Artigo original

Asthma Guidelines in Day-to-day Practice

Diretrizes de Asma na Prática Diária

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RESUMO

A morbidade e a mortalidade por asma persistem como problemas no mundo, apesar dos instrumentos efetivos para seu controle. Diretrizes internacionais, tais como as da *Global Initiative for Asthma*, fornecem direções para melhorar o cuidado com a asma. Os elementos dessas diretrizes apresentam: 1) medidas objetivas para dimensionar a asma, como a espirometria, para diagnosticar e monitorar a resposta ao tratamento; 2) conselhos para o controle ambiental efetivo; 3) abordagem por etapas na terapia farmacológica, guiadas pelo controle da doença; 4) desenvolvimento de parcerias com o paciente e, quando apropriado, seu cuidador. Lições dessas recomendações podem ser incorporadas no cuidado diário prestado ao asmático e melhorar os desfechos.

Descritores: Asma/diagnóstico; Asma/terapia; Educação de pacientes como assunto.

ABSTRACT

Despite effective means of asthma control, asthma morbidity and mortality persist worldwide. International guidelines such as the Global Initiative for Asthma Guidelines have provided a roadmap for improved asthma care. The elements of these guidelines are to 1) use objective measures of asthma, such as spirometry, to diagnose and monitor the response to treatment; 2) provide advice on effective environmental control; 3) use a step-up approach to pharmacologic therapy guided by disease control; and 4) develop a partnership of care with the patient and, when appropriate, the caregiver. Lessons from these guidelines can be incorporated into the day-to-day care of asthma and can improve asthma outcomes.

Keywords: Asthma/diagnosis; Asthma/therapy; Patient education as topic.

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CAUSE FOR OPTIMISM FOR ASTHMA PATIENTS

The end of the 20th century introduced a dramatic new approach to asthma care. No longer was there a reliance on bronchodilator medications alone to control the symptoms of asthma. The disease became recognized as a chronic inflammatory disease of the airways. With the advent of safe anti-inflammatory medications, symptom prevention as well as symptom control became possible. The long-term goal of asthma treatment is directed at reducing and possibly eliminating airway inflammation. Medications referred to as "controller therapies" are used for this purpose. Inhaled corticosteroids have become the mainstay of controller therapy for persistent asthma symptoms. Agents that are capable of inhibiting the synthesis or action of pro-inflammatory mediators called leukotrienes were introduced in the 1990's as controller therapies for asthma.

With new insights into the pathogenesis of asthma, as well as new and safer medications to control the disease, there is reason for optimism in the management of asthma. A global strategy through international asthma guidelines, developed as part of the Global Initiative for Asthma (GINA), has provided a roadmap for asthma care, including the goals of treatment (Chart 1) and evidence-based protocols to lead clinicians to successful outcomes for their patients (1). The GINA has made an effort to raise awareness of the growing importance of asthma worldwide.

Chart 1 - Goals of asthma treatment

1. Limit symptoms of dyspnea, wheeze, chest tightness, and cough, day and night
2. Provide normal daily activity level; no absenteeism from work or school
3. Maintain normal or near-normal lung function
4. Reduce or eliminate asthma exacerbations; avoid emergency visits and hospitalizations
5. Minimize use of rescue medication and use lowest dose and fewest medications possible
6. Avoid side effects of medications

BARRIERS TO IMPROVED CARE

Coupled with the optimism regarding the prospects for improving asthma care are the sobering statistics with which we must contend. There has been a sharp increase in the global prevalence, morbidity, mortality, and economic burden associated with asthma over the last 50 years, particularly in children, in whom it has become the most common chronic disease (2). Although the reasons for this increased prevalence remain largely unknown, the increase has been noted to parallel the increase in that of atopic diseases worldwide. The World Health Organization has estimated that there are approximately 235 million people worldwide who currently suffer from asthma, and it has become increasingly common in the developing countries, probably because of the increased urbanization of communities (3).

Studies indicate that asthma is underdiagnosed and undertreated worldwide, and this has created a substantial burden on individuals and their families (4-8). Poor asthma control can restrict the activities of patients and impair their quality of life for years. Internationally, trends indicate an increasing number of hospital admissions for asthma. This has been most pronounced in young children, and reflects an increase in the number of cases of severe asthma, poor disease management, and poverty. However, most asthma deaths occur in individuals who are 45 years of age or older and are largely preventable. Such deaths are frequently related to inadequate long-term medical care or to delays in obtaining medical treatment during the fatal attack (9). Over 80% of asthma deaths occur in low- and lower-middle-income countries (3).

Although a number of barriers to reducing the burden of asthma, such as poverty, a low national public health priority, poor health care infrastructure, limited patient access to medication, and environmental factors, are out of the hands of ordinary clinicians, other barriers can be addressed. In day-to-day asthma care, stressing avoidance of asthma triggers, such as tobacco smoke and occupational pollutants, and improving patient education about this condition can have a major positive impact on outcomes.

The barriers to reducing the burden of asthma are particularly problematic in developing countries, where many patients have limited access to care and to essential medications. The GINA has outlined a 6-point patient management plan that can improve asthma care, especially that provided by primary care clinicians (10). The plan focuses on patient education and written treatment plans, together with ongoing communication and review by patients and their providers. Adherence to evidence-based principles of asthma treatment can also have a positive impact on patient outcomes.

USING ASTHMA GUIDELINES IN DAY-TO-DAY PRACTICE

The introduction of international guidelines to improve asthma outcomes provided a practical, clinician-friendly approach to this disease. The new definition of asthma reminded us that asthma is an inflammatory airway disease and that inhaled corticosteroids that have anti-inflammatory properties are the foundation of treatment for those with persistent asthma symptoms. Four cornerstones of asthma care were outlined. (Chart 2) Each has relevance in the day-to-day care of asthma patients.

