

Asthma

Asthma is a condition in which the airways are narrowed because hyper-reactivity to certain stimuli produces inflammation; the airway narrowing is reversible.

Range of severity of asthma:

The patient with *severe persistent asthma* experiences continual symptoms that limit physical activity, with frequent exacerbations. Nocturnal symptoms are frequent.

The patient with *moderate persistent asthma* experiences daily symptoms, with exacerbations that affect physical activity. Nocturnal symptoms occur less than once weekly.

The patient with *mild persistent asthma* experiences symptoms more than twice weekly but less than once daily, with exacerbations that may affect physical activity. Nocturnal symptoms occur more than twice monthly.

The patient with *mild intermittent asthma* experiences symptoms twice weekly or less & nocturnal symptoms occur twice monthly or less.

Causes:

The narrowing of airways of asthmatic patients can be triggered by many stimuli, such as pollens, dust, smoke, cold air, & exercise.

In an asthma attack, the smooth muscles of the bronchi go into spasm, and the tissues lining the airways swell from inflammation and secrete mucus into the airways. These actions narrow the diameter of the airways; the narrowing requires the person to exert more effort to move air in and out.

Asthma is also common and severe in many people without defined allergies. When an asthmatic patient exercises or breathes cold air, a similar reaction occurs. Stress & anxiety also may trigger bronchoconstriction in asthmatic patients.

Diet may trigger asthma. It may be caused by food additives. Some drugs, as aspirin & beta blockers, may induce asthma.

Asthma is a possible result of gastroesophageal reflux disease and may be the most important extraesophageal manifestation. Reflux of stomach contents may trigger asthma through microaspiration.

Symptoms and Complications:

An asthma attack may begin suddenly with wheezing, coughing, and shortness of breath. Wheezing is particularly noticeable when the person breathes out. At other times, an asthma attack may come on slowly with gradually worsening symptoms.

In either case, people with asthma usually first notice shortness of breath, coughing, or chest tightness. The attack may be over in minutes, or it may last for hours or days.

Itching on the chest or neck may be an early symptom, especially in children.

During an asthma attack, shortness of breath may become severe, creating a feeling of anxiety. Sweating is a common reaction to the anxiety and the effort of breathing.

In very severe attack, a person will be able to say only a few words without stopping for breath. Wheezing may diminish because hardly any air is moving in and out of the lungs.

Confusion, lethargy, and blue skin color (cyanosis) are signs that the person's oxygen supply is severely limited, and emergency treatment is needed.

Prevention:

- Patients with allergen-induced asthma must limit their exposure to these allergens.
- Avoidance of stress, particularly when suffering from a viral illness.

Medications:

Beta agonists:

Beta agonists stimulate beta₂ adrenergic receptors in the airways. Stimulation of beta₂ receptors by sympathomimetic amines in turn stimulates the enzyme adenylate cyclase, producing an increased intracellular cyclic adenosine monophosphate concentration. In the airways, this results in smooth muscle relaxation, inhibition of cholinergic neurotransmission, increased mucociliary clearance, reduced mucosal edema, and inhibition of mast cell mediator release. Examples are: fenoterol, salbutamol (albuterol), and terbutaline.

Theophylline:

It is an oral bronchodilator, and in a severe asthma attack it can be given intravenously. The main mechanism of action of theophylline is that of adenosine receptor antagonism.

Muscarinic-receptor antagonists

These drugs block acetylcholine from causing smooth muscle contraction and from producing excess mucus in the bronchi.

Ipratropium bromide is one of these drugs. This drug is not particularly effective against allergen challenge and is only really of use in asthmatic attacks. It can be useful as an adjunct to other bronchodilator therapy, particularly in severe acute asthma. Its major clinical role is as a bronchodilator in some cases of chronic bronchitis and in asthma precipitated by b₂-adrenoceptor antagonists.

Anti-inflammatory agents (Corticosteroids):

Block the body's inflammatory response and are effective at reducing asthma symptoms. If taken for long periods, corticosteroids gradually reduce the likelihood of asthma attacks by making the airways less sensitive to a number of stimuli. Long-term use of oral corticosteroids may cause many side effects, thus usually for long-term use, inhalant corticosteroids are prescribed. Patient must wash his/her mouth after the use of the inhaled steroids to avoid oral infections.

Sodium cromoglycate:

Not all asthmatic subjects respond to this drug, and it is not possible to predict which patients will benefit. It is generally said that children are more likely to respond, and they have become the anti-inflammatory drug of first choice in children

Leukotriene receptor antagonist (Montelukast)

They are the newest drugs available to help control asthma. They prevent the action or synthesis of leukotrienes, which are chemicals made by the body that cause asthma symptoms.

Treatment:

The clinical goals of asthma treatment are to:

- Maintain normal activity levels.
- Maintain normal or near normal pulmonary function rates.
- Prevent chronic symptoms.
- Prevent recurrent exacerbations of asthma.
- Avoid adverse effects from asthma medications.

Drug treatments allow most people with asthma to lead relatively normal lives. Immediate treatments to get asthma attacks under control differ from continuous treatments designed to prevent attacks.

An asthma attack should be treated as quickly as possible to open the airways. Most of the same drugs used to prevent an attack are used but in higher doses or different forms.

Treatment of asthma attack: an asthma attack should be treated as quickly as possible to open the airways. Quick relief beta-adrenergic receptor agonists are taken with inhaler or nebulizer. People having severe attacks and those who don't show improvement with other treatment may receive corticosteroid injections, usually intravenously.

Because people with severe asthma commonly have low blood oxygen levels, they may receive oxygen during attacks while they receive other treatment. Intravenous fluids may be needed if the person is dehydrated.

Long-term asthma treatment: Long-term control medicines include: inhaled corticosteroid, inhaled long-acting beta-agonists, leukotriene modifiers (montelukast), cromolyn, theophylline.

How to use a metered-dose inhaler?

1. Remove the cap and hold the inhaler upright.
2. Shake the inhaler.
3. Tilt your head back slightly and breathe out.
4. Put the inhaler either in your mouth or 1 to 2 inches from it and start to breathe in slowly, like sipping hot soup.
5. Spacers are useful for all patients, especially young children and older adults.

6. Press down on the inhaler to release the medicine as you start to breathe in slowly.
7. Breathe in slowly for 3 to 5 seconds.
8. Hold your breath for 10 seconds to allow medicine to go deeply into your lungs.
9. Repeat puffs as directed. Wait 1 minute between puffs to allow the second puff to get into the lungs better.

NOTE: These instructions are for a metered-dose inhaler only. Inhaled dry powder capsules are used differently. To use a dry powder inhaler, close your mouth tightly around the mouthpiece of the inhaler and breathe in quickly.