A REVIEW ON MANAGEMENT OF ASTHMA

Sakshi Ashok Shirsath , Ms. Anjali Mali , Dr. Gajanan Sanap

Late Bhagirathi Yashwantrao Pathrikar College Of Pharmacy, Pathri, Tq.Phulambri, Dist.Chhtra.Sambhajinagar

ABTRACT

Asthma is chronic disease which mainly affects lungs, very common in general population. All over the world 300 million people are suffering from asthma. Every year 255,000 people Dies because of this chronic disease. In Asthma airways of the lungs to swell and narrow, leading to wheezing, shortness of breath, chest tightness, and coughing. Asthma is caused by inflammation (swelling) in the airways. When an asthma attack occurs, the lining of the air passages swells and the muscles surrounding the airways become tight. This reduces the amount of air that can pass through the airway . These obstructive airway illnesses are manifested with chronic inflammation affecting the whole respiratory tract. Obstruction is usually intermittent and reversible in asthma, but is progressive and irreversible in COPD. In persons who are sensitive airways, asthma symptoms can be triggered by breathing allergens or triggers. This review mainly explains about the main reasons, symptoms, Diagnosis, Precautions to be taken to avoid further progression, Pathogenes is and treatment of chronic asthma. Asthma continues to be recognized as a well-known respiratory disease requiring complex management. Asthma is assessed and treated by clinicians across the continue. The interest in evidence-based recommendations for diagnosis, treatment, and long term management is ongoing and essential for a ligning clinical practice with its changes.

KEYWORDS *:- Defination, Pathophysiology, types, causes, diagnosis, treatment, prescriptions.*

INTRODUCTION

Asthma is an inflammatory disease of the airways to the lungs.It makes breathing difficult and can makes ome physical activities challenging oreven impossible.

Asthma is one of the most common chronic inflammatory disorders. Its prevalence varies worldwide between 5% and more than 20%. It isn't clear why some people get asthma and others don't, but it's probably due to a combination ofenvironmental and genetic factors. Asthma affects all ages: it is the most common chronic disease of childhood, adolescence and adulthood and has large effects on school and work performance of patients. Asthma is a serious challenge to public health. There is no cure and many patients remain uncontrolled despite available treatment. Combined efforts in public health, basic and clinical research are neededto fight this highly prevalent and increasing disease.

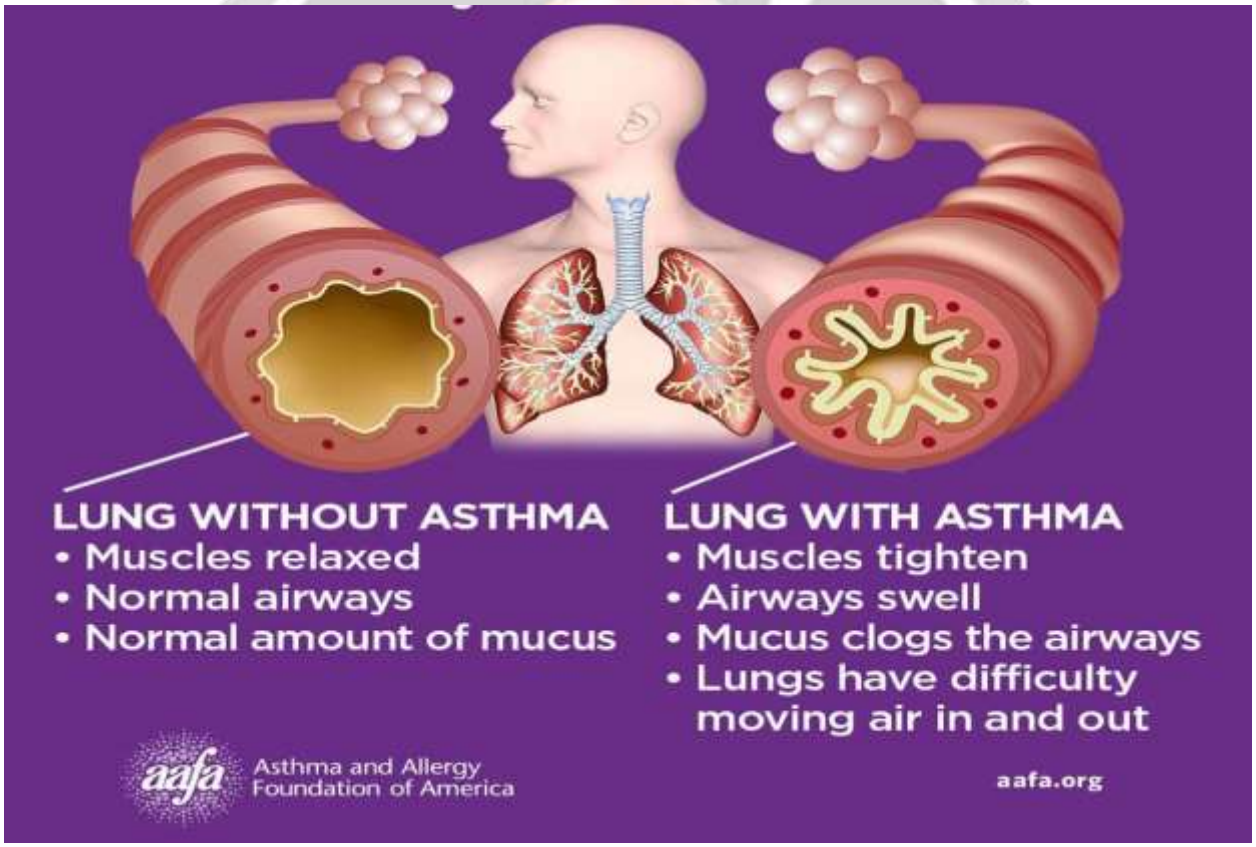
Asthma is chronic disease which mainly affects lungs. All over the world 300 million people are suffering from asthma. Every year 255,000 people are losingtheir lives around the world because of this chronic disease. Asthma is a disease thatcauses the airways of the lungs to swell and narrow, leading to wheezing,

