GENERAL REVIEW ON ASTHMA

[1]Aslam Memon, [2]Akshit Shah,[3]Kshama Sanghvi, [4]Akram Pathan,
[5]Darshan Chaudhry ,[6]Dev Sagar, [7]Farhan Mumbaigara

Student of B. pharm

***Abstract*- Asthma is a disorder characterized by chronic airway inflammation, airway hypersensitivity to a variety of stimuli, and airway obstruction. It is at least partially reversible, either spontaneously or with treatment. Asthma affects 3–5% of the U.S. population and is more common in children than in adults. Airway obstruction may be due to smooth muscle spasms in the walls of smaller bronchi and bronchioles, edema of the mucosa of the airways, increased mucus secretion, and/or damage to the epithelium of the airway. Now a day's so many marketed products are available to treat the asthma and major step to cure this this disease patient should prevent the exposure to antigen, reduction of bronchial inflammation and hyperactivity, have to be used some medication to dilate the narrowed bronchi. This review article was discussed about the pathophysiological approaches towards the asthma management**

***Keywords*- general information about asthma, types of asthma, treatment, who response**

INTRODUCTION:

Asthma can be controlled through education and treatment. working as a team, school personnel, healthcare providers and parents can help children with asthma participate fully in school, sports and home activities.
what is asthma? --
asthma is one of the most common chronic diseases of childhood, affecting more than 6 million children.
asthma is a chronic inflammatory lung disease that can cause repeated episodes of cough, wheezing and breathing difficulty. during an acute asthma episode, the airway lining in the lungs becomes inflamed and swollen. in addition, mucus production occurs in the airway and muscles surrounding the airway spasm. combined, these cause a reduction in air flow.
Asthma is characterized by:
• airway inflammation: the airway lining becomes red, swollen, and narrow.
• airway obstruction: the muscles encircling the airway tighten causing the airway to narrow making it difficult to get air in and out of the lungs.
• airway hyper-responsiveness: the muscles encircling the airway respond more quickly and vigorously to small amounts of allergens and irritants.
common signs and symptoms of an acute asthma episode are included below:
• coughing
• wheezing — may be absent
• breathlessness — while walking or while at rest
• respiratory rate increased
• chest tightness
• chest or abdominal pain
• fatigue, feeling out of breath
• agitation
• increased pulse rate
• inability to participate in sports
During an acute asthma episode, signs and symptoms of increasing respiratory
distress or breathing difficulty include:
• Retractions — increased use of chest, neck or abdominal muscles
• Refusal to lie down — a child may prefer to sit or lean forward in order to make breathing easier

Some individuals are predisposed to developing asthma with a strong family history of the disease. Exposure to inhaled substances and particles that provoke an irritation or allergic reaction in the airways is a significant risk factor for the disease. Irritants may include dust, pollen, mould, smoke, chemical or pollution.

❖ Epidemiology of asthma

The prevalence of asthma varies widely in different regions of the world due to distinct genetic, environmental and occupational risk factors. However, this disparity appears to be closing as the prevalence in high-income countries is reaching a plateau whereas the prevalence in low and middle-income countries continues to rise.
Other triggers that can promote the presentation of asthma symptoms include cold air, anger, fear and physical exercise. Additionally, some medications such as nonsteroidal anti-inflammatory drugs (NSAIDs) and beta blockers can trigger symptoms. Worldwide, it is estimated that approximately 334 million people currently suffer from asthma, and 250,000 deaths are attributed to the disease each year. The prevalence of the disease is continuing to grow, and the overall prevalence is estimated to increase by 100 million by 2025.

❖ **Risk Factors**

Some individuals are predisposed to developing asthma with a strong family history of the disease. Exposure to inhaled substance and particle that provoke an irritation or allergic reaction in the airways is a significant risk factor for the disease. Irritants may include dust, pollens, mould, smoke, chemical or pollution.

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Reducing Burden of Disease

Asthma has a comparably low mortality rate when contrasted with other chronic diseases. Most deaths associated with asthma occur in low and lower-middle income countries. Poor control of asthma has been linked to inadequate access to medication used in the management of the condition.

Asthma is a chronic condition with no known cure, but management options are available to improve quality of life and allow patients to live an uninhibited life. Patient education to increase knowledge about the triggers for asthma so that they can be avoided is the first step to reducing the disease burden. Medications used to relieve symptoms or control inflammation and prevent exacerbation both have a role to play in managing asthma and improving overall outcomes of the disease.[11]

❖ **Difference between acute and chronic asthma**

Acute asthma

Asthma itself is a chronic condition, so it's important to avoid triggers that might bring on an asthma attack. These include allergens and untreated infections. If you have asthma, you must be careful to follow your treatment plan. If your asthma is well controlled, you can usually live a relatively normal life. However, a trigger exposure can cause an acute asthma flare, which is otherwise known as an asthma attack. During an asthma attack, the bronchial passages that allow air in and out of the lungs swell up and become narrow.

