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INNOVATIVE THERAPIES FOR SEVERE ASTHMA: EFFICACY OF BIOLOGICS AND NEW TREATMENT GUIDELINES

ABSTRACT

In this review, we discuss a recent review article about asthma and its research studies. Asthma is a Chronic respiratory condition characterized by inflammation and narrowing of the airways, leading to recurring episodes of wheezing, coughing, chest tightness, and shortness of breath. Numerous risk factors and protective factors along with their molecular mechanism, contribute to the development of asthma. Asthma affects all aged people, with a significant burden on both individuals and healthcare systems worldwide. This abstract provides an overview of asthma, including its etiology, pathophysiology, clinical presentation, diagnosis and management strategies.

Keywords

Types Of Asthma, Etiology, Treatment, Diagnosis, Research Works, Pathophysiology, And Trigger Factors
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INTRODUCTION:

Asthma is a Chronic Respiratory Condition that Causes Inflammation and Constriction of the Airways, Resulting in Symptoms Like Difficulty in Breathing, Coughing, Wheezing, and Chest Tightness. Its Severity Ranges from Mild to Severe, with Trigger Factors Including Allergies, Exercise, Cold Air, or Pollutants. It Involves the Narrowing of the Airway Due to Muscle Spasm, Excess Mucus Production, And Inflammation, Leading to Difficulty in Breathing. Treatment Primarily Involves Medication aimed at Managing Symptoms and Preventing Asthma Attacks.

TYPES OF ASTHMA:

Asthma can be classified into several types based on various factors such as the underlying triggers, age of onset, and severity of symptoms. Here some common types are given below

- ALLERGIC ASTHMA.
- NON - ALLERGIC ASTHMA.
- OCCUPATIONAL ASTHMA.
- EXERCISE - INNDUCED ASTHMA.
- PREGNANCY ASTHMA.
- CHILDHOOD ASTHMA.
- ADULT - ONSET ASTHMA.
- SEVERE ASTHMA.
- COUGH-VARIANT ASTHMA

ALLERGIC ASTHMA:

Allergic asthma is a type of asthma triggered by allergens such as pollen, dust mites, pet danger, or mold.

NON-ALLERGIC ASTHMA:

Unlike allergic asthma, non-allergic asthma is not triggered by allergens. Instead, it may be triggered by factors such as cold air, exercise, respiratory infections, irritants in the air (e.g. smoke, pollution), or certain medications.

OCCUPATIONAL ASTHMA:

This type of asthma happens primarily to people who work around irritating substances. occupational involves exposure to chemicals, dust, fumes, or gases are common triggers for occupational asthma.

EXERCISE-INDUCED ASTHMA:

Physical activity or exercise can trigger asthma symptoms in some individuals. It is also known as exercise-induced bronchospasm. It is characterized by coughing, wheezing, and shortness of breath during or shortly after exercise.

PREGNANCY AND ASTHMA:

Maternal smoking during pregnancy has been linked to various adverse effects on infant's lung function. This can make them more vulnerable to respiratory issues and diseases later on.

CHILDHOOD ASTHMA:

It is also known as pediatric asthma. It is one of the most common chronic conditions in children and can persist into adulthood or improve over time.

ADULT-ONSET ASTHMA:

This type of asthma starts after the age of 18. Asthma that develops for the first time in adulthood is known as adult-onset asthma. It may be triggered by factors such as smoking, obesity, hormonal changes, or occupational exposures.

SEVERE ASTHMA:

Some individuals have asthma that is difficult to control despite treatment with standard medication. Severe asthma is also known as refractory or difficult-to-treat- asthma, requires specialized management.

COUGH-VARIANT ASTHMA:

Severe coughing is a primary symptom of asthma, but it can also be caused by other conditions like postnasal drip, chronic rhinitis, sinusitis, or gastroesophageal reflux disease (GERD). Coughing of sinusitis with asthma is common

Is Cold trigger Asthma and how?

Yes, cold air trigger asthma in some people. When cold air enters the airways, it can cause them to constrict or tighten, leading to asthma symptoms such as coughing, wheezing, and difficulty breathing. Cold air can also irritate the airways, making them more sensitive and prone to inflammation.

ETIOLOGY:

The etiology of asthma is multifactorial, involving a complex interplay of genetic, environmental, and immunological factors. While the exact cause of asthma is not fully understood, several key factors contribute to its development.

1. Genetic predisposition.
2. Environmental factors.
3. Immune dysregulation.
4. Airway hyperresponsiveness.
5. Epigenetic factors.
6. Cigarette Smoking.
7. Obesity.
8. Family history.

TRIGGER FACTOR:

- Allergies.
- Air pollution.
- Other air borne irritants.
- Health conditions like respiratory infection, exercise, or physical activities.
- Weather.
- Air temperature.
- Strong emotions.
- Some medications.

