
NORTHSTAR HEALTHCARE CONSULTING

CLINICAL COMPASS

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UPDATED ASTHMA GUIDELINES

BACKGROUND

Asthma is estimated to affect more than 22 million people in the U.S., with nearly 6 million being children, and accounts for 500,000 hospitalizations each year. Asthma is a chronic disease, which is characterized by inflammation and constriction of the airways.^{1,2} The inflammation often causes increased sensitivity and thickened mucus production in the lungs. When inflammation occurs, the

muscles around the airway constrict causing a decrease in airflow and, along with the mucus production, causes the airways to narrow to an even greater extent.¹



The exact cause of asthma is unknown. However, factors of asthma can include innate immunity, genetics, and environmental causes.² Substances and situations that can exacerbate an asthma attack include cockroaches, dust and dust mites, smoke, air pollution, pollen, mold, cold air, and exercise. Chemicals and medications, such as sulfites, nonselective beta-blockers, aspirin, and nonsteroidal anti-inflammatory drugs, can induce asthma attacks. The common cold and other infections can also result in an attack.¹

SIGNS AND SYMPTOMS

The signs and symptoms of asthma include coughing, wheezing, chest tightness, and shortness of breath. Asthma symptoms often tend to get worse in the evening and at night. Early signs of asthma can include a cough that does not subside, fatigue, decrease in peak expiratory flow, and shortness of breath. More severe signs of asthma consist of severe wheezing, unable to talk, chest pain, and difficulty breathing.³

DIAGNOSIS

The diagnosis of asthma is made using patient history, physical exam, and lung function tests, including spirometry. Other tests that can be used in assisting the diagnosis of asthma include x-ray, electrocardiogram, and allergy testing. Tests to rule out gastroesophageal reflux disease can also be helpful.²

TREATMENT OPTIONS

The primary goal of treatment for asthma is to maintain lung function. Other goals include reduction in use of short-acting beta₂ agonists, prevention of wheezing, and prevention of chest tightness. The following drugs are used in the treatment of asthma.²

Short-Acting Beta₂ Agonists

Short-acting beta₂ agonists (SABAs) relax smooth muscles in the lungs resulting in bronchodilation. These agents should be used on an as-needed basis in the treatment of asthma and are used in the prevention of exercise-induced asthma. Chronic use of SABAs is not recommended. If SABAs have to be used more than 2 days a week, asthma is considered not under control (with the exception of use in exercise-induced asthma).² Short-acting beta₂ agonists include albuterol, levalbuterol, and pirbuterol.⁴

Long-Acting Beta₂ Agonists

Long-acting beta₂ agonists (LABAs) also relax pulmonary smooth muscles and may be used to prevent exercise-induced asthma, but are not recommended as monotherapy in the asthma treatment. Long-acting beta₂ agonists are the preferred therapy to be used in conjunction with inhaled corticosteroids for chronic therapy.² Salmeterol and formoterol are LABAs indicated for use in asthma.⁴

Inhaled and Oral Corticosteroids

Inhaled corticosteroids (ICSs) are the most effective long-term medications to treat asthma. Inhaled corticosteroids work by limiting the inflammatory process and reduce the risk of exacerbations.² Inhaled corticosteroids include beclomethasone, budesonide, fluticasone, triamcinolone, mometasone, ciclesonide, and flunisolide. Combination products of an ICS and a LABA are available with fluticasone+salmeterol and budesonide+formoterol. Oral corticosteroids are reserved for the treatment of severe asthma and include prednisone and methylprednisolone.⁴

Leukotriene Modifiers

Leukotriene modifiers interfere with the release of leukotrienes to help prevent bronchoconstriction. Leukotriene modifiers are not preferred, but can be used as alternative therapy. These agents can also be used with inhaled corticosteroids; however, leukotriene modifiers are not considered preferred therapy over adding a LABA in patients 12 years of age and older.² Leukotriene modifiers include montelukast and zafirlukast, and zileuton.⁴

Mast Cell Stabilizers

Mast cell stabilizers reduce hypersensitivity by interfering with chloride channels on mast cells.^{2,5} Mast cell stabilizers are recommended as alternative, but not as preferred therapy. Mast cell stabilizers can be useful in the preventive treatment prior to exercise as well as unavoidable exposure to known allergens.² Mast cell stabilizers include cromolyn and nedocromil.⁴

