

Management of Bronchial Asthma

Objectives

- Introduction to asthma
- Risk factors for asthmatic attacks
- Risk factors for drug AEs
- Goals for long term management
- Drug classification
- Levels of asthma control
- 5 steps in asthma drug management
- Treatment of asthmatic attacks
- Drug AEs

- **a chronic inflammatory disorder**
- **airways are hyperresponsive**
- **airflow is limited**
 - **Bronchoconstriction**
 - **mucus plugs**
 - **inflammation**

- **Asthma attacks are episodic**
- **Airway inflammation is chronically present**

Risk factors for exacerbations

- Ever intubated for asthma
- Uncontrolled asthma symptoms
- Having ≥ 1 exacerbation in last 12 months
- Low FEV_1

Risk factors for exacerbations

- No ICS, incorrect inhaler technique and/or poor adherence
- High short acting beta₂ agonist (SABA) use, > 1X200 dose canister/month
- Exposures – Smoking, allergens
- Major psychological (depression, anxiety) or socioeconomic problems

Risk factors for exacerbations

- Co-morbidities – Obesity, rhinosinusitis, food allergy
- Pregnancy
- Blood or sputum eosinophilia

Risk factors for drug adverse events

- Frequent oral corticosteroids (OCS)
- High dose inhaled corticosteroids (ICS)
- CYP450 inhibitors

Goals of long term management

- **Achieve and maintain control of symptoms**
- **Maintain normal activity levels, including exercise**
- **Maintain pulmonary function as close to normal levels as possible**

Goals of long term management

- Prevent asthma exacerbations**
- Avoid adverse effects from asthma medications**
- Prevent asthma mortality**

Quick relief drugs

- **Adrenergic receptor stimulants**
 - Short acting β_2 agonists (SABA, inhaled, oral)
 - Epinephrine
- **Short acting anticholinergics**
 - Ipratropium bromide
 - Oxitropium
- **Methylxanthines**

Long-term controller drugs

- **Corticosteroids (inhaled, systemic)**
- **Long acting β_2 agonists (LABA)+ ICS**
- **Mast cell stabilizing agents**
- **Leukotriene pathway inhibitors**
- **Omalizumab**
- **Chromones**

Long-term controller drugs

- **Long acting anticholinergic agents**
 - Tiotropium
- **Anti-IL5 antibodies**
 - SC mepolizumab
 - IV reslizumab
- **Sustained release tablets**
 - Salbutamol, Terbutaline, Aminophylline

- **Controller medication**
 - may be taken daily
 - prevents symptoms
 - improves lung function
 - prevents attacks
- **Reliever medications**
 - occasionally required to treat acute attacks

Levels of asthma control

- **Well controlled**
- **Partly controlled**
- **Uncontrolled**

Levels of asthma control

- **Determined by taking history of the past 4 weeks**
- **Well controlled (All of the following)**
 - **Daytime symptoms (None or $\leq 2/\text{wk}$)**
 - **Limitation of activity (None)**
 - **Nocturnal symptoms/awakening (None)**
 - **Need for reliever (None or $\leq 2/\text{wk}$)**

Levels of asthma control

- **Partly controlled (1-2 of the following)**
 - **Daytime symptoms ($> 2/\text{wk}$)**
 - **Limitation of activity (Any)**
 - **Nocturnal symptoms/awakening (Any)**
 - **Need for reliever ($> 2/\text{wk}$)**

Levels of asthma control

- **Uncontrolled**
 - 3 - 4 features of partly controlled asthma

1. Patient education

- **Avoid risk factors**
- **Take medications correctly**
 - **Understand the difference between “controller” and “reliever” medications**
- **Recognize signs that asthma is worsening and take action**
- **Seek medical help as appropriate**

