a patient over time.

Spirometry in an asthmatic patient will demonstrate a typical pattern of obstructive airway disease (reduced FEV<sub>1</sub>/FVC ratio) with a diminished expiratory flow that improves with bronchodilator

## *Medical Information to Support the Decisions of TUECs Asthma*

therapy. However, the absence of a bronchodilator response does not exclude a diagnosis of asthma. A 12% increase in FEV1 following beta-2 agonist use is considered to be the standard diagnostic test for the reversibility of bronchospasm.

A number of bronchial provocation tests are currently available to evaluate airway responsiveness in patients with asthma or atypical chest symptoms of indeterminate etiology.

Bronchial provocation may be performed by the use of specific agents, or by exercise challenge in laboratory or field settings or by tests of hyperventilation. A test specific decrease in FEV1 following the administration of a provocative agent is considered to be diagnostic and comparable to the stimulus of exercise.

These tests may provoke significant respiratory symptoms and should only take place in a supervised setting with appropriate medical support. To accurately evaluate these tests, patients should stop all bronchodilator or anti-inflammatory therapy prior to the provocation test. For short acting Beta-2-agonists this will be for 8 hours and for long acting Beta-2- agonists and inhaled Glucocorticosteroids (GCS) for 24 hours prior to testing. Further reference should be made to the European Respiratory Society (ERS) standards.

### **Bronchial Provocation Tests**

*It is not within the scope of this document to provide the full details of each bronchial provocation test. These should be undertaken in collaboration with a respiratory physician in an established respiratory laboratory.*

Provocation may be by inhalation of cold, dry air, inhalation of aerosols or exercise. Common provocation tests include

- Methacholine Aerosol Challenge (20% fall of FEV1-PC20<4mg/ml, [steroid naïve])
- Mannitol Inhalation (15% fall of FEV1)
- The Eucapnic Voluntary Hyperpnea (EVH) test (10% fall of FEV1)
- Hypertonic Saline Aerosol challenge (15% fall of FEV1)
- Exercise Challenge Tests (field or laboratory) (10% fall of FEV1)

A positive response to any one of the above provocation tests is required to confirm bronchial hyperresponsiveness. If not, a review of the medical file will be required. The medical file should be updated and relevant test results should not be older than three months at the time of application.

## *Medical Information to Support the Decisions of TUECs Asthma*

### C. Relevant medical information

Additional helpful information includes the age of onset of symptoms, the response to alternative medical treatment, details of provocative or "trigger" factors, a past history of allergic disorder and the results of any dermatologic tests of hypersensitivity.

In accordance with the International TUE Standard valid from 1.1.2009 and with current best medical practice, the medical file required to support an application for a TUE in the case of an athlete with asthma or any of its clinical variants must include the following details:

- 1) a complete medical history as described
  - 2) a comprehensive report of the clinical examination with specific focus on the respiratory system
  - 3) a report of spirometry with the measure of the Forced Expiratory Volume in 1 second (FEV1)
  - 4) if airway obstruction is present, the spirometry will be repeated after inhalation of a short acting Beta-2 agonist to demonstrate the reversibility of bronchoconstriction
  - 5) in the absence of reversible airway obstruction, a bronchial provocation test is required to establish the presence of airway hyperresponsiveness
  - 6) exact name, speciality, address (including telephone, e-mail, fax) of examining physician
- (see Annex 1 of International Standard for Therapeutic Use Exemptions, January 2009)

### 3. Medical best practice treatment

The mainstay of treatment for asthma is inhaled GCS with the use of Beta2 agonists for emergency or breakthrough symptoms only. It should be emphasized that the overuse of short and long acting bronchodilators (beta2agonists) has detrimental health effects.

#### A. Name of prohibited substances

- The use of all Beta-2 Agonists including their D- and L-isomers are prohibited in sport. Therefore the use of salbutamol, terbutaline, salmeterol and formoterol when administered by inhalation, now require a Therapeutic Use Exemption in accordance with the relevant section of the International Standard for TUE.
- In accordance with the above mentioned Standard, a declaration of use must be completed by the Athlete for inhaled glucocorticosteroids. Oral GCS require a TUE

*Medical Information to Support the Decisions of TUECs  
Asthma*

**B. Route**

Inhaled. Severe cases may require oral or intravenous GCS.

**C. Frequency**

The athlete should always be treated at the lowest medication level necessary to control all symptoms when undertaking exercise at a level consistent with competition effort.

**D. Recommended duration of treatment**

Lifetime, but with annual review by an appropriately qualified physician for asthma. In the case of EIB the duration will be symptom dependent.

