

Recent Guidelines in Bronchial Asthma Management in Children: Review Article

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ABSTRACT

Background: A common childhood and adolescent illness, asthma is a chronic inflammatory condition marked by episodes of wheezing, dyspnea, tightness in the chest, and coughing. A mix of genetic and environmental factors is likely to be responsible for its occurrence. A short-acting beta-2 agonist (such as salbutamol) breathed into the lungs is mainly used to treat acute symptoms. Inhaling corticosteroids and avoiding triggers like allergens and irritants can help prevent symptoms.

Objective: to determine the recent treatment modalities in bronchial asthma management in children.

Conclusion: many scientific advances have improved our understanding of asthma and ability to manage and control it effectively. However, recommendations for asthma care need to be adapted to local conditions, resources and services.

Keywords: Bronchial asthma, Corticosteroids, Short-acting beta-2 agonist.

Bronchial Asthma:

Inflammation of the airways is a characteristic of asthma, which is a long-term, diverse disease. Wheeze, shortness of breath, tightness in the chest, and cough are all respiratory symptoms that can change with time and intensity, along with a fluctuating expiratory airflow restriction that may become permanent later on in the disease process ⁽¹⁾.

Epidemiology:

Asthma is a clinical ailment that affects millions of children throughout the world every year. In the United States alone, asthma affects about 25 million individuals. 6.4 million of these are children living in the United States. It is indicated that the global incidence of asthma has plateaued in some wealthy countries but continues to climb in low and middle-income countries ⁽¹⁾.

Diagnosis of asthma:

Making an asthma diagnosis relies heavily on finding both a distinctive pattern of respiratory symptoms as well as a changeable restriction in expiratory airflow. Because it is difficult to establish a diagnosis of asthma once the controller is started based on the pattern of respiratory symptoms and data supporting the diagnosis, asthma should be diagnosed as soon as a patient first presents ⁽²⁾.

History:

The presence of asthma or atopic condition in either mother or father is highly associated with asthma; diagnosis is based primarily on family history ⁽³⁾. Atopic march, a pattern of clinically described atopic disorders, is present in the patient's medical history. Asthma first developed in childhood when the atopic march first showed up as eczema or allergic rhinitis in infancy ⁽⁴⁾. There has also been a link shown between asthma risk and early exposure to allergens like house dust mites ⁽⁵⁾.

Presentation of asthma symptoms: Asthma symptoms present itself in a non-specific and varied manner during

early life, making a diagnosis challenging. Coughing, wheezing, and shortness of breath are all frequent symptoms, especially at night. Asthma diagnosis relies heavily on whether or not bronchodilators have improved symptoms in children of this age range. Allergens tend to be the primary cause of these intermittent symptoms ⁽⁶⁾.

While the symptoms commonly present in late childhood include wheezing, chest tightness, and non-localized chest pain, which are usually intermittent and primarily linked to allergen and exercise-induced symptoms, this results in decreased activity and a refusal to perform any exercise; however, severe attacks are more common when exposed to triggers ⁽⁷⁾.

Physical examinations:

Asthma symptoms can vary from person to person, and most individuals only have a history of asthma symptoms when they first visit the doctor. Acute attack symptoms are most often detected through auscultation, which reveals a wheezy chest and a prolonged expiration time. Respiratory distress may also take the form of tachypnea, retraction, grunting or even cyanosis, which necessitates the use of supplemental oxygen ⁽⁸⁾.

Investigations:

When asthma is suspected, a pulmonary function test must be performed. Asthma is mostly clinically diagnosed. In order to reduce overdiagnosis or underdiagnosis, several algorithms were developed to link clinical history and symptoms to specific tests ⁽⁹⁾.

Treatment of Asthma (Fig. 1):

Asthma treatment's goal is to regulate symptoms while preserving children's regular activities and reducing airway inflammation ⁽¹⁰⁾. Another goal is to lessen flare-ups, keep lung function and development intact, and reduce drug side effects to a minimum.



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The GINA cycle of asthma care