2. Identify and Reduce Exposure to Risk Factors if possible

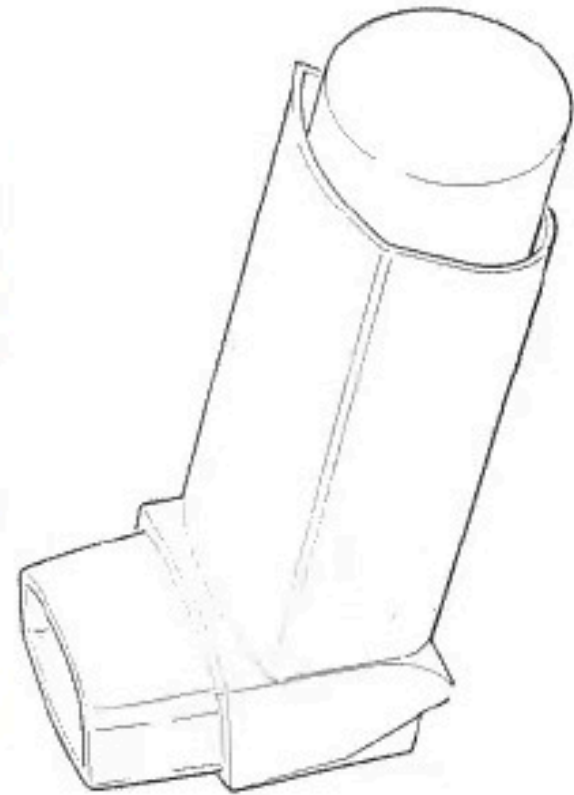
- **House dust mites**
 - **No carpet**
 - **Wash bed linens and blankets weekly in hot water and dry in the sun**
 - **Pillows and mattresses**
 - **air-tight covers**

- **Patients should not avoid exercise**
 - **Prevent by taking a drug before strenuous exercise**
 - **inhaled SABA**
 - **Or leukotriene modifier**
 - **Or cromone**

- **Teach patients how to use inhaler devices**
 - demonstration
 - illustrated instructions
 - check technique at every visit

How to use a metered dose inhaler

1. Remove cap and shake inhaler
2. Breathe out gently
3. Put mouthpiece in mouth and at start of inspiration, which should be slow and deep, press canister down and continue to inhale deeply
4. Hold breath for 10 seconds, or as long as possible then breathe out slowly
5. Wait for a few seconds before repeating steps 2-4



**ALWAYS DEMONSTRATE TO THE PATIENT HOW TO USE
THE METERED DOSE INHALER**

- Stepwise approach to treatment is based on
 - Efficacy
 - Safety
 - Cost

- **Step 1**

- **Reliever**

- **SABA as needed**
 - **OR As needed low dose ICS-formoterol (preferred in GINA 2020 guidelines)**
 - **Data supporting this used only budesonide-formoterol**

- **Controller**

- **As needed Low dose ICS-formoterol**
 - **Or**
 - **Low dose ICS whenever SABA used**

- **Step 2**

- **Reliever**

- As needed low dose ICS-formoterol
 - Or SABA (as needed)

- **Controller**

- Daily low-dose ICS
 - Or
 - As needed low dose ICS-formoterol
 - Other options
 - Leukotriene receptor antagonist (LTRA)
 - Or
 - Low dose ICS whenever SABA used

- **Step 3**

- **Reliever**

- As needed low-dose ICS + formoterol
 - Or SABA (as needed)

- **Controller**

- Low-dose ICS + LABA (preferred)
 - Other options
 - Medium dose ICS
 - Low dose ICS + LTRA

- **Step 3**
- **LABA not used as monotherapy**

- **Step 4**
 - **Reliever**
 - Like step 3
 - **Controller**
 - Medium dose ICS +LABA (preferred)
 - Other options
 - High dose ICS
 - Add tiotropium
 - Or add LTRA

- **Step 5**
 - **Reliever**
 - **Like step 3**

- **Step 5**
 - **Controller**
 - **Should be referred to asthma specialist if available**
 - **High dose ICS-LABA +/- choices below**
 - **Anti – IgE Rx (omalizumab)**
 - **Tiotropium**
 - **For uncontrolled eosinophilic asthma**
 - **Anti IL-5 (for eosinophilic asthma)**
 - » **SC mepolizumab**
 - » **IV reslizumab**
 - **IL5 receptor alpha antibody**
 - » **SC Benralizumab**
 - **Anti IL4 receptor alpha**
 - » **SC Dupilumab**
 - **Or add oral CS (lowest dose)**

