Guidelines for Management of Bronchial Asthma in India at Primary and Secondary Levels of Health Care

Developed under the WHO-GOI Biennium (2004-05) at the Consensus Workshop (February 2005) held at the Postgraduate Institute of Medical Education and Research, Chandigarh, with participation of experts from Medical Institutes, State Health Services, and General Practitioners, besides representatives from Indian Council of Medical Research, Indian Chest Society, National College of Chest Physicians and American College of Chest Physicians (India)

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Fig 1. Algorithm for diagnosis and management of bronchial asthma at primary and secondary levels of health care

Breathlessness, Wheezing, Cough, and/or Chest tightness

Symptoms are variable, intermittent, recurrent, seasonal, worse at night, and provoked by one or more triggers

Additional symptoms of fever, expectoration, chest pain

Suspect bronchial asthma

Suspect alternate diagnosis

Physical examination

Wheezing / rhonchi (diffuse, bilateral, polyphonic, expiratory), hyperinflation

Normal, or other focal signs, bronchial breathing, coarse crepitations, collapse

Manage as bronchial asthma (as per Table 3)

Symptomatic treatment (e.g. antibiotics), sputum for AFB

Good response

Poor response

Poor response, and sputum AFB negative

Sputum AFB positive

Continue as per Table 3

Refer to Secondary care level

Give DOTS (as per RNTCP)

Note: In children, noisy breathing is an additional important symptom to look for at initial assessment. Physicians must enquire into additional symptoms such as diarrhea, failure to thrive, etc., and find out if symptoms are present since birth. In children, these may be important clues to alternative diagnosis such as foreign body aspiration, congenital cardiopulmonary disorders, or parasitic infestations.

AFB Acid-fast bacilli, DOTS Directly-observed therapy (short course), ECG Electrocardiogram, FEV Forced expiratory volume in first second, PEF Peak expiratory flow, RNTCP Revised National Tuberculosis Control Programme
INTRODUCTION
Asthma is a common clinical problem encountered at all levels of health care. The prevalence rates are variable depending upon the definition and methodology employed. Population prevalence in adults is at least 2.5 percent or more. In children, the prevalence is likely to be higher, exceeding 5 percent. Both men and women are almost equally affected.

Asthma can be defined as a chronic inflammatory disorder of the airways, characterized by recurrent episodes of wheezing, breathlessness, chest tightness and cough that is often reversible, either spontaneously or with treatment. Different terms such as allergic or asthmatic bronchitis, wheezy bronchitis, intrinsic and extrinsic asthma are frequently employed in clinical practice.

PATHOGENESIS AND PATHOPHYSIOLOGY
The hallmark of pathological changes in asthma is chronic inflammation of the airways. In addition, there is hyper-reactivity and imbalance of the autonomic neural control of the airways resulting in bronchoospasm. There is swelling and oedema of the airway mucosa, and bronchial hypersecretion. All these factors together cause narrowing of the lumina of the airways, leading to symptoms of asthma. The current pharmacotherapy is quite effective in controlling these phenomena.

NATURAL HISTORY
Asthma commonly begins in childhood and early youth, but may also start later in life at any age. Contrary to common belief, children do not necessarily “grow out of asthma.” Almost two thirds of the asthmatic children continue to have symptoms in puberty/adolescence. About 5-10% children with ‘mild’ asthma may develop severe asthma later in life.

Some patients, especially those whose asthma remains poorly controlled, may develop more permanent changes due to ‘airway remodeling’. This may cause relative irreversibility and persistence of symptoms.

PREDISPOSING AND RISK FACTORS
Exact cause of asthma is not known. Both environmental and genetic factors are important. A family history of asthma or atopy (allergy or presence of other atopic manifestations (e.g. allergic rhinitis, skin allergies) and airway hyper-reactivity predispose an individual to develop asthma. However, asthma can develop in the absence of family history. and airway hyper-responsiveness predispose an individual to develop asthma. Respiratory tract infections, environmental pollutants, and occupational allergens may also predispose to the development of asthma. Respiratory tract infections, environmental exposures, certain drugs and chemicals known to precipitate acute attacks are important triggers of asthma (Box 1). Food is normally not a trigger unless it is specifically proved to be so in an individual. Most patients may have more than one trigger.

Box 1. Important asthma triggers
- Respiratory infections, usually viral
- Allergens (Indoor/Outdoor)
- Air pollution (Indoor/Outdoor) including smoke and fumes (biomass fuel)
- Tobacco smoke (both active and passive)
- Drugs: beta-blockers and NSAIDs
- Food additives and preservatives

DIAGNOSIS
Diagnosis of asthma is a two-step approach. The first step is to suspect, and then to confirm the diagnosis. Laboratory investigations are important to exclude alternate diagnoses. Diagnosis of reversibility and/or variability of forced expiratory volume in first second (FEV₁) on spirometry or peak expiratory flow (PEF) is important to diagnose asthma and differentiate it from chronic obstructive pulmonary disease. It is advisable to follow an algorithmic approach whenever an individual presents with respiratory symptoms (Fig 1, see overleaf).

