

# Asthma treatment of children and adolescents: Strategies for a global approach

ROBERT L THIVIERGE MD FRCPC

*Multidisciplinary Asthma Clinic, Hôpital Ste-Justine, Montréal, Québec*

**RL THIVIERGE. Asthma treatment of children and adolescents: Strategies for a global approach. Can Respir J 1995;2(Suppl A):43A-45A.**

Strategies for a global approach to the management of asthma in children and adolescents are described. Such an approach requires the physician to explain to the patient the pathophysiology of asthma, to evaluate and, whenever possible, change predisposing environmental factors, to establish a written plan of action and to maintain a close follow-up of the patient to ensure compliance.

**Key Words:** *Action plan, Asthma, Environmental factors, Global management*

**Le traitement de l'asthme de l'enfant et de l'adolescent : Stratégies pour une approche globale**

**RÉSUMÉ :** Les stratégies pour une approche globale de la prise en charge de l'asthme chez l'enfant et l'adolescent sont décrites. Une telle approche exige du médecin qu'il explique au patient la physiopathologie de l'asthme, qu'il évalue et modifie, quand c'est possible, les facteurs environnementaux prédisposants. Il doit aussi établir un plan d'action écrit et maintenir un suivi rigoureux du patient pour garantir sa fidélité au traitement.

**T**HE MANAGEMENT OF THE ASTHMATIC CHILD HAS changed considerably in the past few years. The definition of asthma has itself been modified; asthma is no longer defined only as bronchospasm secondary to an allergenic or viral exposure but as a mucosal inflammatory response to an agent or more often to a set of agents that induce and maintain inflammation (1).

This article describes a global clinical approach that should be taken by practitioners as educators of asthmatic children and their parents. The following steps will be addressed: explaining the pathophysiology of asthma; changing the avoidable environmental factors; establishing a written action plan with the asthmatic child; and modulating the control visits to ensure compliance.

## EXPLAINING THE PATHOPHYSIOLOGY OF ASTHMA

The primary role of the attending physician is that of educator. It is essential to explain carefully the nature of asthma, distinguishing clearly the two phenomena involved – bronchospasm and inflammation. To illustrate this distinction, it is very useful to draw an analogy with the nasal phenomenon during hay fever season. One observes mucosal edema and secretions (the inflammatory component) but also sneezing (the dynamic component).

Several factors are known to cause bronchial inflammation and hyperreactivity. In general, respiratory viruses are the first inductors of the asthmatic responses during the first few years of life. Thus, daycare centres become particu-

larly fertile reservoirs of such inductions in preschool children.

Later, after infancy, specific allergies develop that may cause asthma: allergies to dust, mites, moulds, cats, dogs, etc (2,3). Special attention must be given to atopic children during the first months of life: their potential for becoming asthmatic is high.

It is also desirable to discuss the characteristic symptoms of asthma (4,5) – coughing, shortness of breath and wheezing. For a long time, the wheezing crisis that brought patients to emergency rooms associated with the clinical improvement brought on by treatment with an adrenergic agent (subcutaneous noradrenaline or inhaled salbutamol) was considered the hallmark of asthma. Today, frequent, repeated and persistent coughing is considered a symptom of asthma. The shortness of breath associated with coughing or wheezing is also part of the symptom triad. If, at one time, it was said that all patients who were wheezing were not necessarily asthmatic (referring to the possibility of an intrabronchial foreign body, for example), today it is recognized that every case of wheezing or coughing should first suggest asthma.

### EVALUATING ENVIRONMENTAL FACTORS

In an effort to explain the recent dramatic increase in asthma cases, attention is now being paid more and more to the macro-environment and phenomena such as industrial pollution, acid rain and changes in the ozone layer.