shortness of breath, chest tightness, and coughing. Asthma is caused by inflammation (swelling) in the airways. When an asthma attack occurs, the lining of the air passages swells and the muscles surrounding the airways become tight. This reducesthe amount of air that can pass through the airway. In persons who are sensitive airways, asthma symptoms can be triggered by breathing allergens or triggers. This review mainly explains about the main reasons, symptoms, Diagnosis, Precautions to be taken to avoid further progression, Pathogenesis and treatment of chronic asthma.

WHAT IS ASTHMA

Asthma is one of the most common chronic diseases of childhood, affectingmore than 6 million children.Asthma is characterized by:

- **Airway inflammation**: The airway lining becomes red, swollen, and narrow.
- **Airway obstruction**: The muscles encircling the airway tighten causing the airwayto narrow making it difficult to get air in and out of the lungs.
- **Airway hyper-responsiveness**: The muscles encircling the airway respond morequickly and vigorously to small amounts of allergens and irritants.



PATHOPHYSIOLOGY OF ASHTMA

The phthophysiology of Asthma is complex. Cells Involved inInflammation is as follows**:-**

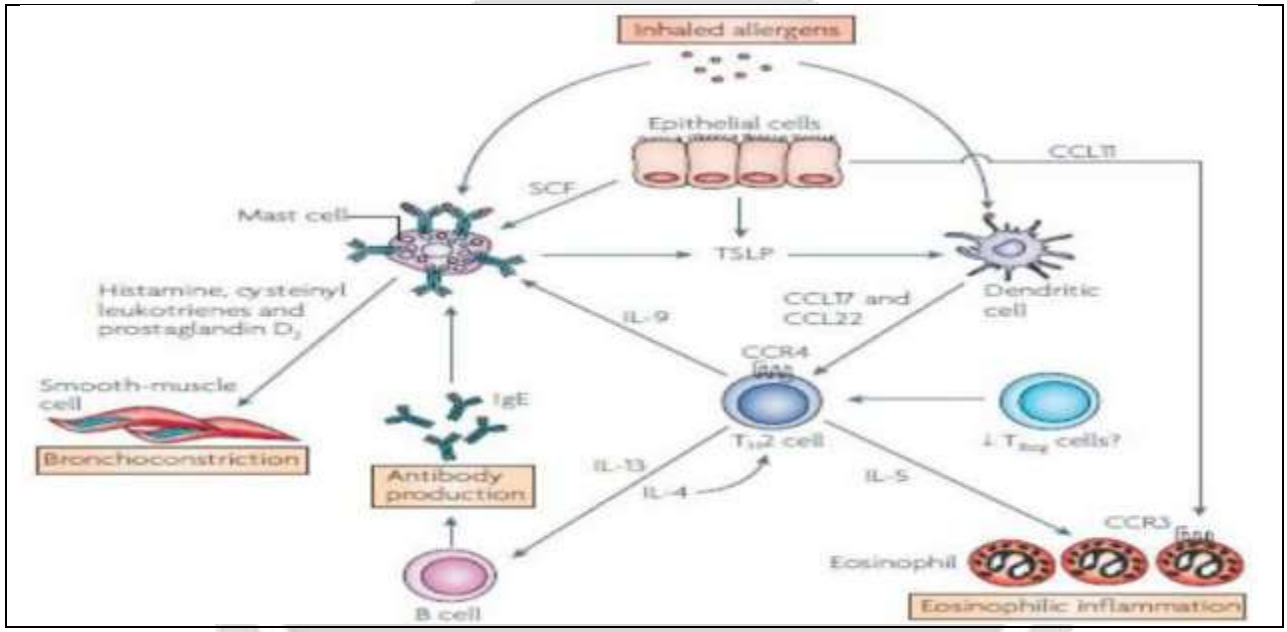
Mast cells:-Activated by IgE dependent mechanism, initiate acute bronchoconstriction action by releasing histamine, ProstaglandinD2, leucotrieneetc.

Macrophages:-Activated by low affinity Ige Receptor, Produce variousInflammotory mediators.

Dendritic cell:-these cells function as key Antigen Presenting cells that Interact with allergens from the airway Surface and then stimulate Th2 cellProduction

Eosinophils :-infiltration is characteristic feature of asthma, activatedby IL-5, causes exacerbation of Asthma by Producing mediators.

Lymphocytes:-T-helper 2 cells (Th2 cells). Activates eosinophilic inflammation by Releasing cytokines(IL-4,IL-5andIL-3) leadst:EosinophilInfiltration, IgE overproduction, development of bronchial hyper responsiveness.



TYPES OF ASTHMA

Asthama is brokendown into various types based on the cause and this verities of symptoms

- intermittent
- mild persistent
- moderate persistent
- severe persistent.