The symptoms of acute asthma vary depending on the severity of the attack. Some of the things to look out for are listed below. These symptoms will either appear during an attack or worsen if they already exist.

- Wheezing
- Chest tightness
- Cough
- Shortness of breath
- The sensation of air hunger
- Difficulty sleeping
- Severe fatigue
- Faster breathing
- Increased heart rate
- Unexplained sweating
- Decreased alertness
- Difficulty completing sentences
- Inability to lie flat [1-10]

Chronic asthma

A chronic condition is a health condition or disease that is persistent or otherwise long-lasting in its effects or a disease that comes with time. The term "*chronic*" is often applied when the course of the disease lasts for more than three months. Common chronic diseases include diabetes, functional gastrointestinal disorder, eczema, arthritis, asthma, cancer, chronic obstructive pulmonary disease, Lyme disease, autoimmune diseases, genetic disorders and some viral diseases such as hepatitis C and acquired immunodeficiency syndrome. An illness which is lifelong because it ends in death is a terminal illness. It is possible and not unexpected for an illness to change in definition from terminal to chronic. Diabetes and HIV for example where once terminal yet are now considered chronic due to the availability of insulin for diabetics and daily drug treatment for individuals with HIV which allow these individuals to live while managing symptoms. [13]

In medicine, *chronic* conditions are distinguished from those that are *acute*. An acute condition typically affects one portion of the body and responds to treatment. A chronic condition, on the other hand, usually affects multiple areas of the body, is not fully responsive to treatment, and persists for an extended period of time. [14] Chronic conditions may have periods of remission or relapse where the disease temporarily goes away, or subsequently reappears. Periods of remission and relapse are commonly discussed when referring to substance abuse disorders which some consider to fall under the category of chronic condition. [15] Chronic conditions are often associated with non-communicable diseases which are distinguished by their non-infectious causes. Some chronic conditions though, are caused by transmissible infections such as HIV/AIDS. 63% of all deaths worldwide are from chronic conditions.[16] Chronic diseases constitute a major cause of mortality, and the World Health Organization (WHO) attributes 38 million deaths a year to non-communicable diseases.[17] In the United States approximately 40% of adults have at least two chronic conditions [17][18] Living with two or more chronic conditions is referred to as multimorbidity.[19]

Allergic asthma

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Allergic asthma is the most common type, affecting around 60% of people with asthma in the U.S. Around 8 in 10 people with allergic asthma will also have another allergic condition, such as eczema, allergic rhinitis, or a food allergy. Certain allergens in the environment can trigger allergic asthma. Some common allergens include:

• pollen
• pet dander
• mould spores
• foods such as milk, eggs, and certain nuts
• dust mites, cockroaches, and cockroach faeces
• irritants in the air, such as tobacco smoke and automobile and chemical fumes
• heavily fragranced products, such as perfumes
It is important for people with allergic asthma to seek treatment from a specialist, as this can help them manage their condition. They should also take any prescribed medication as a specialist directs.
The following tips may also help people with allergic asthma avoid common allergens:
• Vacuum and dust regularly in order to remove pet dander, dust mites, and cockroach allergens.
• Keep pets out of bedrooms.
•Avoid outside activities when pollen or air pollution levels are high.
• Avoid foods that trigger allergic reactions, such as milk, eggs, shellfish, peanuts, and tree nuts, including hazelnuts, walnuts, and almonds.
• Reduce the use of harsh chemicals or heavily fragranced products at home.

Nonallergic asthma
Nonallergic, or intrinsic, asthma does not require an allergen to trigger an asthma attack.
It is less common than allergic asthma, accounting for around 10–33% of all asthma cases. It is more likely to appear in adulthood and affects more females than males.
Experts believe that nonallergic asthma develops due to genetic and environmental factors.
For example, symptoms may occur when a person has exposure to:
• cold
• humidity
• stress
• exercise
• pollution
• irritants in the air, such as smoke
• respiratory infections, such as a cold, flu, or sinus infection
Treatment
People with symptoms such as shortness of breath, wheezing, or coughing should seek help from an asthma specialist. This will help them determine what is triggering their symptoms. However, it may take longer to work out what is causing nonallergic asthma
To manage their symptoms, they should also take any prescribed medication as a specialist directs
Other types are: -
•'Seasonal' asthma.
• Occupational asthma.
•'Exercise-induced' asthma
• Difficult asthma.
• Severe asthma
•'Brittle' asthma [4]
Diagnosis & Test
All of these asthma test help your doctor decide if you have asthma and other conditions that often come with it, like allergies, GERD and sinusitis.

