

DIAGNOSIS AND CLASSIFICATION OF CHILDHOOD ASTHMA

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Abstract

Wheezing is a common complaint in early childhood. Whilst it is important to recognize that not all children presenting with wheezing have asthma, one has to be aware that asthma can present atypically as chronic cough, recurrent bronchitis, recurrent pneumonia, chest infection, chest pain or chest tightness after exercise. Parental history of asthma and personal history of eczema are useful clues. A child with recurrent wheezing with a parental history of asthma or personal history of eczema should in practice be treated as early asthma, after other causes which mimic asthma have been ruled out. A child who has only intermittent symptoms but suffered an acute severe exacerbation requiring hospitalization should be managed as persistent asthma. Children who do not show expectant response to asthma therapy should be evaluated for alternative diagnosis.

Introduction

Asthma is a chronic inflammatory disease. Population based survey have shown that asthma is under treated and disease burden is high^{1,2}. Asthma Insights and Reality in Asia Pacific (AIRIAP) Study showed 34% of adults and children had reported asthma symptoms at least once in a week. Thirty-five (35%) had needed urgent acute care and 9% had been hospitalized for asthma. 23% of children had missed school because of asthma.

One barrier which may have resulted in sub optimal care of asthma is the difficulty in making a definite diagnosis and in accurately assessing severity of the disease for appropriate treatment. This is particularly so in children.

DIAGNOSIS

Does the child have asthma? If the child presents with a typical history of cough and wheeze or breathlessness, is it always due to asthma?

Not all wheezers have asthma

Wheezing is a common complaint in early childhood. In a longitudinal cohort study, 48.5% of children below age of 6 years had at least one wheeze³. Majority were transient wheezers.

What are the other causes of wheezing which may mimic asthma?

- 1) Recurrent viral associated wheezing;
- 2) Recurrent aspiration or gastro-esophageal reflux;
- 3) Congenital airway anomalies eg. tracheobronchomalacia;
- 4) Infections – mycoplasma infection, PTB;
- 5) Others – cardiac causes, interstitial lung disease, immunodeficiency, cystic fibrosis.

Not all asthma wheezes

Whilst it is important to recognize that not all children presenting with wheezing have asthma, one has also to be aware of atypical presentation. Not all children with asthma present with the hallmark wheezing, about 5% have chronic cough without wheezing.

What are the atypical presentation of childhood asthma?^{4,5}

- 1) Chronic cough;
- 2) Recurrent bronchitis;
- 3) Recurrent pneumonia/chest infection;
- 4) Chest pain/chest tightness after exercise.

Objective measurements are useful but only feasible in older child. Peak Expiratory Flow (PEF) monitoring and spirometry can be useful to confirm reversible airway obstruction and hence, supports the diagnosis of asthma. They can be particularly useful in diagnosis of children with atypical presentation.

In younger children, it is difficult to differentiate between early asthma and recurrent viral associated wheezing without asthma. Children who continued to wheeze after the age of 7 years is likely to continue wheezing^{6,7,8}. In the past, the approach had been to wait and see and only intervene when an older child remained symptomatic. However, longitudinal study in children had shown that delay in intervention may result in long term sequela of lung development and somatic growth⁹. Therefore there is a need for early intervention, but who or when should one intervene?

Long term studies have thrown light on some of the predictors for persistent wheezing in children^{3,10,11}. These factors may be helpful in making a decision as to who should receive early anti-inflammatory treatment.

Predictors of persistent wheezing or asthma

- 1) Parental history of asthma (4 x increase);
- 2) Personal history of eczema (2 x increase);
- 3) Severe or frequent wheezing;
- 4) Wheezing not associated with infection;
- 5) Allergen induced wheezing;
- 6) Elevated total IgE.

In clinical practice, parental history of asthma and personal history of eczema are particularly useful. A child with recurrent wheezing with a parental history of asthma or personal history of eczema should in practice be treated as early asthma, after other causes which mimic asthma have been excluded.

ASSESSING THE CHILD WITH ASTHMA

It is prudent to take a detailed history and conduct a careful examination. The purpose is:

1. to ensure that the child does not have a disease other than asthma;
2. to look for concomitant illness which may have contributed to the symptoms eg. allergic rhinitis;
3. to assess the severity of asthma – it may be necessary to do a re-evaluation after treating the concomitant illness thus removing the confounding factor which may have interfered with an accurate assessment of the disease severity;
4. it is important to re-evaluate after adequate therapy, as failure to respond as expected may be indicative of a wrong diagnosis and an alternative diagnosis should be considered.

Practical pointers in the assessment of a child with asthma

1. History : careful inquiries into the following:-
Day and night symptoms: night symptoms are particularly indicative of severity;
Exercise limitation eg. the inability to participate in PE, laughter / activity induced wheezing/breathlessness;
Trigger factors particularly environmental factors which may have acted as triggers eg household smoking, carpets etc.;
School absenteeism;
Childcare attendance;
Current medication and compliance.