In foods:

2.5% of people with asthma are triggered to severe stages by food. In severe allergic food can anaphylaxis.

- A rotten egg.
- Peanuts.
- Tree nuts.
- Milk.
- Food

These foods aren't directly causing asthma, if we take allergen food may cause chronic asthma

PATHOPHYSIOLOGY:

TRIGGER EXPOSURE (pollen, dust, dander).

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AIRWAY INFLAMMATION

↓

BRONCHOCONSTRICTION (airway narrow, leading to airflow limitation).

↓

MUCUS PRODUCTION (inflammation triggers hyper mucus secretion).

↓

AIRWAY HYPERRESPONSIVENES

↓

SYMPTOMS (shortness of breath, wheezing, etc.).

↓

ASTHMA ATTACK (severe airway obstruction and bronchoconstriction).

↓

RESOLUTION

(Bronchodilators, anti- inflammatory)

TREATMENT:

NON-PHARMACOLOGICAL TREATMENT:

HERBES:

1) Turmeric.

2) Ginseng.

3) Garlic.

4) Black seed.

5) Honey.

6) Chinese herb combination and some others.

1) TURMERIC:

Turmeric has anti-inflammatory properties, and its active compound is curcumin**.** It is powerful antioxidants that play a crucial role in minimizing inflammation.

2) GINSENG:

Ginseng has anti-inflammatory property and immunomodulatory effects, which could potentially benefit asthma patients by reducing airway inflammation.

3) GARLIC:

It has anti-inflammatory and antioxidant properties. Garlic active compound allicin can help reduce oxidative stress and inflammation.

4) BLACKSEED:

It is also known as nigella sativa.it contains thymoquinone. Its antihistamine properties of blackseed helps to reduce allergic reactions**.**

5) HONEY:

Certain compounds of honey such as flavonoids and phenolic acids, have been shown to possess anti-inflammatory properties that could reduce asthma symptoms**.**

6) CHINESE HERB COMBINATION:

While specific combination may vary based on the TMC practitioner's diagnosis and patient's symptoms, there are several commonly used in Chinese herbs for asthma. The herbs are:

- Ma Huang (Ephedra sinica)
- Xing Ren (prunus Armeniaca)
- Gan Cao (Glycyrrhiza Ural Ensis)
- Ku Shen (sophora flavescens)
- Bai Bu (stemona sessilifolia)
- ZiWan (Radix asteris)
- Jie geng (platycodon grandiflours)

Blend includes lingzhi (mushroom) Gan Cao (licorices root) Ku Shen (sophora root).

It reduce Airway constrictor and Inflammation.

TRADITIONAL TREATMENT (AYURVEDIC)

Ayurvedic practitioners has multiple techinques

- Saying mantras
- Massages
- Yoga
- Oral and topical use of herbs
- Dietary and lifestyles changes
- Breathing exercise

Herbs

- Argemone Mexicana

Other herbs

- ***Cassia Sophera***
- ***Piper betel***
- Holy basil (Tulsi)
- Euphorbia Hirta

These have antihistamine, bronchodilating, Anti asthmatic properties.

Tea is treating asthma:

- Ginger teas -zingiber officinale
- Ginger teas - Camellia sinesis
- Black teas - camellia sinesis
- Eucalyptus teas – eucalyptol
- Licorice teas – Glycyrrhiza glabra
- Mullein teas – Verbasscum thapus
- Breathe easy teas

Fennel fruit, licorice root, eucalyptus leaves, peppermint leaf, BiYan Pian (a blend of 11 Chinese herbs).

PHARMACOLOGICAL TREATMENT:

- Bronchodilators: Short-acting beta- agonist (albuterol and levalbuterol),

long-acting beta agonist (salmeterol and formoterol).

- Inhaled corticosteroids (fluticasone, budesonide, beclomethasone).
- Combination inhalers (inhaled corticosteroid and a long-acting beta-agonist.
- Leukotriene modifier (montelukast, zafirlukast, and zileuton).
- Monoclonal antibodies (omalizumab, mepolizumab, reslizumab, benralizumab).
- Anticholinergic (long acting = ipratropium and short acting anticholinergic= tiotropium).
- Oral corticosteroids (prednisone, or prednisolone).

Why is asthma not curable?

