



## REVIEW ARTICLE

# TOWARDS A DEEP UNDERSTANDING OF BRONCHIAL ASTHMA

By

*Tarek Safwat*

Chest Department, Ain Shams University

Asthma is a major cause of chronic morbidity and mortality with an estimated 300 million individuals affected worldwide and there is evidence that its prevalence has increased considerably over the past 20 years, especially in children.

*The Global Initiative for Asthma* was created to increase awareness of asthma among health professionals, public health authorities, and the general public, and to improve prevention and management through a concerted worldwide effort.

*Bronchial Asthma according to the GINA guidelines final update November 2006 is clearly defined as:* A chronic inflammatory disorder of the airways in which many cells and cellular elements play a role. The chronic inflammation is associated with 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 within the lung that is often

reversible either spontaneously or with treatment.

Clinical manifestations of asthma can be controlled with appropriate treatment. When asthma is controlled, there should be no more than occasional flare-ups and severe exacerbations should be rare.

*A number of factors that influence a person's risk of developing asthma have been identified:* Common risk factors for asthma symptoms include exposure to allergens (such as those from house dust mites, animals with fur, cockroaches, pollens, and molds), occupational irritants, tobacco smoke, respiratory (viral) infections, exercise, strong emotional expressions, chemical irritants, and drugs (such as aspirin and beta blockers).

*As regards to diagnosing Bronchial Asthma:* Asthma can often be diagnosed on the basis of a patient's symptoms and medical history.

Presence of any of these signs and symptoms

should increase the suspicion of asthma:

- Wheezing - especially in children "A normal chest examination does not exclude asthma"
- History of any of the following:
  - Cough, worse particularly at night
  - Recurrent wheeze
  - Recurrent difficult breathing
  - Recurrent chest tightness
- Symptoms occur or worsen at night, awakening the patient.
- Symptoms occur or worsen in a seasonal pattern.
- The patient also has eczema, hay fever, or a family history of asthma or atopic diseases.
- **Symptoms occur or worsen in the presence of:**
  - Animals with fur
  - Aerosol chemicals
  - Changes in temperature
  - Domestic dust mites
  - Drugs (aspirin, beta blockers)
  - Exercise
  - Pollen
  - Respiratory (viral) infections
  - Smoke
  - Strong emotional expression
- Symptoms respond to anti-asthma therapy.
- Patient's colds "go to the chest" or take more than 10 days to clear up.

Measurements of lung function by spirometer or Peak expiratory flow (PEF) measurements provide an assessment of the severity, reversibility, and variability of airflow limitation, and help confirm the diagnosis of asthma.

**Regarding the spirometer measures:** An increase in FEV1 of  $\geq 12\%$  (or  $\geq 200$  ml) after administration of a bronchodilator indicates reversible airflow limitation consistent with asthma. (However, most asthma patients will not exhibit reversibility at each assessment, and repeated testing is advised).

**While the Peak expiratory flow (PEF)**

**measurements, can be an important aid in both diagnosis and monitoring of asthma:**

- PEF measurements are ideally compared to the patient's own previous best measurements using his/her own peak flow meter.
- An improvement of 60 L/min (or  $\geq 20\%$  of the pre-bronchodilator PEF) after inhalation of a bronchodilator, or diurnal variation in PEF of more than 20% (with twice-daily readings, more than 10%), suggests a diagnosis of asthma.

**Diagnostic Challenges:**

- Cough-variant asthma: Some patients with asthma have chronic cough (frequently occurring at night) as their principal, if not only, symptom. For these patients, documentation of lung function variability and airway hyperresponsiveness are particularly important.
- Exercise-induced bronchoconstriction: Physical activity is an important cause of asthma symptoms for most asthma patients, and for some (including many children) it is the only cause. Exercise testing with an 8-minute running protocol can establish a firm diagnosis of asthma.
- Children under age 5: Not all young children who wheeze have asthma. In this age group, the diagnosis of asthma must be based largely on clinical judgment, and should be periodically reviewed as the child grows (see the GINA Pocket Guide for Asthma Management and Prevention in Children for further details).
- Asthma in the elderly: Diagnosis and treatment of asthma in the elderly are complicated by several factors, including poor perception of symptoms, acceptance of dyspnea as being "normal" for old age, and reduced expectations of mobility and activity. While diagnosing asthma it is crucial to exclude COPD, the simplest way to differentiate between these two diseases is symptoms where COPD symptoms include productive cough, dyspnea, sputum

overproduction; in addition to the differences between lung function test of both diseases.

- Occupational asthma: Asthma acquired in the workplace is a diagnosis that is frequently missed. The diagnosis requires a defined history of occupational exposure to sensitizing agents; an absence of asthma symptoms before beginning employment; and a documented relationship between symptoms and the workplace (improvement in symptoms away from work and worsening of symptoms on returning to work).

**Classification of Asthma:** Traditionally, the degree of symptoms, airflow limitation, and lung

function variability have allowed asthma to be classified by severity (e.g., as Intermittent, Mild Persistent, Moderate Persistent, or Severe Persistent).