1) Intermittent:-

This type of asthma comes and goes so you can feelnormal in between asthma flares.

- **symptom frequency**: Symptoms may occur about 2 days a week or lessoften.
- **nighttime awakenings**: Symptoms may wake a person two or fewer timeseach month.
- **severity**: Symptoms will not interfere with regular activities.
- **lung capacity**: The result of a forced expiratory volume (FEV) lung capacitytest is usually 80 percent or more of normal values.
- **inhaler use**: A person will need to use a short-acting beta agonist (SABA)inhaler to control symptoms on 2 or fewer days each week.

2) Persistent:-

People with Persistent asthma have symptoms more than twice aweek.

Persistent asthma is divided further as –Mild, Moderate, Severe.

A) Mild persistent asthma

This is the least severe form of persistent asthma.For aperson with mild persistent asthma:

- **Frequency symptom**: Symptoms will occur more often than twice a week but not everyday.
- **night time awakenings**: Symptoms tend to wake a person three or four timesa month.
- **severity:** Symptoms may have a minor impact on regular activities.
- **lung capacity**: The result of a FEV lung capacity test is often 80 percent ormore ofnormal values.
- **inhaler use:** A person will need to use a SABA inhaler to control symptomsmore often than twice a week but not daily.

B) Moderate persistent asthma

This is the second most severe form of asthma.For aperson with moderate persistent asthma:

- **symptom frequency**: Symptoms will occur on a daily basis.
- **nighttime awakenings**: Symptoms will wake a person more often than once aweek but not every night.
- **severity**: Symptoms will limit regular activities somewhat.
- **lung capacity**: The result of a FEV lung capacity test tends to be 60–80percent ofnormal values.

• **inhaler use**: A person will need to use a SABA inhaler on a daily basis.

C) Severe persistent asthma

Severe persistent asthma is the most serious form. For a person with this type ofasthma:

• **symptom frequency**: Symptoms will arise throughout the day.

• **nighttime awakenings**: A person will likely be woken by symptoms everynight.

• **severity**: Symptoms willsignificantly limit regular activities.