Physical Exam
Your doctor will start with a physical exam. They will:
• Look at your nose, throat, and upper airways
• Use a stethoscope to listen for a whistling sound when you breathe
• Check your skin for allergy symptoms like eczema or hives
They'll also ask you about signs of asthma such as:
• Wheezing
• Coughing
• Breathing problems
• Chest tightness

Medical History
Next, your doctor will ask about your symptoms and overall health to figure out if asthma or something else is causing your problem. Some questions might include:
• What are your symptoms?
• When do you have them?
• What seems to trigger them? What about cold air, exercise, or allergies?

• Does a family member have hay fever, asthma, or allergies?
• Does a family member have hay fever, asthma, or allergies?
• What medications do you take?
• Do you often come into contact with tobacco smoke, pets, dust, or chemicals in the air?
What do you do for a living?

Lungs Function Tests
Lung function tests are a way to check how well your lungs are working. Doctors use them to diagnose asthma and to monitor its progression. Monitoring asthma with lung function tests is helpful, because you may not always be able to tell just from your symptoms whether your asthma is under control.
In most cases, you have lung function tests in an exam room that contains special devices to measure lung function. A specially trained respiratory therapist or technician is likely to do the tests.
Ask your doctor if you should do anything to prepare for your lung function tests. For instance, you might need to adjust your medication. You may also need to avoid heavy meals, smoking, and any irritants or other substances that might trigger an asthma attack.

Types of lung function tests
These lung function tests are commonly used to diagnose and monitor asthma:
• Spirometry is the most common. It's a simple, quick, and painless way to check your lungs and airways. You take a deep breath and exhale into a hose attached to a device called a spirometer. It records how much air you blow out (called forced vital capacity or FVC) and how quickly you do it (called forced expiratory volume or FEV). Your score is lower if your airways are swollen or constricted because of asthma or other lung diseases. Your doctor may want you to have several spirometry lung function tests to monitor your asthma over time. You might have spirometry before and after you take medication to see if the medication helps. Your doctor may also want readings taken during exercise to see how your airways react to exercise.
• Challenge tests are lung function tests used to help confirm a diagnosis of asthma. You inhale a small amount of a substance known to trigger symptoms in people with asthma, such as histamine or methacholine. After inhaling the substance, someone tests your lung function. Because challenge tests can trigger an asthma attack, you should have them done only by someone with experience.
• Peak flow meter tests measure how well your lungs push out air. Although they are less accurate than spirometry, these lung function tests can be a good way to regularly test your lung function at home -- even before you feel any symptoms. A peak flow meter can help you know what makes your asthma worse, whether treatment is working, and when you need to seek emergency are. The peak flow meter is a handheld plastic tube with a mouthpiece on one end, which you breathe into. Your doctor might ask you to use the peak flow meter each day and write down the readings. After a couple of weeks, you report the results to your doctor.
• Exhaled nitric oxide test. You'll breathe into a tube connected to a machine that measures the amount of nitric oxide in your breath. Your body makes this gas normally, but levels could be high if your airways are inflamed.

Other Test You May Need If You Have Asthma
Even if your lung function tests are normal, your doctor may order other tests to see what could be causing your asthma symptoms.
• Gas and diffusion tests can measure how well your blood absorbs oxygen and other gases from the air you breathe. You breathe in a small amount of a gas, hold your breath, then blow out. The gas you exhale is analysed to see how much your blood has absorbed.
• X-rays may tell if there are any other problems with your lungs, or if asthma is causing your symptoms. High-energy radiation creates a picture of your lungs. You may be asked to briefly hold your breath while you stand in front of the Xray machine.
Sinuses
Nasal polyps or sinusitis may make asthma harder to treat and control. Sinusitis, also called a sinus infection, is an inflammation or swelling of the sinuses due to infection. When the sinuses become blocked and filled with fluid, bacteria grow, causing infection and inflammation. Your doctor may order a special sinus X-ray, called a CT scan, to examine your sinuses if they think you have an infection. If you have sinusitis, you will be treated with antibiotics for at least 10 to 12 days. Treating the sinusitis may help prevent asthma symptoms.

Tests for Other Conditions
The doctor may also do tests for other conditions that can make asthma worse, like:
• Gastroesophageal reflux disease (GERD)
• Allergies

Judging the Severity of Asthma
Based on these tests and your symptoms, your doctor may diagnose you with asthma. The next step is to find out if your asthma is severe. This will help them decide your treatment. You'll have one of these four types of asthma:
1. Mild intermittent asthma. Mild symptoms less than twice a week. Night time symptoms less than twice a month. Few asthmas attack.
2. Mild persistent asthma. Symptoms three to six times a week. Night time symptoms three to four times a month. Asthma attacks might affect activities.
3. Moderate persistent asthma. Symptoms every day. Night time symptoms five or more times a month. Asthma attacks affect your activities.

