Asthma Pharmacotherapy

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KEYWORDS

• Asthma • Therapy • Medications • Short acting beta agonists
• Inhaled corticosteroids • Long acting beta agonists • Anti-IgE therapy

KEY POINTS

- Inhaled SABAs are the preferred medication for intermittent asthma symptoms and acute reversal of bronchoconstriction.
- Persistent asthma symptoms are preferably managed with inhaled corticosteroids (ICSs) with or without adjunctive therapy consisting of LTRAs, zileuton, or theophylline.
- Particle size of inhalers plays a key role in lung deposition and hence effectiveness.
- Omalizumab, anti-IgE therapy injection, has been indicated as an adjunct for persistent allergic patients with asthma uncontrolled with ICS+LABA combination therapy with a low risk of anaphylaxis after injection.
- Many novel asthma therapies are being investigated that target gene expression, anti-inflammatory mechanisms, and steroid resistance.

INTRODUCTION

Asthma represents a chronic inflammatory process marked by bronchial hyperactivity, mucus hypersecretion, and airway edema that leads to airway obstruction. These changes in the airway initially are reversible, but with continued airway remodeling the extent of reversibility may vary, leading to more difficult management. The goals of asthma pharmacotherapy are to reverse the inflammatory state and airway obstruction. The National Asthma Education and Prevention Program (NAEPP) Expert Panel has devised evidence-based guidelines for asthma care, including recommendations for therapy based on asthma severity (**Fig. 1**).[1]

BETA-2 AGONISTS

Short-Acting Beta-2 Agonists

Short-acting beta-2 agonists (SABAs), such as albuterol and levalbuterol, are recommended for intermittent asthma symptoms and serve to immediately reverse

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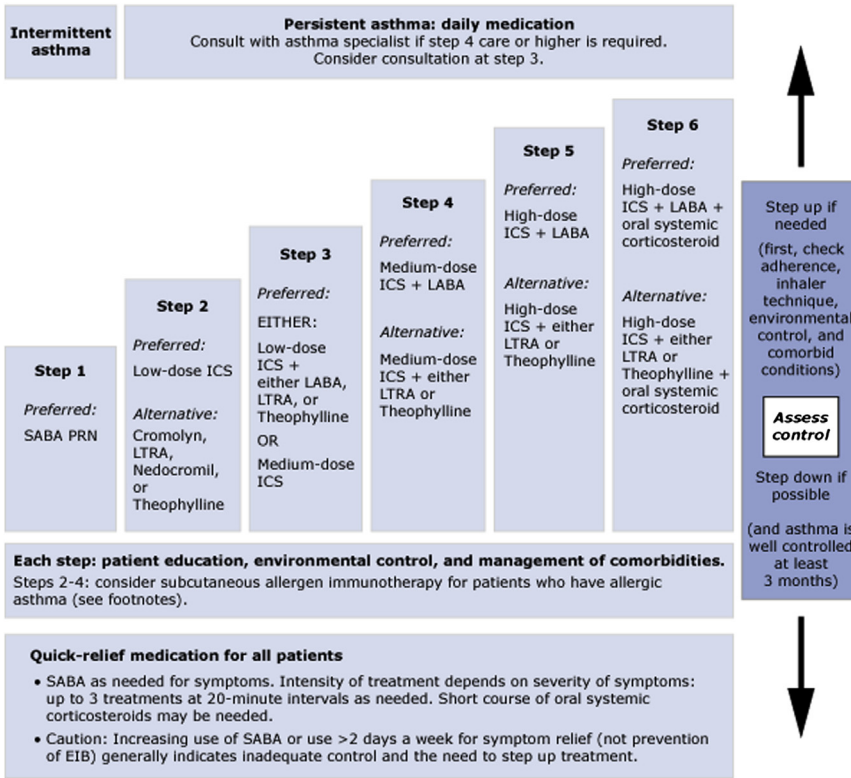

Fig. 1. NAEPP expert panel guidelines for asthma care. (*From* National Heart, Lung, and Blood Institute. Full Report 2007, guidelines for the diagnosis and management of asthma. Available at: www.nhlbi.nih.gov/guidelines/asthma. Accessed September 10, 2013.)

bronchoconstriction via potent bronchodilation. The mechanism of action is via a selective interaction on beta-2 receptors of bronchial smooth muscle to achieve bronchodilation. SABAs are the preferred medication for acute asthma exacerbations as a rescue inhaler due to the quick onset of bronchodilation. Regular use of SABAs is not recommended because of the development of tachyphylaxis and increased hyper responsiveness.

Long-Acting Beta-2 Agonists

Long-acting beta-2 agonists (LABAs), salmeterol and formoterol, provide approximately 12 hours of bronchodilation. The mechanism by which LABAs provide long-acting effects has not been clearly delineated. Multiple mechanisms have been described in the development of once-daily ultra- LABA preparations, including partitioning of the drug into lipophilic compartments after inhalation forming small depots of the drug, the presence of small lipid rafts in airway smooth muscle, and the tight binding to beta-2 adrenoreceptor and formation of ternary complexes.[2]

Since 2005, LABAs are no longer recommended as sole agents for the management of asthma. In 1993, Castle and colleagues,[3] in a study using salmeterol, showed convincing evidence that mortality increased threefold in patients with asthma, which led to a study influenced by the Food and Drug Administration (FDA), the Salmeterol