
بسم الله الرحمن الرحيم

إن الذين آمنوا وعملوا الصالحات إنا لا نُضَيّعِ أجر مَن أحسن عملاً

الكهف:30

MANAGEMENT OF ASTHMA

Chronic Stable Asthma

A. Non pharmacologic therapy:

-Non pharmacologic management strategies including patient education & avoidance of asthma triggers.

- Education: the goal of asthma education is to improve patient understanding of the disease and its management and consequently to improve adherence to treatment recommendations.
- Environmental control: Avoidance of aeroallergens, viral respiratory pathogens, air pollution and certain drugs (beta blockers, aspirin) can prevent exacerbation, reduce the need for drug treatment and decrease utilization of emergency facilities.

-Influenza vaccination has been shown to reduce the incidence of upper respiratory illneses in people of all ages, thus it would decrease the incidence of exacerbation of asthma. however, this has not conclusively been shown

-Allergen immunotherapy also appears to be of benefit in highly selected patients with defined allergic triggers. As a rule, patients who have many allergic triggers tend to benefit less from immunotherapy than those with a single trigger.

2-Pharmacological Management:
(AsthmaMedications)

-Drugs available for treatment of asthma are:

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Drugs currently available

to treat asthma are classified as long-term control medications or "controllers"and quick-relief medications or "relievers" on the basis of their principal pharmacodynamic and clinical effect.Thus, short-acting bronchodilators such as inhaled beta agonists or anticholinergics are considered quick-relief medications.

Corticosteroids, long-acting beta agonists, leukotriene pathway inhibitors, cromolyn sodium, nedocromil sodium, sustained-release theophylline, and omalizumab are considere long-term control medications, since they are used to achieve and maintain control of symptoms and are usually used daily on a long-term basis.

Former nomenclature that classified drugs according to whether or not they had bronchodilator or anti-inflammatory properties is discouraged, since some medications have anti-inflammatory as well as bronchodilator properties.

I-β-adrenergic agents(*Agonists*:

1-Non selective β-adrenergic agonists:

stimulate both α & β receptors.

i.e., Adrenaline, Nor-Adrenaline, Ephedrine, Isoproternol (onset <5 min., duration 2-3 hrs).

2-Selective β2-adrenergic agonists:

A-Short acting β2-agonists:

-i.e Albuterol, Terbutaline, Salbutamol.

-Method of administration:

Oral (tablets, suspension)

Inhalation: MDI, Solution (Nebulizer), Dry powder.

-Inhaled short acting β2-agonists are the <u>drugs of Choice</u> for relief of symptoms due to acute airway obstruction.By stimulating bronchial smooth muscle β-adrenergic receptors, these agents cause smooth muscle relaxation and bronchodilatation within **10-15** min. of administration. The duration of action of these agents **is 4-6 hrs**. Oral preparations are available for patients who can not use inhalers.

-Side-effects: Tremors, Palpitations, Anxiety, and Hypokalemia.

B-Long acting and sustained release β2-agonists:

-Long acting inhaled β2-agonists (Salmetreol, Formeterol) which have Onset **1-2 hrs**. And at least a Duration of **12 hrs**. of action. These agents are not recommended for the short term relief of acute symptoms, but used as maintenance medications and should be given twice daily on a long term basis.

-Oral sustained release β2-agonists (Albuterol) have one advantage of BID oral administration.

II-Theophylline:

-It has the following properties: (Advantages)

Weak bronchodilator →by inhibiting the Phospho-diesterase enzyme (PDE). Anti-inflammatory effect.

Enhanced mucociliary clearance.

Improved diaphragmatic muscle contractility.

Theophylline now is primarily used as an adjunctive therapy,

-Disadvantages include:

Potential GIT, CNS, and CVS toxicity.

The need to monitor serum levels due to low therapeutic to toxic ratio.

Drug interaction with erythromycin, cimetedine, and ciprofloxacin.

-**Route of administration**:

Oral → sustained release tab., syrup.

Parenteral → I.V, I.M.

Rectal → suppositories.

-Therapeutic serum level → 10-20 µg/ml.

III-Anti-cholinergic agents: Ipratropium

-Anti-cholinergic agents induce airway smooth muscle relaxation by blocking muscarinic receptors on airway smooth muscle thus inhibiting vagally mediated cholinergic tone.

-They have a slower onset of action than β-agonists; the duration of their activity is more prolonged, usually lasting for 6-8 hrs.

-They are often given in combination with β-agonists in the management of severe acute asthma.

-Method of administration:

Inhalation → MDI, solution (Nebulizer).

Short-acting anticholinergic agent ipratropium bromide

long-acting anticholinergic drug tiotropium

It remains to be seen whether the long-acting anticholinergic drug tiotropium will prove to be useful as an asthma treatment.

IV-Corticosteroids:

-Glucocorticoids are the most effective agents available for treating persistent asthma. Steroid efficacy is generally attributed to anti-inflammatory effects.

-Glucocorticoids are available for systemic or inhalation use.