Methylxanthines

Theophylline is believed to work via mild anti-inflammatory effects.² Theophylline also has some bronchodilatory effects caused by relaxation of the smooth muscles in the airways.⁵ Theophylline is recommended in conjunction with an ICS or as an alternative, but not preferred, therapy in children 5 years of age and older.² Serum concentrations of theophylline must be monitored.^{4,5}

Immunomodulators

Omalizumab is a monoclonal antibody that prevents the binding of IgE on mast cells and basophils helping to reduce the allergic response. Omalizumab is only reserved as adjunctive therapy and for patients aged 12 years and older with hypersensitivity to relevant allergens, such as dust mites, cockroaches, cats and dogs.² Omalizumab should be administered in a clinical setting due to the possible risk of anaphylaxis and may also increase the risk of malignancies.^{4,5}

TREATMENT GUIDELINES

Updated treatment guidelines from the National Heart Lung and Blood Institute (NHLBI) Expert Panel Report 3 (EPR-3) are based on the age of the patient and severity of asthma. Asthma is classified as either mild intermittent, mild persistent, moderate persistent, or severe persistent. Mild intermittent asthma only requires as needed treatment while severe persistent requires multiple medications for the management of asthma symptoms. The table below highlights the NHLBI EPR-3 treatment guidelines.²

New Stepwise Approach for Asthma Patients (All Ages)						
	Intermittent	Persistent				
Ages	Mild	Mild	Moderate		Severe	
	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
0-4 years of age						
Preferred	SABA as needed	Low dose ICS	Medium dose ICS	Medium dose ICS + LABA or montelukast	High dose ICS + LABA or montelukast	High dose ICS + LABA or montelukast + oral corticosteroids
Alternate		Cromolyn or montelukast				

5-11 years of age						
Preferred	SABA as needed	Low dose ICS	Low dose ICS + (LABA, LTRA, or theophylline) or medium dose ICS	Medium dose ICS + LABA	High dose ICS + LABA	High dose ICS + LABA + oral corticosteroid
Alternate		Cromolyn, nedocromil, LTRA, or theophylline		Medium dose ICS + LTRA or theophylline	High dose ICS + LTRA or theophylline	High dose ICS + LTRA or theophylline + oral corticosteroid
12 years of age and older						
Preferred	SABA as needed	Low dose ICS	Low dose ICS + LABA or medium dose ICS	Medium dose ICS + LABA	High dose ICS + LABA and consider omalizumab for patients with allergies	High dose ICS + LABA + oral corticosteroid and consider omalizumab for patients with allergies
Alternate		Cromolyn, nedocromil, LTRA, or theophylline	Low dose ICS + either LTRA, theophylline, or zileuton	Medium dose ICS + either LTRA, theophylline, or zileuton		

Adapted from the NHLBI EPR-3 2007 guidelines for the diagnosis and management of asthma.

SABA=short-acting beta² agonist; ICS=inhaled corticosteroid; LABA=long-acting beta₂ agonist; LTRA=leukotriene receptor antagonist

Parents of patients aged 0-4 years old in Step 3 or higher should consult an asthma specialist and an asthma specialist should be considered at Step 2. An asthma specialist should be consulted for patients aged 5 years and older in Step 4 or higher, and a consultation with a specialist should be considered at Step 3.²

SURVIVAL

From 1980-1994, the prevalence of asthma has increased 75%. There are approximately 10 million new cases of asthma each year, and of these, nearly half of the new diagnoses are in children less than the age of 10.⁵ Asthma-related emergency room visits account for 5,000 visits and causes over 1,000 patient admissions into the hospital each day. Asthma causes an estimated 5,000 deaths each year.⁶

CONCLUSION

Asthma affects millions of people each year. Currently, there is no cure; however, with medications, asthma can be controlled. Asthma should be controlled as soon as symptoms appear. Asthma is a chronic disease that should be carefully monitored and managed by physicians via lung function tests, asthma action plans and detailed patient histories. Patients should also use peak flow meters and record their measurements to help better manage their disease.²

Pharmacists can play a vital and active role in the care of patients with asthma. Counseling on the proper use of inhalers can help improve patient therapy. Pharmacists can also assist in monitoring patients based on the frequency of albuterol fills. Counseling on key points, such as allergen avoidance and flu vaccination, can lead to better patient outcomes. For children, the use of spacers and masks help improve the delivery of the drug into the lungs.²

REFERENCES

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