UNIT NO. 1

ASSESSMENT OF ASTHMA

Dr Alan Ng Wei Keong

PREVIEW

This unit covers the definition, diagnosis, assessment of asthma and the risk factors for developing asthma, for precipitating an exacerbation.

OBJECTIVES

At the end of this unit, the course participants should be able to describe the following:

1. Definition of asthma
2. Diagnosis of asthma
3. Assessment of severity in an asthmatic patient
4. Risk factors for asthma

1. What is asthma

Asthma is a chronic inflammatory disorder of the airways in which many cells and cellular elements play a role. The chronic inflammation causes an associated increase in airway hyperresponsiveness that leads to recurrent episodes of wheezing, breathlessness, chest tightness and coughing, particularly at night or in the early morning. These episodes are usually associated with widespread but variable airflow obstruction that is often reversible either spontaneously or with treatment.

Asthma is a common condition in the community and affects all ages. The prevalence of asthma has increased in the last 20 years, especially among children. Recognition is important so that patients can be treated and live a normal life with good symptom control, minimal exacerbations and maintenance of pulmonary function.

2. Diagnosis

History

The most common symptoms in asthma are wheezing, breathlessness, cough and chest tightness. Symptoms are typically episodic and variable; they worsen at night or in the early hours of the morning. In some patients, the symptoms can be persistent and unremitting.

Cough is often nocturnal and may disturb sleep, or on waking in the morning. Patients may complain of cough or wheezing after exercise or following exposure to allergens. There may be a positive family history of asthma or atopy. An occupational cause should be looked for if there is an association between occurrence of symptoms and workplace.

The diagnosis of asthma is obvious when there is a history of typical symptoms such as recurrent wheeze or cough at night, early morning, or with exercise. However, one should remember that not all wheezing is due to asthma. Alternative causes of wheezing should be considered in the very young and the elderly, particularly when it is of recent onset. These include foreign body aspiration, airway obstruction by tumour or lymph nodes and airway stenosis, chronic obstructive lung disease and left ventricular failure. In a young child, diagnosing asthma can be difficult as childhood respiratory tract illnesses occur commonly often presenting cough with or without wheeze.

Physical examination

Because of its episodic nature, patients may not have any clinical signs in between attacks. The main clinical finding on examination during an acute attack is wheezing on auscultation. Other features include tachypnoea, hyperinflation of the chest and difficulty in speaking in sentences.

Recognition of a severe attack

This is potentially life threatening and the patient is in need of urgent medical attention. The features include:

- Respiratory rate L 30/min
- Rising pulse rate or rate L 120/min
- Drowsiness, agitation or restlessness
- Cyanosis
- Pulsus paradoxus
- Rapid shallow breathing
- Inability to speak
- 'Silent lungs'
- PEF I 100 L/min

Lung function

Measurements of lung function are important in establishing a clear diagnosis of asthma. It is also a useful objective assessment of the disease state as patients may underestimate or not recognize the severity of their symptoms.

The most commonly used tests are spirometry (FEV_1: forced expiratory volume in 1 sec; FVC : forced vital capacity) and measurement of peak expiratory flow (PEF). They are used to:

- demonstrate airflow limitation
- demonstrate reversibility of airflow limitation after inhalation of bronchodilator (improvement of PEF by 15% and FEV_1 by 12%)
- document variability (diurnal variation L 20%)
- demonstrate hyperresponsiveness by challenge testing (methacholine, exercise)

3. Severity assessment

The severity of asthma can be classified by an assessment of symptoms (frequency, effect on physical activity, nocturnal symptoms), the need for beta2 agonist to treat symptoms, and lung function. The classification is based on severity and is used in decisions concerning management of the patient.

ALAN NG WEI KEONG, Head of Department, Respiratory Medicine, Tan Tock Seng Hospital

Classification of asthma severity by clinical features before treatment

Severity	Symptoms	Nocturnal symptoms	FEV_1 or PEF
Intermittent	Symptoms I once a week Brief exacerbations	Less than twice a month	80% predicted Variability I 20%
Mild persistent	L once a week but I once a day	L twice a month	80% predicted Variability 20% - 30%
Moderate persistent	Daily Attacks affect activity	L once a week	60% - 80% predicted Variability L 30%
Severe persistent	Continuous Limited physical activity	Frequent	60% predicted Variability L 30%

Management of asthma follows a stepwise approach according to the level of severity based on the classification.

- Intermittent asthma
- Mild persistent asthma
- Moderate persistent asthma
- Severe persistent asthma

4. Risk factors

The risk factors in asthma can be classified as a) those that predispose an individual to developing asthma, and b) those that can precipitate an exacerbation.

Predispose to development of asthma

The host factors that increase the risk of developing asthma include genetic predisposition, atopy, airway hyperresponsiveness, gender and race. Exposure to factors in the environment influence the susceptibility to developing asthma in these predisposed individuals. Examples are exposure to airborne allergens and occupational sensitizers, respiratory infections, diet, tobacco smoke, air pollution and socioeconomic status.

Precipitate an exacerbation

Triggers are risk factors that precipitate asthma exacerbations. If a trigger can be identified in a patient, it would be possible to prevent or minimize asthma attacks by avoidance. Many of these triggers may be inhaled allergens from the environment. Triggers vary from person to person, and from time to time.

A detailed history analyzing the events preceding an attack and various exposures and the environment, recognition of a recurring pattern and recording of a diary may help identify the trigger.

Trigger factors

- Allergens
  - Indoor (house dust mites, cat, dog & cockroach allergen, fungi)
  - Outdoor (pollens, fungi)
- Tobacco smoke
- Air pollutants
- Respiratory infections (viral)
- Exercise
- Hyperventilation
- Weather changes
- Sulphur dioxide
- Foods, additives and drugs

REFERENCES

1. National Institutes of Health, National Heart, Lung, and Blood Institute. Global strategy for asthma management and prevention (2002 report). Available on www.ginasthma.com.
2. Fitzgerald JM, Ernst P, Boulet LP, O'Byrne PM (eds). Evidence based asthma management. BC: Decker; Hamilton. 2001.
3. Barnes PJ, Grunstein MM, Leff AR, Woolcock AJ (eds). Asthma. Lippincott-Raven Publishers, Philadelphia. 1997.

Learning Points:

- Asthma is a common respiratory problem affecting all age groups. It is characterized by chronic inflammation in the airways, resulting in bronchial hyperresponsiveness and reversible airflow limitation.
- A firm diagnosis, based on clinical data and supported by lung function assessment, should be established in all cases.
- All patients should be classified according to severity to facilitate a stepwise approach to management.