-**Inhaled** glucocorticoids include: Beclomethasone dipropionate, Budesonide, Fluticasone.

-**Systemic** glucocorticoids include:

Oral preparations → Prednisolone, prednisone, cortisone, betamethasone.

Parentral preparations → Hydrocortisone, methyl prednisolone, betamethasone, dexamethasone.

Side effects include:

Systemic → Adrenal suppression, Osteoporosis, Hypertension, DM, Myopathy, Growth suppression, and Psychiatric reaction.

Local → Oral Candidiasis and Dysphonia.

Cromolyn sodium and nedocromil sodium are classified as controller agents, and because they are remarkably safe, these drugs are considered first-line agents in the treatment of children with asthma,

VI- Leukotriene modifiers:

-Zileuton (a leukotriene synthesis inhibitor) and Zafirlukast (a leukotriene receptor antagonist) are oral medications .These agents results in persistent bronchodilatation, reduced asthma symptoms, reduced medication use, reduced awakening from sleep at night, diminished need for prednisone therapy.

VII-ANTI-IGE MONOCLONAL ANTIBODIES

A monoclonal antibody to IgE (omalizumab) rapidly reduces serum IgE and is an adjunctive agent for atopic asthmatic patients dependent on corticosteroids.

PHARMACOLOGICAL MANAGEMENT OF ASTHMA CAN BE DIVIDED INTO:

Long term management:

Formulation of long term management plan for a patient with asthma requires the following:

Assessment of the frequency and severity of asthma symptoms.

The frequency of nocturnal symptoms interfering with sleep.

The degree of disruption of school or work by asthma.

The number of hospitalization or emergency department visits for asthma attacks.

Peak expiratory flow rate (PEFR) or spirometry should be performed to assess the severity of airflow obstruction.

Asthma therapy should be tailored to the severity of asthma for each individual patient.

 # Treatment regimens based on *classification* of asthma *severity* are:

<u>Mild intermittent asthma:</u>

-*<u>Clinical features:</u>* (Cough, wheezing, dyspnea)

- Daytime symptoms ≤ **2** times/wk.
- Nocturnal symptoms ≤ **2** times/mo.
- Peak flow or FEV1 ≥ 80 % predicted (when asymptomatic).

-Therapy:

Short acting β-agonist

→ On an as-need basis (1-2 buffs by MDI).

MILD PERSISTENT ASTHMA:

-Clinical features:

Daytime symptoms > **2** times/wk. but not daily.

Nocturnal symptoms > **2** times/mo.

Peak flow or FEV1 ≥ **80** % predicted.

-Therapy:

Short acting β-agonist → as needed, low dose.

Long acting β-agonist.OR Cromolyn sodium.

OR

Inhaled glucocorticoids.OR Leukotriene modifiers.

MODERATE PERSISTENT ASTHMA:

- Clinical features:

Daytime symptoms → Daily.
Nocturnal symptoms > **1** times/wk.
Peak flow or FEV1 > 60 % to < 80 % predicted.

- Therapy:

Short acting β-agonist → as needed, medium to high dose.
Long acting β-agonist. PLUS
Inhaled glucocorticoids. OR
Sustained release Theophylline.

SEVERE PERSISTENT ASTHMA:

- Clinical features:

Daytime symptoms → Continuous.

Nocturnal symptoms → Frequent.

Peak flow or FEV1 ≤ 60 % predicted.

- Therapy:

Short acting β-agonist → as needed, high dose.

Long acting β-agonist.

Inhaled glucocorticoids.

Sustained releaseTheophylline.or leukotriene modifier

Patients not controlled with inhaled glucocorticoids and one or more long acting bronchodilator are often considered candidates for systemic glucocorticoid therapy **0.5 mg/kg/day for 8-21 days,** followed by a tapering course to the lowest dose that maintain control.

MANAGEMENT OF ACUTE EXACERBATIONS (STATUS ASTHMATICUS):

Acute asthma exacerbations may be Fatal, and patients presents with this condition must be treated aggressively and monitored with great care.

Initial assessment of a patient with an acute exacerbation should include:

History → Focusing on Previous asthma hospitalization, intubations, Steroid use, and symptoms suggesting infection.

Physical Examination → focusing on Vital signs, Breath sounds, Use of accessory muscles, and cyanosis.

Measurement of PEFR or FEV1.

Oximetry→Arterial bl. Gases → in more severe cases.

Standard Therapies:

β-agonists :

→ Inhaled Albuterol , Epinephrine by Nebulizer or MDI.

Corticosteroids :

→ Prednisone, Methyl prednisolone.

→ High dose I.V. (Methyl prednisolone 60-120 mg every 6 hrs.).

Oxygen

→ **Titrated to achieve values of 92-94 %.**

Anti-Cholinergics → Ipratropium bromide.

Theophylline

→ I.V. 5 mg/kg over 30 min. Loading dose.

→ 0.5 mg/kg/hr. Maintenance dose.

Antibiotics → When needed.

QUESTIONS???????

Thank you,