



A REVIEW ON PREVENTION AND CONTROL OF ASTHMA

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ABSTRACT

Asthma is a respiratory disorder which causes blockage of respiratory tract. The disorder is associated with hyper-responsiveness that leads to recurrent episodes of cough, running nose, sound while breathing and quick exertion. Symptom episodes are generally associated with widespread, but variable, airflow obstruction within the lungs that is usually reversible either spontaneously or with proper asthma treatment like rapid acting bronchodilator.

KEYWORDS: Hyper-responsiveness, Respiratory disorder, Bronchodilator.

INTRODUCTION

Asthma is defined as a chronic inflammatory disease of the airways. It affects our airways, the tubes that carry air in and out of our lungs. When we have asthma our airways become inflamed and narrowed. It causes wheezing, breathlessness, chest tightness and/or coughing that can vary over time and in intensity. When these symptoms get worsen than usual then it is called as asthma attack or flare-up.^[1] Asthma is a serious disease that affected about 25 million Americans and causes nearly 1.6 million emergency room visits every year.^[2]

There are three major signs of asthma:^[2]

- **Airway blockage.** When we breathe as usual, the bands of muscle around our airways are relaxed, and air moves freely. But when you have asthma, the muscles tighten. It's harder for air to pass through.
- **Inflammation.** Asthma causes red, swollen bronchial tubes in our lungs. This inflammation can damage our lungs. Treating this is key to managing asthma in the long run.
- **Airway irritability.** People with asthma have sensitive airways that tend to overreact and narrow when they come into contact with even slight triggers.

Doctor's rank how bad asthma is by its symptoms:^[2]

1. **Mild intermittent asthma.** Mild symptoms less than twice a week. Nighttime symptoms less than twice a month. Few asthma attacks.
2. **Mild persistent asthma.** Symptoms three to six times a week. Nighttime symptoms three to four times a month. Asthma attacks might affect activities.

3. **Moderate persistent asthma.** Daily asthma symptoms. Nighttime attacks five or more times a month. Symptoms may affect activities.
4. **Severe persistent asthma.** Ongoing symptoms both day and night. We have to limit our activities.

TYPES OF ASTHMA^[3]

1. **Adult-onset asthma.** While asthma generally develops during childhood, it can also develop as we get older in adulthood. Adult-onset asthma occurs because of certain chemicals and other irritants that we might be exposed to frequently in the workplace.
2. **Seasonal asthma.** When asthma symptoms occur during different times of the year. This asthma occurs often due to the change in weather.
3. **Allergic asthma.** This type of asthma is caused by allergens such as dust, dust mites, mold, pollen, cockroaches and pet dander. It is the most common subcategory of the condition.
4. **Non-allergic asthma.** This type of asthma is caused by different types of irritants we encounter in the air like perfume, fresh paint, room deodorizers, wood smoke and tobacco smoke. As we can notice that this asthma is not caused by allergens but it could be a chance of caused by irritants in air.
5. **Asthma-induced COPD.** Another condition that can make breathing difficult is an asthma and chronic obstructive pulmonary disease (COPD) overlap. Some notable types of COPDs include emphysema and chronic bronchitis.
6. **Exercise-induced asthma.** Exercise-induced asthma occurs due to narrowing of airways in the lungs during hard exercise. It does not mean we can't remain active; just to be sure we take necessary treatment when we exercise.

7. **Occupational asthma.** It is another type of asthma that can be directly related to our working environment. Some causes of occupational asthma that might be in our working environment which includes chemicals, enzymes, metals, animal substances and plant substances.
8. **Nocturnal asthma.** This type of asthma generally occurs at night, this occurs because of delayed action of allergens we may have encountered in the day, such as allergens in our mattress, or other causes.

CAUSES OF ASTHMA^[4]

Asthma symptoms often occur in response to a trigger. Common triggers include:

- Infections like colds and flu.
- Allergens such as pollen, dust mites, dust, animal fur and feathers.
- Smoke, fumes and pollution.
- Medicines particularly anti-inflammatory painkillers like ibuprofen and aspirin.
- Emotions including stress or laughter.
- Weather like sudden change in temperature, cold air, thunderstorms, heat and humidity.
- Mold or damp.
- Exercise.