• **lung capacity**: The result of a forced vital capacity lung function test tends tobe less than60 percent of normal values.

• **inhaler use**: A person will need to use a SABA inhaler to control symptoms several times a day.

1) Allergic- Some people allergic can cause as an asthma. Allergic includethings like molds, pollense and pet dander.

2) Non Allergic– Out side factor can have asthma to flare up. Exercise, stress,illness, and weather may cause a flare.

3**) Exercise - Induced asthma / Exercise –induced**

bronchospasm–This type is triggered by exercise.

4**) Occupational asthma –**

This type of asthma happens primarily to people who work aroundirritatingsubstances.

5) Asthma–COPD overlap syndrome(ACOS) –

This type happens when someone have both asthma and chronic obstructive pulmonary disease(COPD).

SIGNS AND SYMPTOMPS OF ASTHMA

Asthma attacks or episodes hardly even happen without warning. An attack are. Not Thewarning signs for the same for everyone. Warnings may start 24 to 48 hours. Before an asthmaattack begins & should be treated as early symptoms. Other asthma symptoms may include coughing, especially at night, when laughing on duringexercise. Fightness,Shortness, The Difficulty talking, Chest, Breath, Anxiousness or panic, Fatique,Chest pain, Rapid breathing, Frequent infections trouble Speaking .

CAUSES AND TRIGGERS

Health experts do not know exactly what causes asthma, but genetic &environmentalfactors both seems to play a significant role.

Some Factors, such or sensitization to an allergen, can be both a cause &atrigger. Thesections below list some other causes & triggers.

Pregnancy:-

According to a 2020 study, smoking during pregnancy appears to increase the risk of Feotus developing asthma later in life.

Pregnancy does not cause or induce asthma. Some women may find their asthma gets worse during pregnancy. Others with undiagnosed asthma may start to experience worsened symptoms in pregnancy.

If you start to experience symptoms of asthma, tell your healthcare team. Your doctor can conduct a thorough diagnosis and may conduct a lung function test.

Obesity:-

According to a 2018 study Trusted source, obesity is both a risk Factors Forand a diseasemodification of asthma in both children & adults. A person with obesity may experience more frequents an severe symptoms&acleacreased quality of life.

Allergies:-

Allergies develop when a person's body becomes sensitized to a specificsubstance.Allergic asthma is the most common type of asthma Inhalinganallergentypic causes aperson's asthma symptoms to occur.

Smoking tobacco:-

According to the ALA, smoking cigarettes can triggers asthma symptoms.Smoke irritates the airways, making them swollen, narrow, and filled with sticky mucus the same things that happen during an asthma flare-up.

That's why smoking can cause asthma flare-ups to happen more often. They also might be more severe and harder to control, even with medicine.

Stress:-

Stress can give rise to asthma symptom but so can several other emotions. Joy, anger,excitement, laughter, crying & other emotional reaction can all trigger an asthma attack.

Stress and anxiety can trigger asthma symptoms. By properly managing your stress, you can reduce your risk of having a stress-induced asthma attack or episode. Studies show that mindful breathing and observation can reduce stress and enhance overall health.

Genetic Factors:-

If a parents or sibling has asthma, you are more likely to develop it.

The genetic factor or genetic gene is known to be the basic physical unit of the heredity process. Moreover, genes contain all the necessary information to help ensure the formation, development and functioning of the body. Genetics are formed from the DNA in the chromosomes.

Environmental Factors:-

Air pollution, both at one's home and outdoors, can effect the development and triggers of asthma. A wide range of indoor and outdoor allergens, irritants, as well as cold temperatures, can exacerbate asthma. Household exposures to dust mites and cockroach allergens, and the irritant effects of environmental tobacco smoke, contribute significantly to asthma morbidity.

Common asthma triggersinclude:-

• Animal (pet hair or dander)

• Dustmites certain medicines (aspirin& other NASIDS)

• Changes in weathers

• Chemicals in the air or in Food.

• Mold

• Exercise

• Tobacco smoke

• Strong emotions(stress)

• Air pollution

• Strong chemicals orsmells

• Fungusspores.

• Clust.

DIOGNOSIS AND TREATMENT

Diagnosis of asthma based on medical history, physical examination 4objectivemeasurements, Family history, environmental history.