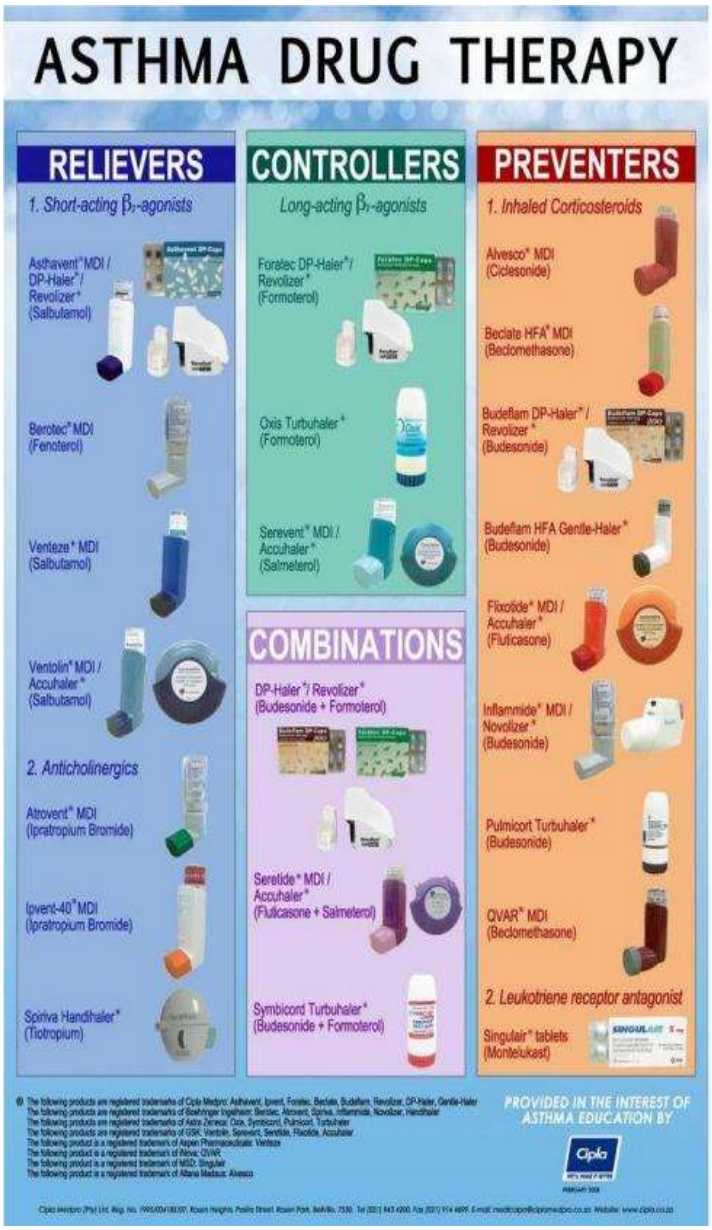
Asthma is considered a chronic condition because it involves inflammation and narrowing of the airways, which can be triggered by various factors like allergies,exercise and environmental conditions. While treatment can effectively manage symptoms, there's currently no known cure for asthma. Research is ongoing to better understand the underlying causes and develop new treatments, but as of now, asthma management focuses on controlling symptoms and preventing flare-ups.

Inhalers color and its means:

- Blue - rescue inhaler.
- Brown - Prevent or controller.
- Green -long -acting bronchodilators(copd).

- Orange or yellow - Prevent or controller, Flovent (corticosteroid),proventil (albuterol sulfate).
- Red, pink or purple -SABA (short-term emergency & long term), Advair (fluticasone propionate & salmeterol).

The above mentioned are some of the colors commonly used by asthma patient



Recent research about Asthma:

Recent research in asthma has explored various avenues, including new treatment options, understanding the underlying causes, and identifying potential biomarkers for personalized medicine. While there have been significant advancements, there have been setbacks and failures in certain areas. For example, some experimental drugs targeting specific pathways in asthma have not shown the expected efficacy in clinical trials, leading to disappointment in their potential as new treatments. Additionally, efforts to fully understand the complex mechanisms of severe asthma and its subtypes continue to face challenges, hindering the development of more tailored therapies.However, despite these setbacks, ongoing research efforts remain focused on improving outcomes for asthma patients through innovative approaches and collaborations within the scientific community.

As the last update in January 2022 it's specific research conducted after the time , including any developments in asthma research in 2024.Ongoing research in the field of asthma on several areas

1.Precision Medicines

2.Gobal Treatment Guidelines

3.Digital Health Solutions

4.Airway Remodeling

5.Biological Therapies

Conclusion

Asthma remains a complex and heterogeneous respiratory condition characterized by airway inflammation, hyperresponsiveness, and intermittent airflow obstruction. Recent research advances emphasize the importance of understanding asthma's varied phenotypes and underlying mechanisms, such as the inflammatory and physical damage caused by

bronchoconstriction. This knowledge enables more personalized treatments, with biological therapies now offering targeted relief for specific asthma subtypes. Updated guidelines advocate for tailored treatment plans, focusing on symptom control and addressing root causes to improve outcomes for patients with moderate to severe asthma . As the field progresses, ongoing research continues to refine both the understanding and treatment of asthma, aiming to improve quality of life and reduce the frequency and severity of attacks.

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