

Key considerations in pediatric asthma management

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Asthma is a chronic condition with symptoms of cough, wheezing, chest tightness or pain, and/or difficulty breathing. These symptoms occur periodically, usually related to specific triggering events. The small airways of people with asthma narrow during these episodes; the narrowing is partially or completely reversible with asthma treatments. In addition, the airways in patients with asthma react to a variety of stimuli, which may include viral illnesses, exercise, inhalant or food allergens to which the patient is allergic, or environmental conditions.

The diagnosis and management of asthma in young children is difficult, since there are many different wheezy phenotypes with varying underlying etiologies and outcomes. Asthma occurs when the small airways (bronchi) in the lungs become inflamed and narrowed, which limits the flow of air out of the lungs. This narrowing is almost always completely reversible with treatment in children. Many different genetic, infectious, and environmental factors may increase the risk of developing asthma, a few of which include: viral infections, pollution, exposure to tobacco smoke, family history, stress, etc. However, not all children with asthma have known risk factors. In other words, even children who live in unpolluted areas and whose parents do not smoke or have asthma can develop asthma. It is not clear if there are ways to reduce a child's risk of developing asthma.

Diagnosis

Fifty to 80 percent of children with asthma develop symptoms before five years of age. Asthma symptoms vary widely and may mimic other childhood diseases (e.g., upper respiratory infections). When parents report episodic or persistent coughing, wheezing, shortness of breath, rapid breathing or chest tightness, and if these symptoms are worse during the evening or early morning hours, or are associated with triggers (e.g., exercise, allergen exposure), the physician should suspect asthma.

The diagnosis of asthma in children requires a careful review of a child's current and past medical history, family history, and a physical examination. Specialized testing is sometimes needed to diagnose asthma and to rule out other possible causes of symptoms.

Managements

Managements should include patient education, trigger avoidance and drug therapy regimens that enable patients to function without limitations from asthma symptoms.

PHARMACOLOGIC THERAPY

Many asthma guidelines recommend daily inhaled corticosteroid (ICS) as first-line therapy in children of all ages. Asthma is classified into four levels according to its severity: mild intermittent, mild persistent, moderate persistent or severe persistent. ICS has been generally expected to change the natural history of asthma if started in the young child, at the age when most asthma begins. Despite this expectation, the role of ICS therapy in altering the natural course of disease in this population of patients with emerging asthma is not well defined.

Wheezing is the classic symptom of asthma, and early childhood wheeze is common. However, less than half of children who wheeze will develop persistent asthma. Some study findings suggest that, of those children with early wheeze who do progress to persistent childhood asthma, lung function abnormalities and airway remodelling are detectable early in life and can increase in magnitude with time.

1) Short and long course medications

Short-acting beta2 agonists rapidly relax bronchial smooth muscle and are the therapy of choice to relieve acute symptoms and prevent exercise-induced bronchospasm. Beta2 agonists relieve symptoms but do not affect the underlying disease. These agents have a good safety record but are subject to overuse because they provide rapid relief and have a short duration of effect.

Overuse indicates that asthma is not controlled and requires increased anti-inflammatory treatment. Therefore, refills of reliever medications should be closely monitored.

Medications for long-term control should be taken daily to maintain control of asthma and prevent exacerbations. Inhaled corticosteroids are the most potent and effective long-term anti-inflammatory medications. They reduce inflammation in airways, improve pulmonary function to a greater degree than any other medication, reduce bronchial hyperresponsiveness and may reduce some aspects of airway remodeling, thus modifying disease progression. Some corticosteroids are effective in once- or twice-daily dosing regimens and may be used in all patient groups and for all levels of disease severity.

2) Leukotriene receptor antagonists

Leukotriene receptor antagonists (LTRAs) prevent airway remodelling, has been replicated in murine models. However, international guidelines recommend LTRA as second-line therapy after ICS in children of any age. Although findings from multiple studies have shown increased efficacy of ICS therapy in children with atopy, the benefits of montelukast include ease of administration and a favourable safety profile. Therefore suggest that montelukast might have a role as first-line therapy in children without an atopic history who need daily asthma medication because of multitrigger wheeze. Even in children with atopy, montelukast could have a role in treatment if there are concerns about growth and about poor technique or adherence for inhaled therapy. Unfortunately, no long-term studies of montelukast have been done in young children.

3) Biological therapies

Immunobiologicals have some tertiary asthma-prevention properties. As an example, omalizumab use in toddlers for the prevention of progression to persistent childhood asthma is being tested in the Controlling and Preventing Asthma Progression and Severity in Kids clinical trial, Studies of dupilumab and mepolizumab in childhood asthma are ongoing. Further studies might help stratify which children are most likely to benefit from this intervention, although it is likely to be children at high risk of developing persistent asthma.

The microbiome is also an active area of research. In a recent study of Brocho-Vaxom given to toddlers with recurrent wheeze (10 days per month for 3 consecutive months), the frequency ($p < 0.001$) and duration ($p = 0.001$) of wheeze attacks decreased compared with placebo in children aged 1–6 years. The efficacy of Brocho-Vaxom (10 days per month for 2 years) on time to occurrence of first lower respiratory tract infection with wheezing during a third observation year in high-risk infants is being tested in an ongoing trial.

EDUCATION

Education for patients and caregivers should focus on the identification and avoidance of triggers, understanding the uses of prescribed medications and the importance of compliance and monitoring, as well as the proper use of inhalation devices. Daily self-management plans provide guidance for patients in peak flow monitoring, medication usage and symptom reporting.

Emergency action plans help identify an exacerbation and delineate the actions to take. These plans should be developed in consultation with caregivers and patients. And aslo, provided to them in writing. Education are getting import in child asthma management. Therefore, in Korea there are 6 Atopy Asthma

Education Information Center with support from the Korean Centers for Disease Control and Prevention and the Ministry of Health and welfare and 6 cities or provinces.

And Korea Asthma Allergy Foundation is conducting certification of Atopy and Asthma- Friendly School (AAFS).

Conclusions

The international guideline for diagnosis and management of asthma in children aged 5 years or younger reiterates the difficulty in diagnosing asthma in this age group. Further randomised trials with younger child at risk of persistent asthma, potentially incorporating other measures in addition to atopic history, such as biomarkers, will help clarify which infants are most likely to benefit from early treatment. These efforts will further the goal of identifying children who are most likely to benefit from appropriate treatment, while minimising long-term risk to other children who are less likely to benefit.

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