Five steps to optimising asthma control for children

Green RJ, MBBCh(Rand),DCH(SA),FCP(SA)(Paeds),DTM&H,MMed(Paed), FCCP, PhD, Dip Allerg (SA)
Paediatric Pulmonologist

Correspondence to: robgreen@global.co.za

(SA Fam Pract 2005;47(3): 19-22)

Asthma is one of the most common chronic diseases, affecting at least one in 10 people. It knows no prejudice, affecting people from all social, cultural and ethnic backgrounds, unlike tuberculosis, which one would expect to encounter in less privileged societies, and coronary artery disease, which is a disease of affluence. Therefore, no matter where the health care "giver" (i.e. doctor, nurse, pharmacist) practises, he or she will see patients with asthma every day. This interaction with asthmatics is often limited, even in a medical setting – limited to the medical or clinical effects and the treatment of the disease, which are very well known. Less well known, and certainly seldom discussed, are the many issues around asthma care that impact on the high morbidity and cost of this chronic illness.

Step one: Prevention of asthma

Prevention of asthma, next to a cure for the condition, would be first prize for practitioners treating and researching asthma. A number of exciting strategies for prevention are being investigated, but need further research. Our existing advice has not met with much progress in the last decade of investigation.

Primary prevention:
Attempts to provide allergen-free diets to pregnant mothers, so popular in the early 1990s, failed to prevent the development of allergy and asthma.[1] Aero-allergen avoidance during pregnancy and early life is unhelpful and may promote atopy, and even allergen avoidance in breastfeeding mothers (foods) to high-risk infants is unhelpful.[2,3] Cigarette exposure is now conclusively linked to atopic aetiology and is a major factor in wheezy infants and as a cause of asthma exacerbations.[4,5] The only practical advice that can be given to the parents of soon-to-be or newly-born high-risk infants is to breast feed exclusively for the first four months of life and not to smoke during pregnancy or in the presence of young children.[6]

Secondary prevention:
The administration of newer antihistamines to clearly atopic infants with eczema has shown some promise in the overall prevention of asthma.[7,8] The ETAC Study found that a subset of atopic infants had a reduced prevalence of wheeze after receiving cetirizine.[7] A study of levocetirizine for asthma prevention is currently underway. Specific immuno-therapy shows promise, but is clearly impractical unless the antihistamine can be ingested.[9] Newer immunotherapy vaccines, especially those that include bacterial products, show promise.[10]

Tertiary prevention:
The avoidance of allergens and irritants in the established asthmatic are important adjuncts to the treatment and prevention of acute exacerbations. Acute exacerbations of asthma, together with uncontrolled symptoms, are the main cost drivers in this disease and certainly impact significantly on the quality of life of the patient.[11] It should be stated that the successful treatment of allergic rhinitis would improve the outcome of asthma.[12]

Step two: Treat associated conditions

A relationship exists between upper and lower airway disease (rhinitis and asthma). A total of 58%-78% of asthmatics also have allergic rhinitis.[13,14] The link between diseases of the upper and lower airway is important for many reasons, amongst others because the therapy for allergic rhinitis improves asthma control and asthmatics with severe allergic rhinitis tend to have worse asthma.[15] Having both conditions will significantly impact on both the quality of life and the cost of treatment.

Two recent studies of the cost of asthma have documented conclusively that asthma costs more if allergic rhinitis is also present,[16] and that the successful treatment of allergic rhinitis can significantly reduce the cost of asthma by reducing hospitalisations for asthma exacerbations.[17]

The clinical link between allergic rhinitis and asthma is further supported by the effectiveness of the antileukotriene agent montelukast on endpoints of both diseases. With the exception of oral and systemic steroids administered for the most severe allergic and asthmatic cases, leukotriene receptor antagonists, such as montelukast, represent the only class of agents indicated for the treatment of both disorders.[18]

Step three: Diagnose asthma early

The usual presentation of asthma in infancy is wheezing, but since not all wheezing in this age group is asthma, care should be taken with a differential diagnosis. The first episode of wheezing in this group of patients is likely to be labelled "bronchiolitis", a specific acute inflammatory disease of the bronchi caused by the Respiratory Syncitial Virus (RSV) and,

less commonly, by other viruses. This condition is short-lived, associated with a mild upper respiratory tract infection, low-grade fever and hyperinflation of the chest, and may be quite profound. RSV infection can predispose to asthma, but this may be due to a pre-existing immune disorder predisposing to allergy and infection.[19] Recurrent wheezing in infancy may be atopy-associated asthma or small-airway disease. The latter category is more likely, but, again, the disease has important quality-of-life issues and may be quite severe, hence a trial of anti-asthma therapy is usually indicated.