However, other respiratory irritants are also present in the micro-environment of the home. It is important to know how well the temperature is maintained in an asthmatic child's home between the end of September and the end of May, a period when this micro-environment is self-contained. Ideally, the ambient temperature should be maintained between 18 and 20°C. It should also be remembered that, over the past 20 years, most houses have been overinsulated and they are frequently overheated. Another important aspect is the humidity level. For several years, it was thought that maintaining a high level of humidity (greater than 50 to 60%) was preferred for every child with respiratory problems. Since the mid '80s, the opposite has been recommended; the ideal relative humidity level in a house should be between 30 and 45%. Parents should therefore have at hand a thermometer and a hygrometer to monitor and control as efficiently as possible the temperature variations in the house.

Cigarette smoke is another irritant than can and must be absolutely avoided. As physicians, we often feel that our recommendations are not always put into practice, but it has been proven that if we insist, during each visit, on the importance of eliminating tobacco smoke, parents feel more responsible as far as asthma management is concerned.

### ESTABLISHING A WRITTEN PLAN OF ACTION

To optimize both patient and family treatment compliance, it is of the most utmost importance to give them a treatment diary in which they will describe symptoms and doses of medication for an objective evaluation. Even if an asthmatic patient only suffers episodic airway obstruction, it

is useful to note these episodes on a calendar and to write down the medication taken.

For the chronic asthmatic it is very useful and effective to ask, at the start, for the symptoms and drugs used to be noted each day in a diary to indicate clearly the evolution of the disease. Follow-up visits should be used to reinforce the overall management strategy (6,7).

The main consensus recommendations (8-11) all define the following drug treatment regimens for the asthmatic child.

**Occasional asthma** with symptoms well controlled by a short treatment with adrenergic agents.

**Mild asthma** with frequent symptoms (cough, shortness of breath, dyspnea, wheezing, more than seven to 10 days a month), which interfere very little with everyday activities and rarely cause a visit to the emergency room or hospital admissions. Nonsteroidal agents such as cromoglycate, nedocromil or ketotifen are recommended as first-step treatment, as are the inhaled steroids in the dose range of 200 to 400 µg per day. Taken continuously for a few weeks (generally four to six weeks) these drugs will alleviate symptoms in patients with mild asthma.

**Moderate asthma** with more marked symptoms that require visits to the emergency room and sometimes admission to hospital. Corticosteroids at doses ranging from 400 to 800 µg per day are used in the long term treatment of moderate asthma.

**Severe asthma** with daily symptoms that interfere with the child's or teenager's normal life. These patients regularly have to be treated in the emergency room and are often hospitalized. It is often difficult to defer the use of bronchodilators.

Whatever the level of treatment, the signs of an effective control of asthma are the absence of symptoms, being able to pursue everyday activities and, finally, the greatest possible reduction in the use of adrenergic agents (12,13).

The use of pulmonary function measures (spirometry with or without bronchial challenge, peak expiratory flow) is limited in ordinary practice to school age children and adolescents. In children less than five years old, different tests (rapid chest compression in the case of newborn infants, oscillation test in children two to five years old) are available in specialized centres.

For many children with moderate to severe asthma, serial measurements with a peak expiratory flow meter help both the parents and the doctor to evaluate the airway obstruction crisis objectively and to make more effective adjustments to the long term treatment plan (14,15).

### CLOSE FOLLOW-UP AND ACTION PLAN

When starting treatment, it is essential to plan a close follow-up of the patient. Prescribing inhaled medication during the acute phase and the period immediately following does not mean that an adequate control of asthma will be automatically achieved. Too many unpredictable factors and difficulties have to be faced, making it impossible to achieve effective therapy and prevention so easily. Education

and support are of the utmost importance when the child and his or her parents undertake the task of asthma self-management. This effort must not be undertaken in a context of crisis. A good relationship has to be established at the beginning of treatment, and must be reinforced every four to six weeks and then at intervals determined by the quality of asthma control. It is also useful to see a patient again two weeks following a significant exacerbation to review the treatment plan.