Medical history (including information about your parentssiblings)Asses for classic

symptoms of asthma:

• Whezzing

• Breathiessness

• Chest tightness

• Cough(with our without seputum)

Diagnostic criteria:-

At least once during diagnostic process when F Evi is confirm that FEv1 FVC is reduced(normally =≥0.75, 0.80 in adults, ≥0.90 in children)

Documented excessive variability in lung function using one or more of the tests below (thegreater the variations , or the more occasions excess variation seen, the more confident thediagnosis):

Positive bronchodilator (BD) reversibility test (more likely to be positive if BD iswith held beforetest SABA ≥4h, LABA≥15h.

Excessive variability in twice daily PEF over 2 weeks

Significant in lung Function after 4 weeks of anti-infammatory treatment.Positiveexercise challenge test.

Positive bronchial challenge test (cusually only preformed in adults)excessive variation in lung Fun between visits class reliable)

A Environmental history:

Seasonal changes, high pollen counts, mold, climate changes (particularlycoldair) for airpollution.

Investigation

1. Lung Function/ pulmonary function test:-

Shows variables air flow limitation

2. Blood tests:-

Shows increase in the number of eosinophils in peripheral blood(70.4xlog/L)

3. Sputumtest:-

The presence of large number of eosinophils in the sputum is a more usefuldiagnostictool.

4. Skin tests(skin–prick tests SPT):

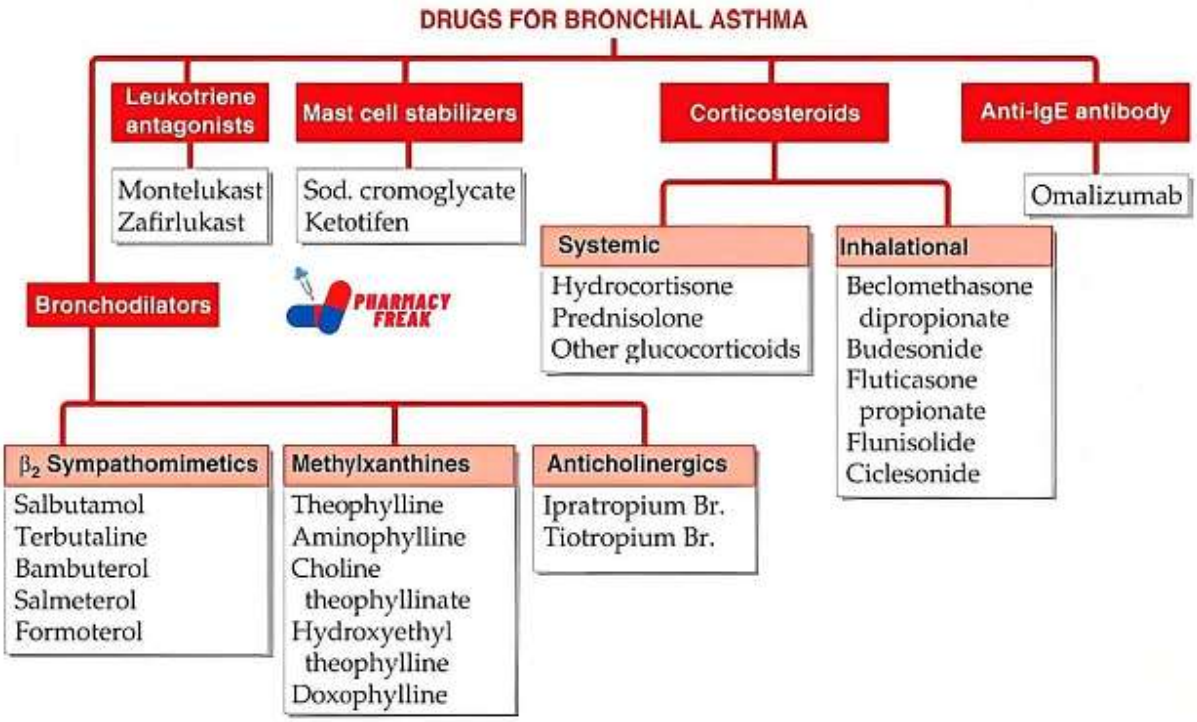
Should be performed in all cases of asthma to help identify allergic causes.