SIGNS AND SYMPTOMS^[5]

- Shortness of breath.
- Cough.
- Chest tightness or pain.
- Wheeze (a whistling sound when we breathe).
- Waking at night due to asthma symptoms.
- A drop in our peak flow meter reading.

PREVENTION^[6]

While there's no way to prevent asthma, we and our doctor can design a step by step plan for living with our condition and preventing asthma attacks.

- **Following our asthma medicines as prescribed.** With our doctor we can take a detailed plan for taking medications and managing an asthma attack.

Asthma is an ongoing condition that needs regular monitoring and treatment. Taking a control of our treatment can make us feel more in control of our life.

- **Identify and avoid asthma causes.** A number of outdoor allergens and irritants ranging from pollen and mold to cold air and air pollution which can trigger asthma attacks. We should find causes which worsens our condition and take suitable steps to avoid those triggers.
- **Monitor our breathing.** We may learn to understand warning signs of an impending attack such as slight coughing, wheezing or shortness of breath. Because our lung function may decrease before we notice any signs or symptoms, regularly

measure and record our peak airflow with home peak flow meter. It measures how hard can we breathe out. (green=safe; yellow=caution; red=emergency).

- **Identify and treat attacks early.** If we response quickly we are less likely to have a severe attack. We also won't need as much medication to control our symptoms. When our peak flow measurements decrease and alert us to an oncoming attack, then immediately take our medication and stop any activity which may have triggered the attack.
- **Take our prescription as prescribed.** We should not make any changes in medications provided by doctors without prior consulting to doctor, even if asthma seems to be improving. It's good idea to bring our prescription when we are going to visit doctor.
- **Pay attention to increasing quick-inhaler use.** If we find hard relying on our quick-relief inhaler, such as albuterol. Then we should conclude that our asthma is not under control then immediately we should refer to doctor's prescription.

DIAGNOSIS

1. **Physical method.** In this method, the doctor diagnoses on physical means such as^[7]
 - Looks at our nose, throat and upper airways.
 - Uses stethoscope to listen for a whistling when we breathe.
 - Checks our skin for allergy symptoms like eczema or hives.
2. **Lung function test.** Our doctor may have to take one or more breathing tests known as lung function tests. These tests measure our breathing. Lung function tests are often done before and after inhaling a medicine known as bronchodilator, which opens our airways.^[8]
3. **Spirometry.** This test measures how much air we can breathe in and out of our lungs, as well as how easily and fast we can blow the air out of our lungs.^[9]
4. **Peak air flow test.** It is a simple measurement of how quickly we can blow air out of our lungs. It's often used to help diagnose and monitor asthma.^[10]
5. **Fractional exhaled nitric oxide (FeNo) test.** It is a way to determine how much lung inflammation is present and how well inhaled steroids are suppressing this inflammation.^[11] FeNo normal level is 25ppb-50ppb.^[12]
6. **Provocation test.** A provocation test is a type of lung test that tells us how sensitive our lungs are. With an irritant challenge our doctor will expose us to a specific asthma trigger to see if our airways react. These might include chemicals, perfume or smoke. After we are exposed to the trigger, we will take a breathing test to see how we respond. This test helps our doctor to confirm possible asthma triggers.^[13]

MEDICATIONS FOR ASTHMA^[14]**1. Agents used for prevention of asthma (prophylaxis)**

- (a). Mast cell stabilizers- Cromolyn sodium, ketotifen
- (b). Omalizumab

2. Agents used for the acute asthma (Bronchodilators)

- (a). Beta 2 Sympathomimetic- Salbutamol (albuterol), terbutaline,
- (b). Methylxanthines- Theophylline, aminophylline
- (c). Antimuscarinic drugs- Ipratropium, tiotropium

3. Agents used for chronic asthma

- (a). Leucotriene antagonist- Zafirlukast, Montelukast
- (b). Glucocorticoid
 - (i) Used by inhalation: Beclomethasone dipropionate, beclomethasone valerate, budesonide, fluticasone propionates, ciclesonide, mometasone
 - (ii) Used systemic route: Prednisolone (oral), hydrocortisone (i.v.)
- (c). Long acting beta 2 agonists- Salmeterol, formoterol
- (d). Methylxanthines.

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