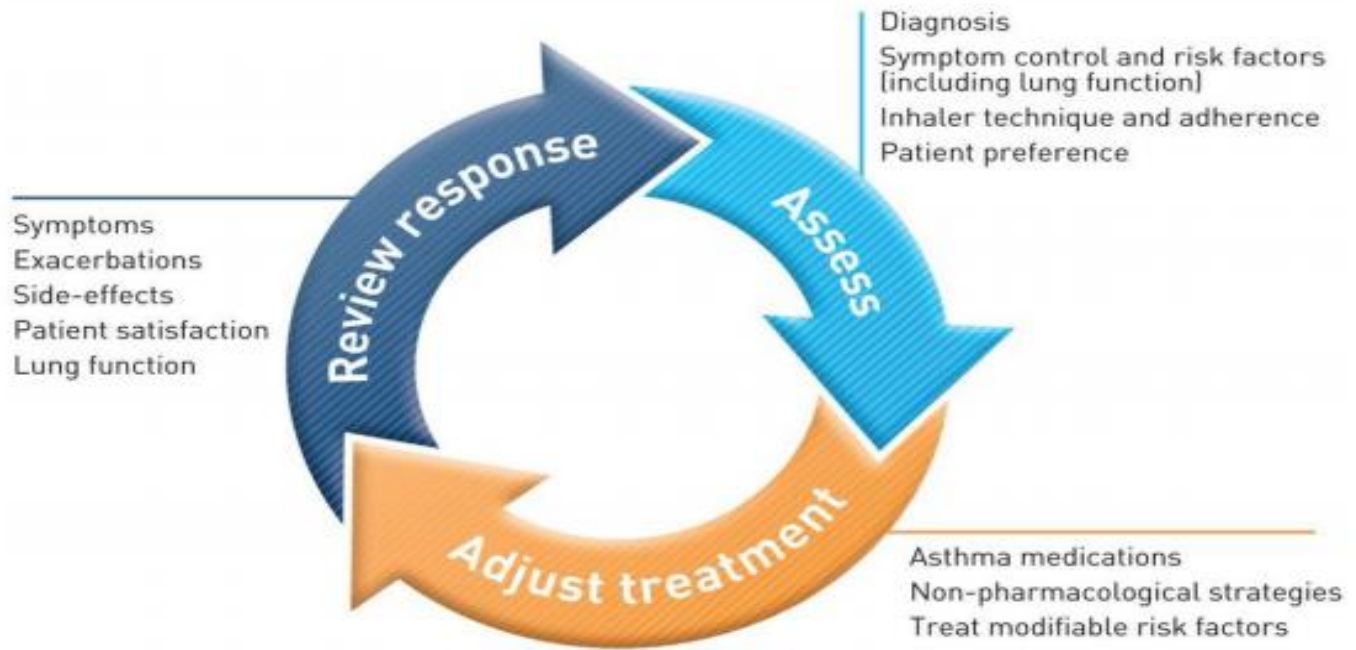


Figure (1): Asthma control cycle for individual asthma treatment ⁽¹⁾.

Asthma medication:

Controller medication:

These are administered on a regular basis as a preventative measure.

To reduce airway inflammation, control symptoms, and limit future risk factors such as exacerbations and decreased lung function, these medications are employed ⁽¹⁰⁾.

Reliever medications:

These medications are given to all patients as needed to ease the symptoms of asthma or asthma attacks. Exercise-induced bronchoconstriction (EIB) can be prevented in the short-term using these medications ⁽¹⁾.

Add-on therapies for patients with severe asthma:

Regardless of optimizing treatment with high dose controller medications (such as high dose inhaled corticosteroids (ICS) and long acting beta agonist (LABA)) and treating modifiable risk factors, these drugs may be used with patients who have persistent symptoms or exacerbations ⁽¹⁾.

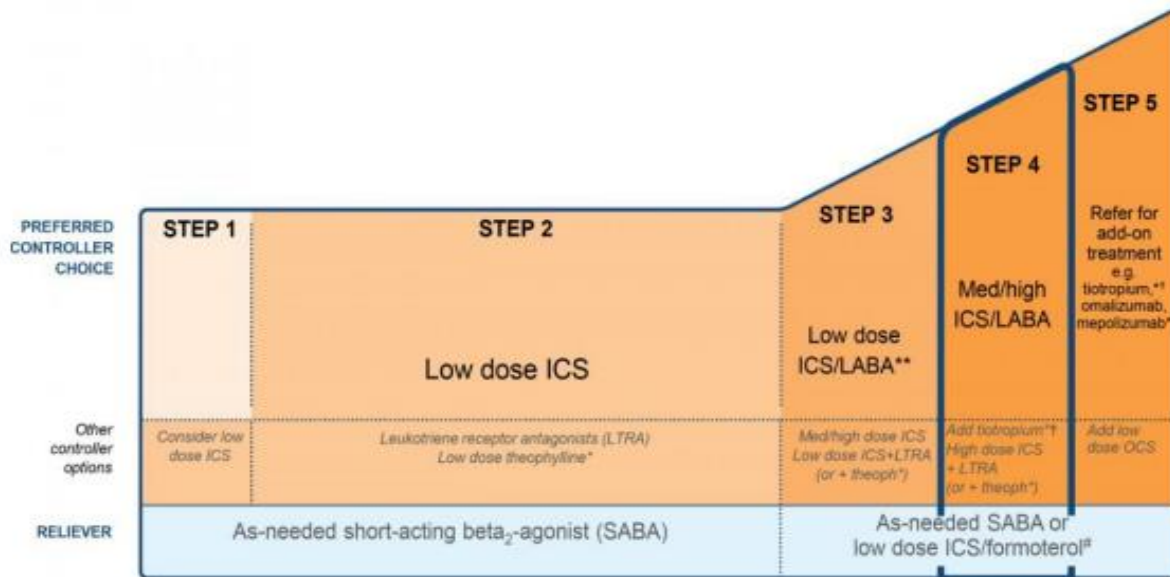
Stepwise approach for adjusting asthma treatment (Fig. 2):