ASSessment of Severity
Once the diagnosis of asthma is made, it is important to stage the disease based on its severity. For purposes of management, asthma can be categorized as mild, moderate and severe (Table 1) depending upon the clinical symptoms, limitation of usual (or accustomed) activities, use of rescue drugs and symptoms (spirometric parameters (whenever available). In the absence of spirometry, PEF measured with the help of a PEF meter can be used as the supportive evidence.

Table 1. Staging of asthma

<table>
<thead>
<tr>
<th>Symptoms disturbing sleep</th>
<th>Daytime symptoms</th>
<th>Limitation of activities</th>
<th>Use of rescue medication</th>
<th>FEV₁ or peak expiratory flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; once per week</td>
<td>&lt; Daily</td>
<td>Nil</td>
<td>&lt; 1 dose per day</td>
<td>Normal, 60-80% &lt;60%</td>
</tr>
<tr>
<td>&gt; once per week</td>
<td>&gt; Daily</td>
<td>Severe limitation</td>
<td>&gt; 2 doses per day</td>
<td></td>
</tr>
</tbody>
</table>

Mild
Moderate
Severe

MANAGEMENT
It is important to effectively manage asthma to help an individual live a normal life, and avoid acute exacerbations as well as long-term complications. The important currently available anti-asthma drugs can be classified as controllers (required for maintenance treatment) and relievers (required for quick relief, rescue drugs) (Box 2). Inhalated corticosteroids constitute the cornerstone of maintenance therapy (Table 2).

Box 2. Asthma medications
- Controllers (Prophylactic, Preventive, Maintenance)
  - Taken daily to keep asthma under control
  - Steroids, Long-acting beta-2 agonists, Sustained-release theophyllines, Leukotriene receptor antagonists, and Cromones
- Relievers (Quick relief, Rescue)
  - Rapid-acting drugs that relieve bronchoconstriction
  - Short-acting beta-2 agonists, anticholinergics, theophyllines, short course oral steroids

Table 2. Equivalent doses of inhaled corticosteroids (in µg)

<table>
<thead>
<tr>
<th>Low dose</th>
<th>Medium dose</th>
<th>High dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult</td>
<td>Child</td>
<td>Adult</td>
</tr>
<tr>
<td>Budesonide</td>
<td>300-400</td>
<td>100-200</td>
</tr>
<tr>
<td>Beclomethasone</td>
<td>200-400</td>
<td>100-200</td>
</tr>
<tr>
<td>Fluticasone</td>
<td>250-500</td>
<td>50-125</td>
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</table>

The recommendations for use of drugs vary depending upon the stage of asthma (Table 3). Mild asthma can be further divided into intermittent (symptoms for less than two days per week) and persistent (symptoms for more than two days per week) categories, and treatments are based on this classification.

Systemic corticosteroids on long term basis must be avoided. A short course of up to two weeks (0.5 mg/kg/day) is however often valuable for managing acute severe asthma (Table 4).

Box 3. General principles of pharmacotherapy in patients with bronchial asthma
- Inhaled drugs should preferably be given using metered dose inhaler with spacer
- Proper inhalation technique is most essential for optimal results
- Long acting beta-agonists (LABA) should be always combined withICS
- Short acting beta-agonists (SABA) should be used only as reliever medication
- Methylxanthines can be used as an alternative to inhaled steroids only in mild disease, or in acute severe asthma when standard treatment is not effective
- Anticholinergic drugs provide additional effect to SABA aerosol in exacerbations
- Systemic glucocorticoids are important only in the treatment of exacerbations of asthma

Table 3. Management of asthma in adults and children

<table>
<thead>
<tr>
<th>Stage</th>
<th>Preferred choice</th>
<th>Alternative choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>Low-dose ICS + LABA</td>
<td>Theophylline/Cromone</td>
</tr>
<tr>
<td>Moderate</td>
<td>Medium dose ICS + LABA/ or LTRA</td>
<td>Medium dose ICS + LTRA/ theophylline</td>
</tr>
<tr>
<td>Severe</td>
<td>High-dose ICS + LABA, LTRA, theophylline and/or oral steroids at the lowest dose</td>
<td>Oral steroids at the lowest dose to control symptoms (alternate day if possible) + therapy as above</td>
</tr>
</tbody>
</table>

In addition to daily controller therapy, reliever medications on as needed basis may be taken in all stages.

Asthma control requires frequent stepping up or down of therapy

ICS = Inhaled corticosteroid, LABA = Inhaled Long-acting beta agonist, LTRA = Leukotriene receptor antagonist

Patients with intermittent or seasonal symptoms can be managed with only reliever medications taken on an as needed basis.

Box 4. Indications for referral
- Diagnosis unclear or in doubt
- Atypical signs or symptoms (see Fig 1)
- Failure to respond to treatment over one month
- Other conditions complicating asthma or its diagnosis, necessitating additional work-up
- Severe persistent asthma
- Life threatening asthma (cyanosis, mental obtundation)

Besides treatment with drugs, asthma control requires avoidance of triggers (Box 1). Since asthma is a life long problem, it is crucial that the patient and the family are educated about the disease and its management for a normal and healthy life.