**4. Other non-prohibited alternative treatments?**

1. Leukotriene receptor antagonists
2. Anticholinergics
3. Sodium Chromoglycate, (Chromones)
4. Theophyllines (Xanthines)

**5. Consequences to health if treatment is withheld**

- Chronic ill health
- Acute exacerbations of asthma
- Sudden death from "status asthmaticus"
- Underperformance in physical activity and competitive sport

## 6. Treatment monitoring

Due to the nature of "variable airways obstruction" ongoing monitoring should involve a diary with daily symptoms and a peak flow chart to assess the effect of treatment and the influence of exercise. In the same way the correct inhaler technique should be learned and monitored. The treatment should be modified or stopped if the diagnosis is revisited. Monitoring the use of acute emergency services and the need for courses of systemic corticosteroid therapy would also be helpful indicators of therapeutic control.

## 7. TUE validity and recommended review process

The validity of a TUE for an asthmatic athlete is 4 years with at least annual confirmation of the treatment regime by a respiratory physician or a physician experienced in treating asthma in athletes. After 4 years, repeated pulmonary function tests must meet the agreed diagnostic criteria.

## 8. Any appropriate cautionary matters

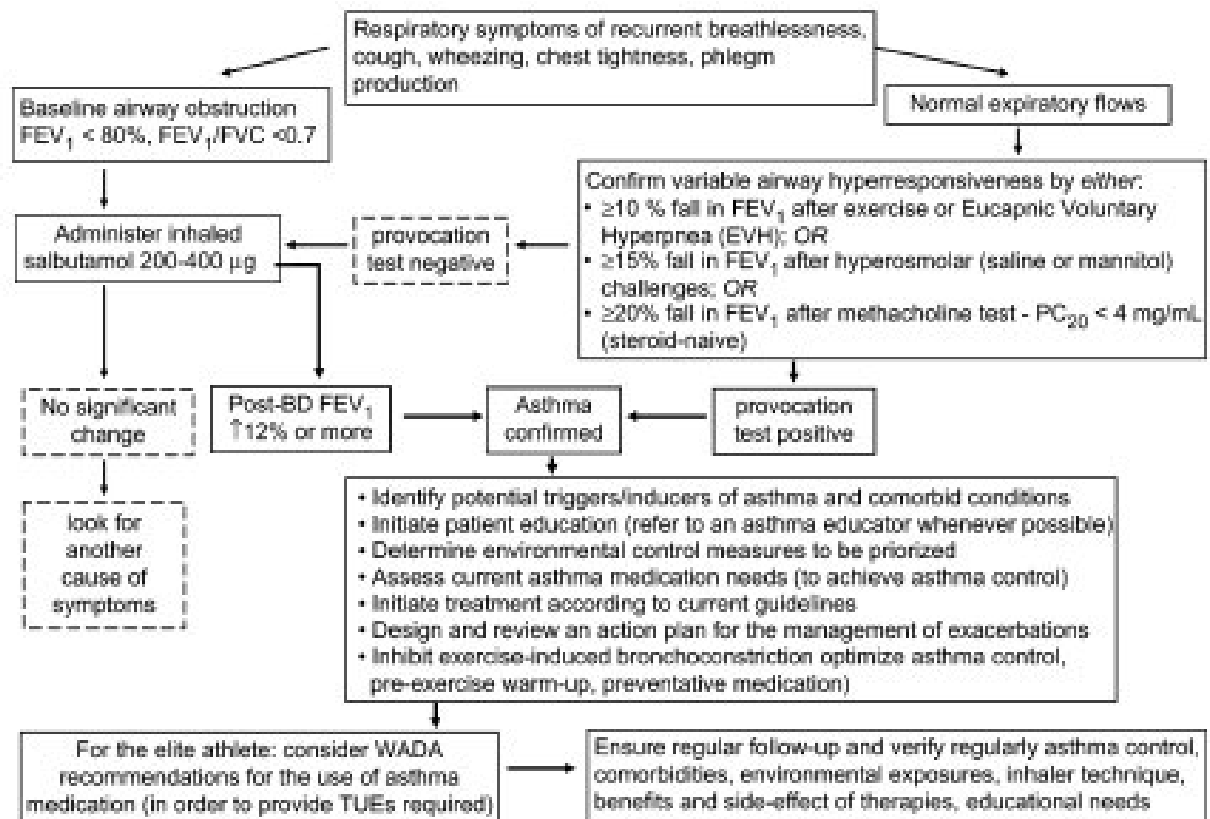
**Remember that all other Beta-2 Agonists and Glucocorticosteroids by systemic routes require a TUE.**

**It should be emphasized that other Beta-2-agonists than the listed 4 should be avoided.**

The athlete should not be exposed to any tests of bronchial provocation at the time of or immediately prior to a major sporting event, when their health may be significantly affected.

## Medical Information to Support the Decisions of TUECs Asthma

Figure: Asthma management for the athlete. BD, Bronchodilator; FVC, forced vital capacity.



Source: Fitch K et al. "Asthma and the elite athlete: Summary of the IOC Consensus Conference, Lausanne Switzerland, January 22-24, 2008" Journal Allergy & Clinical Immunology Volume 122, Number 2, August 2008, p. 257.

## 9. References

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