2. Examination : Careful examination to exclude a cardiac cause, fixed airway obstruction, chronic infection eg. PTB. Features such as :
Hyperinflated (barrel) chest indicate chronic persistent disease. Presence of eczema, allergic rhinitis, is suggestive of atopy;
Stridor if detected is pertinent to exclude upper airway obstruction;
Clubbing of fingers points to chronic lung disease such as bronchiectasis or chronic interstitial lung disease.
3. Assessment of level of severity :
Assessment of severity of asthma is an inherent part of good asthma care. Management of asthma is based on the level of severity of the disease. In young children, the classification is based primarily on symptoms but whenever possible, objective measurement such as Peak Expiratory Flow (PEF) and spirometric measurements should be taken (Table I).

Objective assessment is important because of the tendency for underestimation of the symptoms by child and caregivers. In chronic illness, adaptation of lifestyle occurred, resulting in the apparent lack of symptoms due to poor perception of the disease. A typical example is a child with persistent asthma who does not engage in any physical activities because of exercise induced asthma symptom. When asked if child had problem with exercise, parents are likely to report that the child has no problem. However, should the doctor asked in another way, about physical activities the child is engaged in, that it will become clear that the child did not do any physical exercise at all, that was why he did not encounter any problem!

Investigations, such PEF and spirometric measurements, are also useful tools for objective assessment to evaluate response to therapy.

It is important to recognise that asthma is a variable disease and severity may vary from time to time. A child who usually only have intermittent symptoms but suffered an acute

Table I. Management of Childhood Asthma (severity classification)

| Severity | Symptoms | Night time symptoms | PEF (for children >5yrs) | Step |
|---------------------|--|---------------------|-------------------------------|--------|
| Intermittent | Frequent <1 x/wk >1 x/mo | <2 x/mo | >80% pred, Variability <20% | Step 1 |
| Mild persistent | >1 x/wk <1 x/day | >2 x/mo | >80% pred, Variability 20-30% | Step 2 |
| Moderate persistent | Daily use of B ₂ agonist, daily attacks affect activity | >1 x/wk | >60%<80% Variability >30% | Step 3 |
| Severe persistent | Continuous, limited physical & physical activity | frequent | <60% pred Variability >30% | Step 4 |

severe exacerbation requiring hospitalisation for high dependency / intensive care, should be managed as a persistent asthma.

As a practical guide, any child with asthma symptom more than once a week or had acute severe exacerbation requiring high dependency or intensive care should be managed as a persistent asthma.

REFERENCES

1. Adams RJ, Fuhlbrigge A, Guibert T et al. Inadequate use of asthma medication in the United States : results of the asthma in America national population survey. *J Allergy Clin Immunol* 2002;110:58-64.
2. Anonymous. Variations in the prevalence of respiratory symptoms, self-reported asthma attacks, and use of asthma medication in the European Community Respiratory Health Survey. *Eur Respir J* 1996;9:687-95.
3. Martinez FD, Wright AL, Taussig LM, et al. Asthma and wheezing in first 6 years of life. *N Eng J Med* 1995;332:133-8.
4. Eigen H, Laughlin J, Homrighausen J. Recurrent pneumonia in children and its relationship to bronchial hyperreactivity. *Pediatr* 1982;70:698-704.

5. Chay OM. Bronchial Asthma in Singapore children. *Acta Paediatr Jpn* 1990;32:188-91.
6. Phelan PD, Robertson CF, Olinsky A. The Melbourne Asthma Study. *J Allergy Clin Immunol* 2002;109:189-94.
7. Strachan D, Gerritsen J. Long term outcome of early childhood wheezing : population data. *Eur Respir J (Suppl)* 1996;21:42s-47s.
8. Lewis S, Richard D, Bynner J et al. Perspective of the risk factors for early and persistent wheezing in childhood. *Eur Respir J* 1995;8:349-56.
9. Agertoft L, Pedersen S. Effects of long term treatment with an inhaled corticosteroid on growth and pulmonary function in asthmatic children. *Respir Med* 1994;88:373-81.
10. Sunyer J, Anto M, Kogevinas M et al. Risk factors for asthma in young adults. *Eng Respir J*. 1997;10:2490-4.
11. Strachan DP, Butland BK, Anderson AR. Incidence and prognosis of asthma and wheezing illness from early childhood to age 33 in a national British cohort. *BMJ* 1996;312:1195-9.

RECOMMENDED READING:

MOH Clinical Practice Guidelines 2002
<http://www.ginasthma.com/pog.html>

LEARNING POINTS

- o Typical presentation of childhood asthma include recurrent cough and breathlessness/wheezing.
- o Parental asthma and personal eczema are indicators for persistent wheezing in children.
- o Children with one severe episode of asthma exacerbation should be treated as persistent asthma.
- o Children who do not show expectant response to asthma therapy should be evaluated for alternative diagnosis.