However, it is important to recognize that asthma severity involves both the severity of the underlying disease and its responsiveness to treatment. In addition, severity is not an unvarying feature of an individual patient's asthma, but may change over months or years.

Therefore, for ongoing management of asthma, classification of asthma by level of control is more relevant and useful (Fig. 1).

**Fig 1. Level of Asthma Control.**

Characteristic	Controlled (All of the following)	Partly Controlled (Any measure present in any week)	Uncontrolled
Daytime symptoms	None (twice or less/week)	More than twice/week	Three or more features of partly controlled asthma present in any week
Limitations of activities	None	Any	
Nocturnal symptoms/ awakening	None	Any	
Need for reliever/ rescue treatment	None (twice or less/week)	More than twice/week	
Lung function (PEF or FEV <sub>1</sub> ) <sup>‡</sup>	Normal	< 80% predicted or personal best (if known)	
Exacerbations	None	One or more/year*	

\* Any exacerbation should prompt review of maintenance treatment to ensure that it is adequate.

† By definition, an exacerbation in any week makes that an uncontrolled asthma week.

‡ Lung function testing is not reliable for children 5 years and younger.

**Asthma care management include four simple components:** The goal of asthma care is to achieve and maintain control of the clinical manifestations of the disease for prolonged periods. When asthma is controlled, patients can prevent most attacks, avoid troublesome symptoms day and night, and keep physically active.

**To reach this goal, four interrelated components of therapy are required: Component 1. Develop patient/doctor partnership:** In order to help in the effective management of asthma so that the asthmatic patient can learn how to: avoid risk factors, take medications correctly, understand the difference between “controller” and “reliever” medications, monitor their status using symptoms

and, if relevant, PEF recognize signs that asthma is worsening and take action, seek medical help as appropriate.

**Component 2: Identify and Reduce Exposure to Risk Factors:** To improve control of asthma and reduce medication needs, despite physical activity is a common cause of asthma symptoms however patients should not avoid exercise.

Common strategies for avoiding allergens and pollutants include the followings; Stay away from tobacco smoke, patients and parents should not smoke, avoid drugs, foods, and additives if they are known to cause symptoms, reduce or, preferably, avoid exposure to occupational sensitizers.

**Component 3: Assess, Treat, and Monitor Asthma:** Each patient is assigned to one of five treatment “steps.”

At each treatment step, reliever medication should be provided for quick relief of symptoms as needed.

At Steps 2 through 5, patients also require one or more regular controller medications, which keep symptoms and attacks from starting.

Where the GINA guidelines recommends the addition of Anti-IgE therapy for step 5.

**Inhaled glucocorticosteroids** are the cornerstone treatment in bronchial asthma, they had demonstrated high efficiency in reducing asthma symptoms, reducing frequency & severity of exacerbations, reducing mortality, improving quality of life, improving lung function, decreasing airway hyperresponsiveness& Controlling airway inflammation.

**Long Acting B2 Agonists** had also been associated with a great asthma control outcomes together with a marked reduction in the need of rescue medications & an overall improvement in asthmatics QOL.

	Step 1	Step 2	Step 3	Step 4	Step 5
Asthma education Environmental control					
As needed rapid-acting $\beta_2$ -agonist	As needed rapid-acting $\beta_2$ -agonist				
Controller options	Select one	Select one	Add one or more	Add one or both	
	Low-dose inhaled ICS*	Low-dose ICS plus long-acting $\beta_2$ -agonist	Medium-or high-dose ICS plus long-acting $\beta_2$ -agonist	Oral glucocorticosteroid (lowest dose)	
	Leukotriene modifier **	Medium-or high-dose ICS	Leukotriene modifier	Anti-IgE treatment	
		Low-dose ICS plus leukotriene modifier	Sustained release theophylline		
		Low-dose ICS plus sustained release theophylline			

\* ICS=inhaled glucocorticosteroids

\*\*=Receptor antagonist or synthesis inhibitors

Ongoing monitoring is essential to maintain control and establish the lowest step and dose of treatment to minimize cost and maximize safety.

Typically, patients should be seen one to three months after the initial visit, and every three months thereafter.

**Component 4: Manage Exacerbations:** Do not underestimate the severity of an attack; severe asthma attacks may be life threatening. Their treatment requires close supervision, with Inhaled rapid-acting B2-agonists

*The GINA reports are available on [www.ginasthma.org](http://www.ginasthma.org).*

Oral glucocorticosteroids (0.5 to 1 mg of prednisolone/kg or equivalent during a 24-hour period) introduced early in the course, oxygen at health centers or hospitals if the patient is hypoxemic (achieve O<sub>2</sub> saturation of 95%), combination of B<sub>2</sub>-agonist/anticholinergic therapy which is associated with lower hospitalization rates and greater improvement in PEF and FEV<sub>1</sub>.

*Fortunately* asthma can be effectively treated and most patients can achieve good control of their disease, just by giving those patients high care, close monitoring & a continuous follow up together with selecting the optimal treatment options for each individual patient.