The use of an action plan written down by the doctor and given to the patient at the same time as the symptom diary increases patient compliance and makes him or her feel more responsible for managing the disease. Moreover, because most drugs are delivered by different inhalers, it is essential to ask the patient to bring the medications to the office and demonstrate repeatedly that he or she masters the inhalation technique. The importance given to the effective use of medication will demonstrate how seriously the maintenance treatment of the asthmatic patient is considered. Finally, it is a good idea to plan in one office session (eg, the same morning or afternoon each week) all appointments of patients fol-

lowed for asthma; repetitive application of strategies in different types of asthma will reinforce the message that we value a coherent and continuous management of our asthma patients (16,17).

## CONCLUSION

The global approach to asthma treatment is much more demanding than the simple prescribing of a specific drug; the essential role of educating children with asthma and their families is the most important of these responsibilities. At the first evaluation and at each follow-up visit, the attending physician must give special attention to all the essential factors of successful control of asthma: explain clearly the pathophysiology and significant symptoms of asthma; eliminate systematically all avoidable environmental factors to which the child is exposed; write down a plan of action for long term management; check regularly the quality of the patient's inhalation technique; and, finally, constantly reinforce the everyday treatment strategy. For the asthmatic child, the ultimate goal is to live a normal daily life.

## REFERENCES

1. Barnes PJ. A new approach to the treatment of asthma. *N Engl J Med* 1989;321:1517-27.
2. Platts-Mills TAE, Chapman MD. Dustmites: immunology, allergic disease and environmental control. *J Allergy Clin Immunol* 1987;80:755-75.
3. Chapman MD, Platts-Mills TAE. Cat allergy. *Ann Allergy* 1992;69:273-5.
4. Thivierge RL, Lapierre JG, Gaudreault P. Traitement de l'asthme en pédiatrie: une approche actualisée. *Le Clinicien* 1989;4:23-30.
5. Thivierge RL, Lapierre JG, Gaudreault P. Traitement de l'asthme en pédiatrie (deuxième partie). *Le Clinicien* 1989;4:31-40.
6. Hughes DM, McLeod M, Garner B, et al. Controlled trial of a home and ambulatory program for asthmatic children. *Pediatrics* 1991;87:54-61.
7. Mellins RB, Zimmerman B, Clark NM. Patient compliance. *Am Rev Respir Dis* 1992;146:137-77.
8. National Asthma Education Program Expert Panel Report. Executive Summary: Guidelines for diagnosis and management of asthma. United States Department of Health and Human Services publication 91-3042A. Bethesda: National Institutes of Health, 1991.
9. Warner JO, Gotz M, Landau LI, et al. Management of asthma: a consensus statement. *Arch Dis Child* 1989;64:1065-79.
10. Warner JO, Gotz M, Landau LI, et al. International Pediatric Asthma Consensus Group: a follow-up report. *Arch Dis Child* 1992;67:240-8.
11. Hargreave FE, Dolovich J, Newhouse MT. The assessment and treatment of asthma: a conference report. *J Allergy Clin Immunol* 1990;85:1098-111.
12. Sears MR, Taylor DR, Print CG, et al. Regular inhaled  $\beta$ -agonist treatment in bronchial asthma. *Lancet* 1990;336:1391-6.
13. Page CP. One explanation of the asthma paradox: inhibition of natural anti-inflammatory mechanism by  $\beta$ 2-agonists. *Lancet* 1991;337:717-20.
14. Meltzer AA, Smolensky MH, D'Alonzo GE, et al. An assessment of peak expiratory flow as a surrogate measurement of FEV<sub>1</sub> in stable asthmatic children. *Chest* 1989;96:329-33.
15. Mueller GA, Eigen H. Pulmonary function testing in pediatric practice. *Pediatr Rev* 1994;10:403-11.
16. Clark NM, Gotsch A, Rosenstock R. Patient, professional and public education on behavioral aspects of asthma: a review of strategies for change and needed research. *J Asthma* 1993;30:241-55.
17. St-Laurent-Gagnon T, Turgeon JP, Bernard-Bonnin AC, et al. Teaching inhalation techniques to asthmatic children: a randomized trial. *Pediatrics*. (In press)



**Hindawi**  
Submit your manuscripts at  
<http://www.hindawi.com>

