

Asthma

Shinde Anjali Manik

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ABSTRACT

Definition: Asthma is an ailment that affects the airways in the lungs and is chronic (long-lasting). The airways are the tubes that allow air to enter and exit our lungs. a condition where a person's airways become constricted, swollen, and overflow with mucus, making breathing challenging.

Causes : Asthma symptoms and indications can be brought on by exposure to numerous irritants and chemicals that cause allergies (allergens). The causes of asthma can vary from person to person and can include airborne allergens such as pollen, dust mites, mould spores, pet dander, or cockroach excrement particles.

Symptoms: severe wheezing, both when breathing in and out, uncontrollable coughing, quick breathing, tightness in the neck and chest, difficulty speaking, and feelings of panic or anxiety sweaty and pallid face.

Treatment: Salbutamol, Tebutaline, Salmeterol, Foracort Forte, Dexofylline, Theophylline, Aminophylline, Hydroxyethyl theophylline, Corticosteroids, Budecort, Flohale these drugs are used to treat asthma.

INTRODUCTION:

G-coupled M2 receptors may play a little role in the peripheral airways' smooth muscle contraction, according to some pharmacological research^[4]. muscle-sparing receptors In asthma and COPD, there are two main processes that increase control of airway smooth muscle tone: increased expression and accelerated release of neuronal acetylcholine^[4].

Mostly used in the airways as a parasympathetic neurotransmitter, acetylcholine are known to cause mucus secretion and airway smooth muscle contraction^[7]. Inflammation of the airways increases parasympathetic activity^[3]. Asthma is a persistent, inflamed lung condition that can cause coughing, wheezing, and breathing difficulties. Its distinctive symptoms include fluctuating and recurrent illness, reversChronic obstructive pulmonary .In conclusion, we think that these works provide a clear summary of the virus-associated asthma/COPD area and are

instructive. The COX-2-specific inhibitor NS-398 stopped this synthesis, which also prevented the eosinophils from being drawn into the lungs. On the other hand, some people have reported that elevated PGD2 concentrations worsened airway eosinophilic inflammation^[6].

A common chronic illness of the airways, bronchial asthma (BA) affects several cells and cellular elements^[12]. During a severe asthma attack, the lining of the airways in the lungs swells and becomes inflamed. A small annoyance is asthma. The symptoms of asthma can be controlled even though it cannot be cured. Asthma can strike frequently during the day or rarely during the week. In many nations, asthma develops in about 10% of adults and higher in children^[4]. About 300 million people worldwide suffer from asthma, It also has an impact in Brazil on 19.0 percent of teenagers and 24.3 percent of school-age children^[2].

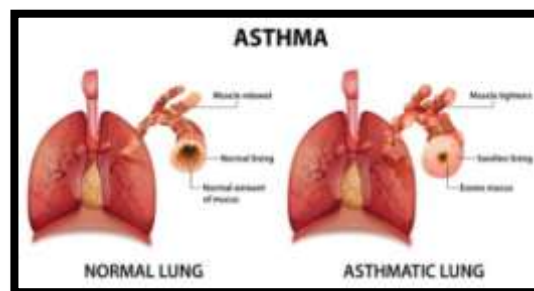


Fig no. 1: Image shows difference between normal lung & asthmatic lung

The perspective that people have of their place in life in relation to their goals, aspirations, standards, and worries is referred to as their quality of life. This perception is influenced by their culture and system of values^[2]. There is no preventive human vaccine against the viral infection, despite the fact that HPIV3 is an etiological agent for respiratory illnesses like pneumonia and asthma^[3]. Herpes simplex viruses' capacity to endure for a very long time as intracellular viruses in the tissues of their hosts is a crucial trait^[8]. A 1-2 percent incidence of *Aspergillus fumigatus* colonisation results in allergic bronchopulmonary aspergillosis (ABPA), a

hypersensitivity pulmonary disease that frequently affects people with bronchial asthma^[15].

CVA's diagnostic standards:

1. A persistent cough that has persisted for longer than 8 weeks
2. Chest X-ray findings were normal.
3. a favourable outcome from a methacholine-based bronchodilator test
4. No anti-asthmatic medication such as inhaled corticosteroids (ICS) or an ICS/LABA combination [10].