TREATMENT

Early detection 4 management of asthma symptoms are imperative to achieve successful treatment 4 contract in adults, corticosteroids 4 leukotriene receptor antagonists in combination with short for long acting B2 agonists are the fundamental of treatment.

- Inhaled corticosteroids are administered for the inflammatory component of asthma.
- Long acting B2 agonists for leukotriene antagonists are frequently part of the asthma symptom control regime for bronchial hyperresponsiveness.
- For patients who present with symptoms of wheezing while being treated with corticosteroids, a long acting B2 agonists recommended.
- When added to an adult patients treatment plan, long acting B2 agonists resulted in a reduction of exacerbations, improved FEV1, reduced symptoms for improved quality of life.

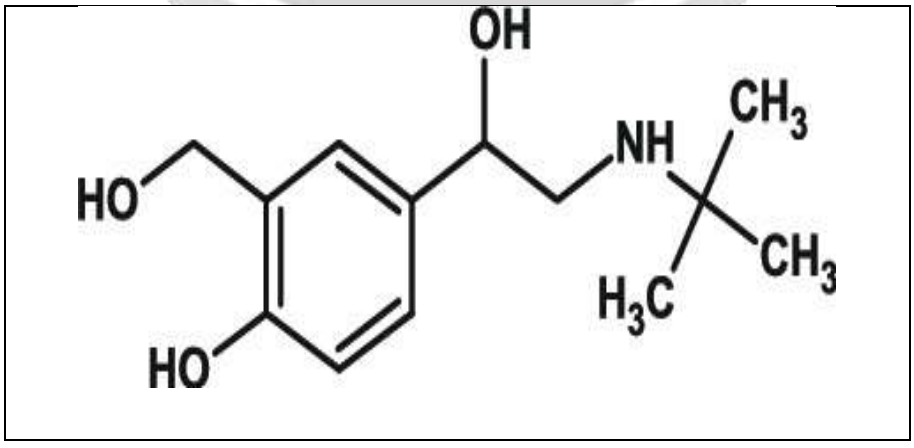
DRUG USED IN THE TREATMENT OF ASTHMA



1) Class 1 Bronchodilators-

Drug Name- Salbutamol

Structure-



MOA:

This are the drugs which comes under smpathomimetics (Adrenergic) category causes bronchodilation through B2 receptor stimulation –CAMP formation in bronchial muscle cell leads to relaxation.

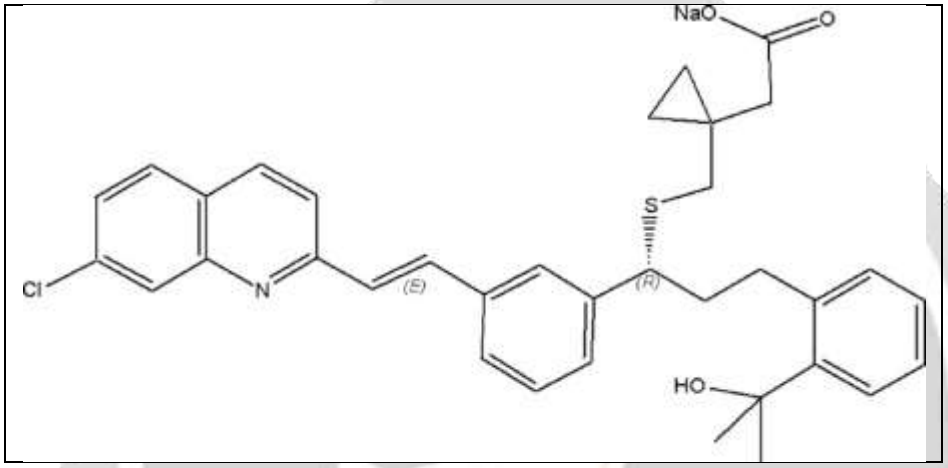
The smooth muscle of the respiratory tract is constituted by a large number of β_2-receptors. Their activity is mediated by the production of cyclic adenosine monophosphate (AMP) as a second messenger. Therefore, as an agonist, salbutamol binds reversibly to these receptors, which are believed to be adenylcyclase, resulting in the conversion of cyclic AMP (15)

2) Class 2

Leukotriene Antagonists

Drug Name- Montelukast

Structure-



MOA:

Both drugs having similar action for clinical utility.