A chronic cough in a young child will create the same diagnostic dilemma. In this case, a differential diagnosis is again important, especially in the child who is failing to thrive, has a cardiac murmur or vomits regularly. The bottom line, however, is that no infant or child should be treated with regular courses of antibiotics for chronic chest symptoms, as is currently the vogue. In addition to being a complete waste of time (as almost all respiratory tract infections in childhood are viral in aetiology), the abuse of antibiotics may contribute to the rising prevalence of allergic diseases (the hygiene hypothesis) and to increasing drug resistance.

A number of strategies have been proposed to diagnose asthma, especially in children under five years of age in whom lung function testing is not possible. These include a trial of bronchodilator therapy, both in the practice setting (modified bronchodilator response test) and with a diary at home, or a trial of oral steroids or even a trial of asthma therapy. The modified bronchodilator response test employs the administration of a bronchodilator (by MDI and spacer or nebulised), followed by an objective assessment of response at 10-15 minutes.

Step four: Aim for 'Total Asthma Control'

Assessments of asthma morbidity in South Africa and the rest of the world reveal that, despite asthma diagnosis and treatment, most asthmatics are still often symptomatic. The Asthma Insights and Reality in Europe (AIRE) survey assessed the level of asthma control among current asthmatics in Western Europe from the patient's perspective.[20] Over one-third of the children and half of the adults reported daytime symptoms at least once a week. Furthermore, 28,0% of the children and 30,5% of the adults experienced asthma-related sleep disturbances at least once a week. The patient's perception of asthma control did not match the severity of their symptoms, as approximately 50% of those reporting severe persistent symptoms considered their asthma to be completely or well controlled. Similar findings have been reported in South Africa.[21]

The above studies suggest that, for most asthmatics, care does not break down in diagnosis, but in the follow-up of care. The care of asthmatics should be striving to achieve 'Total Asthma Control'. This important concept requires that attention be paid to a number of strategies by all doctors treating asthma. These include:

- Understanding asthma as an inflammatory disease
- Awareness of the limitations that asthma places on the quality of life of patients
- Using anti-inflammatory medicine regularly and in the dose that controls all symptoms
- Patient education

Much more important than the initial selection of the type of asthma medication in asthma management is an adequate assessment of asthma control at follow-up. All patients with asthma deserve to meet the Goals of Asthma Management.

The Global Initiate for Asthma (GINA) guidelines specify eight goals for the long-term control of asthma, namely

- Minimal chronic symptoms
- Minimal exacerbations
- No emergency visits
- Minimal need for demand beta-2 agonists
- No limitations in daily activities
- No nocturnal episodes
- Minimal adverse effects from asthma medication
- Normal or near normal pulmonary function[22]

It is important for the practitioner to ask specific questions about asthma control to assess adherence to these goals. Such questions are:

- How often do you have symptoms of asthma?
  1. Cough
  2. Wheeze
  3. Tight chest
  4. Shortness of breath
- How often do you have asthma symptoms at night?
- How often do you need to use your reliever inhaler?
- How often do you have to interrupt sport/activity because of asthma symptoms?
- How often do you miss school/ work because of asthma?

If total control is not being achieved, the following reasons should be considered:

- Patient not compliant
- Patient not using therapy correctly
- Concern about the cost of medication
- Concern about side-effects
- Not understanding the inflammatory nature of asthma
- Unrealistic expectations
- Not using therapy regularly
- Patient not adherent
- Patient has another medical problem
- Not convinced of diagnosis
- Unwilling to use regular therapy
- Dose of ICS insufficient
- Patient has more severe asthma

The National Asthma Education Programme suggests that patients be

informed that the three strategies indicated below must be followed in order to achieve the goals for the management of asthma:

- Take medication as prescribed (understand treatment and the devices used)
- Have and use an action plan when symptoms change
- Keep in touch with doctor

Step five: Select therapy appropriate to asthma severity

It is estimated that most asthmatics (approximately 80%) have a mild form of the disease and that only 5-6% of adult asthmatics have severe or very severe disease. In a South African study of 411 patients cared for by a large medical aid, 41% were classified as having mild asthma, 49% as having moderate asthma and 10% as having severe asthma.[23] In this study, 33% of the severe asthmatics required hospitalisation, compared with 2% of the mild asthmatics.