The treatment decision for asthma is based on a personalised asthma cycle evaluation, therapy adjustment, and response monitoring once asthma treatment has been contemplated. A step-up or step-down treatment method is used to increase or decrease asthma therapy based on asthma control. In order to assess symptom control and minimise the risk of exacerbation, permanent airflow limitation, and drug side effects, a follow-up visit should be scheduled within 2-3 months after starting treatment. Step-down treatment should take place once good asthma control has been achieved in order to use the lowest dose of medication that leads to good control of symptoms ⁽¹⁰⁾.

Before stepping up treatment, patients with uncontrolled asthma who have been on controller medication for 2-3 months must revise and regulate the following things ⁽¹⁾:

Verify with the doctor's diagnosis that the symptom is due to asthma and not something else.

- Make sure you're using the inhaler correctly.
- Dosage confirmation for excellent adherence.
- Avoid exposure to allergens and smoking as risk factors.



*Not for children <12 years

**For children 6-11 years, the preferred Step 3 treatment is medium dose ICS

††For patients prescribed BDP/formoterol or BUD/ formoterol maintenance and reliever therapy

† Tiotropium by mist inhaler is an add-on treatment for patients ≥12 years with a history of exacerbations

Figure (2): The use of a stepwise long-term therapy method in children aged 6 to 11 years ⁽¹⁾.

Step 1: Using a short-acting beta2 agonist (SABA) or inhaler corticosteroid as needed is the first therapy choice.

If SABA is taken as needed, between the ages of 6 and 11 years old, including the ICS controller new studies show that utilizing ICS instead of just SABA reduces asthma exacerbations. In addition, studies have shown no difference in result with good follow-up, however poor compliance and lost follow-up should be taken into account ⁽¹⁾.

Step 2: first-line routine treatment with SABA when necessary for the controller.

Asthma control in children is best achieved by administering ICS at a low dose on a daily basis and supplementing with SABA as necessary. You can also try taking a leukotriene receptor antagonists (LTRA) on a daily basis, but this has less efficacy than regular ICS and is associated with major adverse effects such as impaired mental health, which is why the FDA advises against using montelukast on a long-term basis ⁽⁹⁾. Also, theophylline sustained release is not suggested due to its low efficacy and life-threatening side effects when doses are elevated ⁽⁴⁾. Nedocromil sodium and sodium cromoglycate, on the other hand, are safe but less effective than chormone (nedocromil sodium and sodium chromoglycate) ⁽⁷⁾.

Step 3: Additional SABA-controller therapy may be required.

After taking precautions as mentioned before step up if still uncontrolled use one of three options either increasing dose of ICS to medium dose, use low dose of ICS-LABA (long acting beta2 antagonist) both with as needed SABA ⁽⁹⁾, or switch to low dose ICS-formoterol ⁽⁵⁾.

Step 4: Continually treat controllers and seek expert advice.

If the condition persists, the dose of ICS-LABA should be increased to a medium one with the addition of SABA if necessary. The use of large doses of ICS is not advised due to the increased risk of negative effects ⁽¹⁰⁾. Over the age of six, mist inhalation therapy with the long-acting muscarinic antagonist tiotropium (LAMA) may be added ⁽⁹⁾.

Step 5: Consult a medical specialist, do phenotyping, and consider further treatment options.

In the case of uncontrolled asthma, patients should be directed to an expert with good investigation and add-on medication such as LAMA in separate inhaler or anti immunoglobulin E (anti-IgE omalizumab) for children older than 6 years ⁽¹⁾.

Other non-pharmacological treatment as chest exercise:

Is used to expand lung capacity and to make sure that the air entering and exiting the lungs is functioning normally ⁽¹¹⁾.

Tackling severe cases of asthma:

A mechanical ventilator may be required to assist the lungs and respiratory muscles when an asthma attack is severe and not responding to asthma medications. These breathing aids are only used during an attack, and they are removed after the lungs have recovered enough to resume normal breathing. When suffering from an acute attack, it may be required to spend a brief time in the hospital's intensive care unit. If an asthma attack is severe, you may need to use an asthma nebulizer or get injections of epinephrine or prednisone for asthma. Other therapies may include terbutaline injections, magnesium sulphate) and leukotriene inhibitors ⁽¹²⁾.

CONCLUSION

Many scientific advances have improved our understanding of asthma and ability to manage and control it effectively. However, recommendations for asthma care need to be adapted to local conditions, resources and services.

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