-Block the Cys-leucotriens C4, D4

Membrane phospholipids

PLA (phospholipids) Arachidonic Acid

Lox-5, LTA, 4LT, B4, LTC4 bind to

cystency LTD4LT1 Receptor reads to

Broncho constriction.

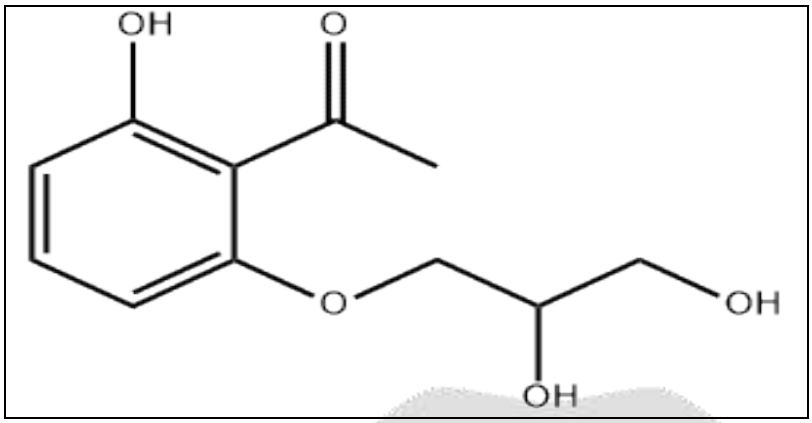
Both this drugs montelukast for to afirlukast block the leukotriene (LT1) Receptor 4 does not cause Bronchoconstriction.

3) Class 3

Mast cell Stabilizers

Drugs Name- Sodium cromoglycate

Structure-



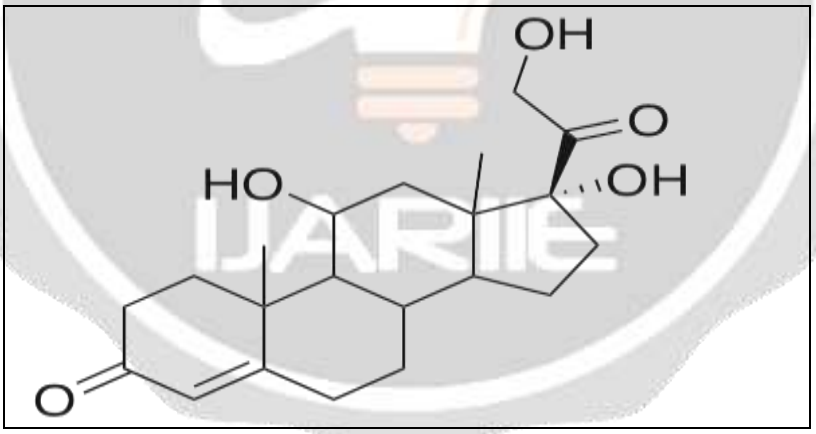
MOA:

It is a synthetic chromon derivative which inhibits degranulation of mast cells by triggers stimuli Cromolyn sodium inhibits the release of inflammatory mediators like histamine and leukotrienes from the sensitized mast cells causing allergies. It basically works at the surface blocking the degranulation that further expands the allergies

4)Class 4

Corticosteroids

Drug Name- Hydrocortisone
Structure-



MOA:

The short term effects of corticosteroids are decreased vasodilation and permeability of capillaries, as well as decreased leukocyte migration to sites of inflammation.Corticosteroids binding to the glucocorticoid receptor mediates changes in gene expression that lead to multiple downstream effects over hours to days. (16)

5) Class 5

Anti-IGE Antibody

Drug Name- Omalizumab

MOA:

Recombinant DNA- derieved monoclonal antibody.

Selectivity bind to human immunoglobin-E (IGE) for decrease binding affinity of IGE to the high.

The mechanism of action involves binding of antibody to the Fc portion of free IgE molecules with added benefit of reducing high-affinity receptors on effector cells, thereby reducing the potential for anaphylaxis in a global, nonallergen targeted manner.

Conclusion

Asthama is a heterogeneous disease affecting millions of people worldwide. It is characterized by airways hyper-responsiveness and air way inflammation withvariable airflow obstruction. Althought the disease can start at any age the first sym. Occur during childhood in the most cases.

In this review detailed discussion was made on the pathogensis, sign and symptoms ,causes, treatment of chronic asthma.

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Thank You...!