Severity of asthma

- **Mild asthma - well controlled at Step 1 or 2**
- **Moderate asthma - well controlled at Step 3**
- **Severe asthma- well controlled at Step 4 or 5**

Severity of asthma

- **If not well controlled**
 - **Check inhaler technique**
 - **Avoid risk factors**
- **Step up Rx until control is achieved**

Severity of asthma

- **If Step 4 not controlling well (3-6 mths)**
 - **Refer to specialist**

- **Well controlled for 3 months and low risk for exacerbations**
 - **Find lowest controlling step**
 - **Reduce ICS dose by 25-50% every 2-3 months**
 - **Stopping low dose ICS is not advised**

	Low dose	Medium daily dose- µg	High daily dose - µg
Beclomethasone (CFC)	200-500	>500-1000	>1000
Beclomethasone (HFA)	100-200	>200-400	>400
Budesonide (DPI)	200-400	>400-800	>800

- CFC = chlorofluorocarbon propellant
- HFA = hydrofluoroalkane propellant
- DPI = dry powder inhaler

- **Frequency of patient review**
 - See patient 1-3 months after the initial visit
 - every 3 -12 months thereafter
- **After an exacerbation**
 - See patient within 1 week

Manage Exacerbations

- **Exacerbations of asthma (asthma attacks) are episodes of a progressive increase in**
- **Shortness of breath**
- **Cough**
- **Wheezing**
- **Chest tightness**
 - **One or a combination of these symptoms.**

- **Do not underestimate the severity of an attack**
 - **Severe asthma attacks may be life threatening**
 - **Treatment requires close supervision**

- **The attack is severe if the patient is**
- **Breathless at rest**
- **Hunched forward**
- **Talks in words rather than sentences (infant stops feeding)**
- **Drowsy, or confused**

- **The attack is severe if**
 - **Has bradycardia**
 - **Has a resp rate > 30 per minute**
 - **Wheeze is loud or absent**
 - **Pulse $> 120/\text{min}$ (infant > 160)**
 - **PEF is $<$ or $= 50$ percent of predicted or personal best**
 - **O₂ saturation (air) $< 90\%$**
 - **The patient is exhausted**

- **Mild or Moderate attacks**
- **Inhaled SABA (spacer/nebulise)**
 - **Begin with 4 to 10 puffs every 20 minutes for the first hour**

- **Oral glucocorticosteroids**
 - Eg 1 mg of prednisolone/kg/d introduced early in the course of a moderate or severe attack (upto 50mg for 5-7 days)
- **O₂ if the patient is hypoxemic**
 - achieve O₂ saturation of 93-95%
- **Check response after 1 hr**

- **Severe asthma**

- **Admit**
- **Combination SABA + ipratropium bromide-
greater improvement**
- **OCS**
- **Oxygen**

- **Theophylline used if inhaled β_2 - agonists are not available**
- **If the patient is already taking daily theophylline measure serum concentration before adding short-acting theophylline**

- **Patients with severe asthma attacks and unresponsive to bronchodilators & systemic glucocorticosteroids**
 - **2 grams of magnesium sulphate IV**

- SABA
 - Tremor, tachycardia
 - Tolerance develops
- LABA
 - Tachycardia, headache, cramps
- ICS
 - Oropharyngeal candidiasis, dysphonia
 - Rinse and spit

- OCS
 - Short term
 - Hyperglycemia
 - GIT effects
 - Mood changes
 - Long term
 - Additional systemic effects

- LTRA
 - Increased LFTs
- Anticholinergics
 - Dry mouth or bitter taste

- **GINA (Global initiative for asthma)
updated 2020**
 - **Global strategy for asthma management
and prevention**
- **Inhaler charts on GINA websites**