All asthma guidelines have algorithms for the selection of asthma medication by disease severity. Mild, persistent asthma requires an inhaled corticosteroid as a single therapy. For patients not able to use these devices or if steroids are feared, leukotriene receptor antagonists can be used. Only the minority of asthmatics require combination therapy.

See CPD Questionnaire, page 38

References

1. Kramer MS. Maternal antigen avoidance during pregnancy for preventing atopic disease in infants of women at high risk. *Cochrane Database Syst Rev* 2000;2:page numbers?.
2. Zeiger RS. Secondary prevention of allergic disease: an adjunct to primary prevention. *Pediatr Allergy Immunol* 1995;6:127-38.
3. Isolauri E, Sutas Y, Salo MK, Isosomppi R, Kaila M. Elimination diet in cow's milk allergy: risk for impaired growth in young children. *J Pediatr* 1998;132:1004-9.
4. Zwi S, Goldman HI, Kallenbach JM, Davies JCA, Becklake MR, Reinach SG. Respiratory health status of children in the eastern Transvaal highveld. *S Afr Med J* 1990;78:647-53.
5. Terblanche APS, Opperman L, Nel CME, Reinach SG, Tosen G, Cadman A. Preliminary results of exposure measurements and health effects of the Vaal Triangle Air Pollution Study. *S Afr Med J* 1992;81:550-6.
6. Kull I, Almqvist C, Lilja G, Pershagen G, Wickman M. Breast-feeding reduces the risk of asthma during the first four years of life. *J Allergy Clin Immunol* 2004;114:755-60.
7. Warner JO, et al. Allergic factors associated with the development of asthma and the influence of cetirizine in a double-blind, randomised, placebo-controlled trial: first results of ETAC, Early Treatment of the Atopic Child. *Pediatr Allergy Immunol* 1998;9:116-24.
8. Gustafsson D, Sjoberg O, Foucard T. Development of allergies and asthma in infants and young children with atopic dermatitis: a prospective follow-up to 7 years of age. *Allergy* 2000;55:240-5.
9. Novembre E, Galli E, Landi F, et al. Co-seasonal sublingual immunotherapy reduces the development of asthma in children with allergic rhinoconjunctivitis. *J Allergy Clin Immunol* 2004;114:851-7.
10. Prescott SL. Bacteria and the allergy epidemic: the culprits and the cure. *Curr Allergy Clin Immunol* 2004;17:108-14.
11. Barnes PJ, Jonsson B, Klim JB. The costs of asthma. *Eur Respir J* 1996;9:636-42.
12. Huse DM, Harte SC, Russel MW, et al. Allergic rhinitis may worsen asthma symptoms in children: the international asthma outcomes registry. *Am J Respir Crit Care Med* 1996;153:A860 (abstract).
13. Pedersen PA, Weeke ER. Asthma and allergic rhinitis in the same patients. *Allergy* 1983;38:25-9.
14. Spector SL. Overview of comorbid associations of allergic rhinitis. *J Allergy Clin Immunol* 1997;99:S773-80.
15. Halpern M, Richner R, Togias A, et al. Allergic rhinitis may increase asthma costs. *Am J Respir Crit Care Med* 1996;53:A860 (abstract).
16 Yawn BP, Yuringer JW, Wollan PC, et al. Allergic rhinitis in Rochester, Minnesota residents with asthma: frequency and impact on health charges. *J Allergy Clin Immunol* 1999;103:54-9.
17 Crystal-Peters J, Neslusan C, Crown WH, et al. Treatment of allergic rhinitis in patients with comorbid asthma: the risk of asthma-related hospitalizations and emergency department visits. *J Allergy Clin Immunol* 2002;109:57-62.
18. Green RJ. Inflammatory airway disease. *Current Allergy and Clinical Immunology* 2003;16:181-6.
19. Global Initiative for Asthma. Global Strategy for Asthma Management and Prevention. Updated from: NHLBI/WHO Workshop Report: Global Strategy for Asthma Management and Prevention. NIH Publication No 02-3659; 2002.
20. Rabe KF, Vermiere PA, Soriono JB, Maier WX. Clinical management of asthma in 1999: The Asthma Insights and Reality in Europe (AIRE) study. *Eur Respir J* 2001;16(5):802-7.
21 Green RJ. The hidden cost of asthma. *South African Respiratory Journal* 2004;10:8-12.
22. Global Initiative for Asthma. Global strategy for asthma management and prevention. NHLBI/WHO workshop report. Publication number 95-3659, 1995.
23. Burns DG. Poster presented at Third Triennial World Asthma Meeting; 2001.