4. Severe persistent asthma. You have ongoing symptoms both day and night. They're so frequent that you have to limit your activities. If a doctor diagnoses you with asthma, they can prescribe medications to help manage your condition and prevent attacks.[5]

Treatment

There's currently no cure for asthma, but treatment can help control the symptoms so you're able to live a normal, active life.
Inhalers, which are devices that let you breathe in medicine, are the main treatment. Tablets and other treatment may also need if your asthma is severe.

Inhalers

Inhalers can help:
• relieve symptoms when they occur (reliever inhalers)
• stop symptoms developing (preventer inhalers)
Some people need an inhaler that does both (combination inhalers).
Reliever inhalers
Most people with asthma will be given a reliever inhaler. These are usually blue. You use a reliever inhaler to treat your symptoms when they occur. They should relieve your symptoms within a few minutes. Tell a GP or asthma nurse if you have to use your reliever inhaler 3 or more times a week. They may suggest additional treatment, such as a preventer inhaler. Reliever inhalers have few side effects, but they can sometimes cause shaking or a fast heartbeat for a few minutes after they're used.
Preventer inhalers
If you need to use a reliever inhaler often, you may also need a preventer inhaler. You use a preventer inhaler every day to reduce the inflammation and sensitivity of your airways, which stops your symptoms occurring. It's important to use it even when you do not have symptoms.
Speak to a GP or asthma nurse if you continue to have symptoms while using a preventer inhaler.
Preventer inhalers contain steroid medicine.
They do not usually have side effects, but can sometimes cause:
• a fungal infection of the mouth or throat (oral thrush)
• a hoarse voice
• a sore throat
You can help prevent these side effects by using a spacer, which is a hollow plastic tube you attach to your inhaler, as well as by rinsing your mouth after using your inhaler.
If using reliever and preventer inhalers does not control your asthma, you may need an inhaler that combines both. Combination inhalers are used every day to help stop symptoms occurring and provide long-lasting relief if they do occur. It's important to use it regularly, even if you do not have symptoms. Side effects of combination inhalers are similar to those of reliever and preventer inhalers.
Inhaler technique
Asthma treatments are delivered straight to the lung by inhalation, so correct use of an inhaler device is vital. Incorrect inhaler technique is common and is associated with poorer outcomes, so this element of care must be tackled during the review. There are many different inhaler devices, varying in shape and size, containing a range of medications that require different techniques and different levels of manual dexterity. Nurses carrying out asthma reviews should ensure they are familiar with all the devices that are frequently prescribed in their area and options for individuals who are in difficulties. When working with a patient it is important that the nurse has practical experience in how the various devices work and is able to teach their correct use.[20]
Combination inhalers

Other treatment

Other treatments, such as injections or surgery, are rarely needed, but may be recommended if all other treatments are not helping.
Injections
For some people with severe asthma, injections of medicines called biologic therapies are given every few weeks. These can help to control the symptoms. They are not suitable for everyone with asthma and can only be prescribed by an asthma specialist. The main side effect is discomfort where the injection is given.
Surgery
A procedure called bronchial thermoplasty may be offered as a treatment for severe asthma. It works well and there are no serious concerns about its safety. You will be sedated or put to sleep using a general anaesthetic during a bronchial thermoplasty. It involves passing a thin, flexible tube down your throat and into your lungs. Heat is then used on the muscles around the airways to help stop them narrowing and causing asthma symptoms

WHO Response

Asthma is included in the WHO Global Action Plan for the Prevention and Control of NCDs and the United Nations 2030 Agenda for Sustainable Development.
WHO is taking action to extend diagnosis of and treatment for asthma in a number of ways .
The WHO Package of Essential Noncommunicable Disease Interventions (PEN) was developed to help improve NCD management in primary health care in low-resource settings. PEN includes protocols for the assessment, diagnosis and management of chronic respiratory diseases (asthma and chronic obstructive pulmonary disease), and modules on healthy lifestyle counselling, including tobacco cessation and selfcare.

Reducing tobacco smoke exposure is important for both primary prevention of asthma and disease management. The Framework Convention on Tobacco Control is enabling progress in this area as are WHO initiatives such as MPOWER and m Tobacco Cessation.

The Global Alliance against Chronic Respiratory Diseases (GARD) contributes to WHO's work to prevent and control chronic respiratory diseases. GARD is a voluntary alliance of national and international organizations and agencies from many countries committed to the vision of a world where all people breathe freely.[11]

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