Severe asthma is defined as having unresponsive or to keep the condition under control, use high-dose inhaled corticosteroids (ICS) along with a second controller (and/or systemic CS)^[13]. Airway hyper-responsiveness is the term used to describe the phenomena where severe bronchoconstriction and airflow blockage are caused by the excessive contractile response of the ASM in asthma in response to just moderate stimulus^[14]. It is well known that the level of oxidative stress caused by violations of the peroxidation mechanisms and the enzymatic support of the prooxidant system determines the severity of bronchial asthma in children^[16]. Typically, DCs do not contact directly with B lymphocytes; instead, they influence them by secreting cytokines and other chemical mediators while engaging with T lymphocytes or epithelial cells.^[17]

Causes: Asthma is triggered and brought on by individual factors. It is thought shifting epigenetic. The Asthma incidence has recently increased due to heritable causes other than those linked to the DNA sequence and a changing environment. The majority of the time, when asthma first develops before the age of 12, genetics is a factor. Beta blockers, irritants like smoke, chilly air, the common cold, exercise, and air pollution are some of the other factors that contribute to the development of asthma^[11]. These complex and poorly understood environmental and genetic interactions also play a role. Aspirin and non-steroidal anti-inflammatory drugs (NSAIDs) including ibuprofen and naproxen are among the treatments. Causes of atopic dermatitis include hay fever, red, itchy skin.

Environmental factors:

Various environmental factor, including as allergens, air pollution, and other environmental chemicals, have been linked to the onset and

worsening of asthma. Smoking increases the likelihood of developing asthma-like symptoms both during and after delivery. Both asthma onset and asthma severity have been linked to bad air quality caused by environmental factors like ozone or traffic pollution.

Hygiene: According to the hygiene hypothesis, the rising incidence of asthma around the world are a direct result of decreased exposure to viruses and bacteria that are not harmful during childhood. It has enhanced hygiene and smaller families in contemporary society are contributing factors in the decreased risk of contracting germs and viruses. Asthma development has been connected to the early use of antibiotics.

Genetic: Numerous genes have been linked to family history as an asthma risk factor. There is a 25% probability that both identical twins will develop the disease if one already does. Numerous of these genes have something to do with the immune system or controlling inflammation. The results have not been uniform across all groups investigated, not even among this set of genes backed by strongly repeated studies^[9].

Pathophysiology :

Asthma is a chronic inflammatory disease of the conducting zone of the airways, especially the bronchi and bronchioles, which causes the surrounding smooth muscles to contract more readily. Gram-negative opportunistic pathogens *Haemophilus influenzae* and *Moraxella catarrhalis* are carried in the respiratory system as commensals^[8]. The characteristic wheezing symptoms and episodes of airway constriction are caused by several factors. Wheezing or a hissing sound when breathing, coughing, shortness of breath, chest constriction, and chest pain are all signs of narrowed airways.

Two types of asthma :

- A. Extrinsic asthma :** This is an immune reaction to environmental allergens, such as dust, pollen, and animal dander, among others^[2]. Delayed hypersensitivity reaction as a result of extrinsic asthma that takes place 6–8 hours after the immediate hypersensitivity reaction, which takes place within 30 minutes of allergen exposure.
- B. Intrinsic asthma:** For which it is unclear what the underlying cause is. It is typically brought on by abrupt, intense emotional reactions like laughing, weeping, being angry, or feeling

stressed, or by coming into touch with chemicals like cigarette smoke, aspirin, or cleaning products. Exercise or a chest infection are some potential. In order to pinpoint the early stages of bacterial colonisation, clinical trials followed the upper respiratory tract of several juvenile groups^[9]. Sometimes the airways themselves alter, which is frequently accompanied by an increase in eosinophils and thickening of the lamina reticularis. Involved cells include neutrophils, macrophages, and T lymphocytes. The immune system's elements, including histamine, leukotrienes, cytokines, and chemokines, among others, may potentially be at play.

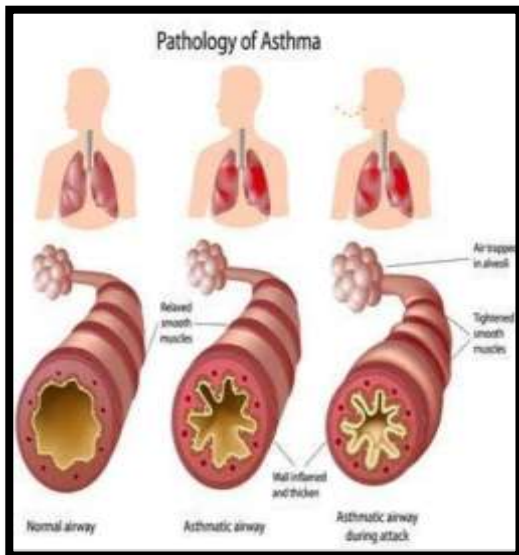


Fig no. 2: Pathology of Asthma

Symptoms: Wheezing, wheezing with dyspnea, wheezing without a cold, chest tightness, nocturnal dyspnea, nocturnal cough, asthma attack, and usage of asthma medications were all indicators of current asthma, asthma-like symptoms, and overall asthma prevalence, according to bivariate analysis^[15]. Asthma symptoms differ from individual to person. Signs and symptoms of asthma include:

1. Chest ache or tightness
2. Breathing difficulties
3. The frequent asthmatic symptom in kids is wheezing when exhaling.
4. Sleep issues brought on by coughing and shortness of breath

Asthma Symptoms And Signs In A Specific Setting :

1. Asthma brought on by exercise, which may be exacerbated by cold and dry air.
2. Workplace irritants such as chemical fumes and gases can cause asthma attacks.
- 3 . Allergic asthma brought on by airborne allergens such as pollen, mould spores, cockroach droppings, or skin particles

Diagnosis:

The Global Initiative for Asthma describes asthma as "a chronic inflammatory condition of the airways in which several cells and cellular components participate." There are often episodes of coughing, wheezing, and dyspnea brought on by the chronic inflammation, especially at night or in the early morning. Since there is currently no reliable test for making the diagnosis, doctors typically rely on the course of their patients' symptoms and how they respond to treatment over time. If there is a history of continuous wheezing, coughing, or breathing problems that happen or get worse with activity, virus illnesses, allergies, or air pollution, asthma may be taken into account. The diagnosis is then verified using spirometry^[6].

Treatment:

Asthma management options exist for both long-term and short-term relief. While there is no permanent cure for asthma, there are effective drugs that can manage the illness. Quick-relief (reliever) or rescue drugs are used to treat asthma because they quickly alleviate any acute symptoms that may arise. Short-acting beta-agonists (SABAs) are one of these and greatly reduce airway bronchoconstriction (causing relaxation of airway smooth muscles). National and international guidelines have recommended SABAs as the first-line treatment for patients with mild asthma .

since the 1995 publication of the Global Initiative for Asthma guidelines (GINA), adopting an approach aimed at controlling the symptoms rather than the underlying condition; a SABA has been the recommended rescue medication for prompt symptom relief. Instead of considering asthma as an illness that is also characterised by airway inflammation, this strategy is based on the antiquated notion that symptoms are linked to the contraction of bronchial smooth muscle (bronchoconstriction). Low -dose ICS improves asthma control in persons with moderate chronic illnesses and lowers the frequency of severe exacerbations that necessitate hospitalization^[9]. A combination of low-dose ICS with LABA maintenance and as-needed SABA was indicated as the first line of treatment when low-dose ICS are

successful in managing the disease (Step 3 of the stepwise strategy).

Asthma Medications :

Albuterol, epinephrine, and levalbuterol are some examples of short-acting beta-agonists. ProAir HFA, Proventil HFA, and Ventolin HFA are examples of quick-relief inhalers (Xopenex HFA).

Ipratropium (Atrovent), an anticholinergic, aids in widening your airways while also reducing When low-dose ICS are successful in controlling the condition, a combination of low-dose ICS plus LABA maintenance and as-needed SABA was recommended as the first line of treatment (Step 3 of the stepwise strategy). mucus production is cing. They take longer to work than short-acting beta-agonists.

Oral corticosteroids like prednisone and methylprednisolone are two examples that lessen airway edoema.

Combination drugs for immediate relief include both an anticholinergic and a short-acting beta-agonist.

Enduring preventative medication :

Long-acting beta-agonists for inhalation include vilanterol, salmeterol, and formoterol.

Inhaled drug combinations: Symbicort, Breo, Dulera, and Advair are a few of these.

Fluticasone (Flovent HFA), beclomethasone (QvarRediHaler), ciclesonide (Alvesco), budesonide (Pulmicort Flexhaler), and mometasone are some examples of inhaled corticosteroids (Asmanex Twisthaler).

Examples of biologics include benralizumab (Fasenra), dupilumab (Dupixent), mepolizumab (Nucala), omalizumab (Xolair), and reslizumab (Cinqair).

Leukotriene modifiers: These include zileuton, zafirlukast, and montelukast (Singulair) (Zyflo).

Cromolyn is an inhaler-based non-steroid medication.

It is available as a pill, capsule, solution, or syrup.

Avoid Asthma Triggers:

1. Animal dander

2. Toxic dust mites. At the very least, keep your pet out of your bedroom if you can't live without one. Carpets should ideally be removed, furniture should be vacuumed, and bedding should be washed in hot water. Ask someone else to do the vacuuming if you can.

3. Outdoor mould and pollen. Keep the windows shut. From late morning to afternoon, stay inside.

4. Cigarette smoke. If you smoke, seek assistance to stop. Don't permit smoking in your house or vehicle.

5. Cockroaches. Treat your home for pests and keep food and rubbish in locked containers. As soon as the odours disappear, leave the room.

6. The chilly air When it's cold outside, cover your mouth and nose.

7. Mold within. Fix leaking pipes and use bleach to remove mouldy surfaces.

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