

Diagnosis and management of asthma in children

Continuing on from last month's article on childhood asthma, **Dr Peter Greally** outlines diagnosis and assessment of control

Referral to a respiratory paediatrician should be considered for severe persistent asthma and persistent asthma with poor control



Asthma is a chronic inflammatory condition of the lower airways that is common in childhood but may occur throughout life. Last month's article outlined the presentation of asthma in childhood; the prevalence of the disease; its clinical presentation and possible differential diagnoses which must be ruled out. This month we continue with diagnosis, treatment and control of childhood asthma.

Diagnosis

Asthma is usually diagnosed using the patient history and examination. Initially a history will be taken. The child's height and weight should be measured and then plotted on a centile chart. In asthma these would be expected to be normal. The respiratory examination may be entirely normal. The hands are checked for finger clubbing which is observed in some chronic respiratory disorders but never in asthma. Sometimes if the condition has persisted for a long time, there will be abnormalities of the chest wall.

A pigeon-shaped breastbone (Pectus carinatum) with indrawing of the lower ribs (Harrison's sulci) may be observed in some patients. Sometimes children with asthma have a hollow breastbone (pectus excavatum).

There may be pallor, swelling and mucous coating of the lining of the nasal passages suggesting allergic rhinitis. Nasal polyps are quite rare in children with nasal allergy. There may be a transverse nasal crease due to constant rubbing of the nose.

Frequently, examination with the stethoscope will be normal. However, during an asthma episode wheeze can be heard and the breath sounds may be decreased in more severe attacks. Cyanosis of the lips and tongue may be apparent if the child is hypoxic.

A peak-flow measurement can be taken in older more co-operative children. The reading may be lower than expected for the child's height, sex and age. If so, bronchodilators such as Ventolin can be given to see if it improves. Sometimes a therapeutic trial of asthma treatment may be required in a younger child that is suspected of having asthma.

Unfortunately there is no such thing as an asthma test. There are a number of additional tests that one can undergo to confirm a clinical suspicion of asthma. A chest x-ray is frequently normal or may show bronchial wall thickening and hyperinflation of the lungs. A chest x-ray is not used to diagnose asthma but may, in some circumstances, help exclude conditions which may mimic asthma. The clinician may consider making a referral to a respiratory or allergy specialists who may order allergy or pulmonary function tests to facilitate the diagnostic process.

Table 1

Example of stepwise management in children aged five to 12 years

Step 1: Mild intermittent asthma

As required short acting bronchodilator

Step 2: Mild persistent asthma

- As in **Step 1**, plus the addition of an inhaled steroid 200-400mcg/day* (other preventer drug if inhaled steroid cannot be used, eg. LTRA or cromolyn)
- 200mcg is an appropriate starting dose for many patients
- Start at dose of inhaled steroid appropriate to severity of disease

Step 3: Moderate persistent asthma

- As in **Step 2**, plus the addition of inhaled long-acting beta agonist (LABA)
- A – Reassess control of asthma: if good response to LABA – continue LABA
- B – Benefit from LABA but control still inadequate
- C – Continue LABA and increase inhaled steroid dose to 400mcg/day* (if not already on this dose)
- D – No response to LABA – stop LABA and increase inhaled steroid to 400mcg/day.

*If control is still inadequate, institute trial of other therapies, such as leukotriene receptor antagonist or SR theophylline

Step 4: Severe persistent asthma

- Initial add-on therapy: Increase inhaled steroid up to 800mcg/day*

Step 5: Persistent asthma with poor control

- Use daily steroid tablet in lowest dose providing adequate control
- Maintain high dose inhaled steroid at 800mcg/day*

Consider referral to respiratory paediatrician at Step 3 or beyond

Treatment

Therapy consists of three components:

- Trigger avoidance
- Choosing the appropriate inhaler and optimising the inhaler technique
- Ensuring adherence to the prescribed medication.

In the majority of cases asthma will be mild (step 1 or 2 of SIGN/BTS guidelines).¹ Evidence based guidelines are available to help clinicians manage asthma in a systematic way, for example

GINA, BTS/SIGN and PractALL. The most commonly referred to guidelines in this part of the world are the GINA and BTS/SIGN guidelines (see Table 1).¹

How is asthma control assessed?

The clinician will frequently use research-based treatment guidelines to assess and treat the child's asthma.^{1,2} These guidelines are updated regularly to keep up with advances in medicine. Asthma control is usually assessed using a composite of the patient history, examination, validated questionnaire, peak flow rate and pulmonary function tests.

A useful self-administered test is the childhood asthma control test see www.asthmacontrol.com/child.html³ which assesses asthma control over the previous four weeks in children aged either four to 11 years or 12 years and older. A patient and parents' answers to the appropriate one of these online quizzes will provide a score that may help them and their healthcare professional to determine if their treatment plan is working or if it might be time for a change.

The absence of symptoms, infrequent use of bronchodilator, normal exercise tolerance, normal pulmonary function and few missed school days are generally signs that asthma is well controlled. Infrequent or lack of exacerbations (asthma attacks) also suggests that asthma is under control. If asthma is under good control the clinician may attempt to step down the child's controller medications. If control has been good for long periods, pulmonary function tests are normal and the patient is on minimal doses of preventative treatment, it may be decided to give the child a trial off therapy.

The future

Many children will outgrow their asthma.⁴ Some studies suggest that as many as two-thirds will remit by their teenage years. However, the condition can relapse later in adulthood, particularly during third and fourth decades. Good prognostic features for remission include mild disease, absence of concurrent allergic conditions, male gender, normal lung function and virus triggered asthma.

Dr Peter Greally is a consultant respiratory paediatrician at the National Children's Hospital, Tallaght and Our Lady's Children's Hospital, Crumlin

References

1. Scottish intercollegiate British Society asthma guidelines (www.sign.ac.uk/guidelines/fulltext/101/index.html) network
2. Diagnosis & Treatment of Childhood Asthma : a PRACTall consensus report. Allergy 2008; 63:5-34
3. Child asthma control test. <http://www.asthmacontrol.com/child.html>
4. Greally P. Childhood Asthma: Your Questions Answered. Liberties Press Dublin 2011; ISBN 978907593-00-0