Chart 2 - Essential components of successful asthma care

Monitoring	Use of self-assessment questionnaires, peak flow measures, spirometry
Avoidance	Eliminate asthma "triggers" such as allergen exposure and home/workplace irritants
Treatment	Anti-inflammatory therapy is the foundation of successful treatment for persistent asthma; short-acting bronchodilators for rescue therapy
Patient education	Provide the necessary tools for self-management including an action plan for exacerbation of symptoms

Lung function testing

As the main symptoms of asthma, including shortness of breath, cough and wheeze, are not specific to this disease, objective assessment of lung function is important for diagnosis. In addition, because of the poor correlation between lung function and patient symptoms and clinical outcomes, spirometry has been advocated for measuring disease severity and the response to therapy. In the majority of underdeveloped areas in the world however, spirometry is not readily available, resulting in incorrect assessment and underdiagnosis of asthma.

Environmental control

Control of environmental influences is the second cornerstone of care. Allergens and occupational factors are considered to be the most important triggers of asthma. For successful long-term management of asthma, these triggers must be identified and prevention of exposures should be the first line of defense (11,12). Symptoms and the need for medication correlate with the level of household exposure of known allergens in susceptible individuals (13,14). Improvement of asthma symptoms occurs when allergen exposure is reduced (15-18).

The important allergens for children and adults are those that are inhaled. Food allergens, although an important cause of anaphylaxis, are not a common precipitant of asthma symptoms. Important indoor allergens include a number of domestic factors: house dust mites; cockroach allergen; fungi (Alternaria, Aspergillus, Cladosporium, and Candida); and warm-blooded animals (cats, dogs and rodents). Rodents are problematic as they excrete urine, feces, and saliva, as well as producing dander that can be highly allergenic. Although removal of a pet from the home of a sensitized patient is encouraged, it may require several months before allergen levels decrease (19). House dust has been shown to be composed of several organic and inorganic compounds, including insects and insect feces, mold spores, animal dander, pollen grains, fibers, mites, and mite feces. In poor and inner-city locations, mouse and rat allergen exposure and sensitization are common in children who have asthma (20). Rodent exposure is also common in underdeveloped regions of the world and must be considered in asthma control in these populations.

In high-risk urban children with asthma, multiple-intervention environmental control studies have been conducted with comprehensive allergen reduction methods. Such studies have demonstrated positive outcomes (21-24). Successful interventions include construction remediation aimed at moisture sources within homes of those with a documented mold problem (23) and home visits by community health workers who promote dust mite and cockroach control and stress behavioral changes such as smoking cessation. Multiple visits are required in order to encourage completion of asthma action plans and deliver resources to reduce exposures. These have included allergy control pillow and mattress encasements, low-emission vacuums, commercial-quality door mats, cleaning kits, roach bait, and rodent traps.

Both outdoor and indoor pollutants contribute to worsening asthma symptoms (25-29). The two main outdoor pollutants are industrial smog (sulfur dioxide particulate complex) and photochemical smog (ozone and nitrogen oxides). It is advisable to recommend that asthma patients avoid, to the extent possible, exertion or exercise outside when levels of air pollution are high.

Indoor pollutants include cooking and heating fuel exhausts, as well as insulating products, paints, and varnishes. Clinicians should advise patients to be aware of the potential irritating effects of newly installed furnishings and finishes which can arise from new linoleum flooring, synthetic carpeting, particleboard, wall coverings, furniture, and fresh paint. The use of poorly vented gas stoves and appliances results in increased indoor levels of nitrogen dioxide and has been associated with increased respiratory symptoms (30,31). Installing non-polluting, more effective heating in the homes of children with asthma does not significantly improve lung function but can reduce symptoms of asthma, days off school, healthcare utilization, and visits to a pharmacist (32). In addition, fumes from wood-burning appliances or fireplaces, which may be used for heating or cooking, can precipitate symptoms in persons who have asthma (33). Sprays and strong odors, particularly perfumes, can also irritate the lungs and precipitate asthma symptoms.

In asthma sufferers, active smoking is a cause of worsening symptoms and deterioration of lung function and also reduces the efficacy of inhaled and systemic corticosteroids in treating asthma (34,35). Long-term passive cigarette smoke exposure has been linked to new-onset asthma in children and adults, as well as to the worsening of asthma symptoms, decreased lung function, and greater use of health services in those with pre-existing asthma (36). Children are more likely

to be affected when the mother smokes rather than when others in the household do so (37). In adults with asthma, exposure to tobacco smoke exposure might be more likely to occur in the work environment (38).

Estimates of the prevalence of occupational asthma vary (39,40). It has been reported that 2-15% of all cases of adult-onset asthma arise from workplace exposure. Taking an occupational history can be very rewarding and can lead to primary prevention and avoidance of the offending environment.

Drug therapy

The third cornerstone of asthma care is pharmacologic therapy. Asthma is an episodic disease, the clinical presentation and natural history of which are highly variable from patient to patient and for any individual patient. Some patients have persistent symptoms and exacerbations from time to time. Others show long periods of remission, with sudden worsening upon exposure to asthma triggers. Treatment protocols are based on this variability and use a step-care pharmacologic approach based on the intensity of the asthma over time (1). As symptoms and lung function worsen, step-up or add-on therapy is given. As symptoms improve, therapy can be stepped down.

It has been challenging to clinicians to quantify the degree of asthma for any given patient and to make decisions based on that assessment regarding treatment. Although lung function is often used as the primary endpoint, guidelines have suggested a composite of measures to gauge disease severity, the intrinsic intensity of the disease, and asthma impairment (1). The latter measures daily symptoms, nighttime awakenings, need of quick relief rescue therapy, work/school days missed, interference with normal daily activities, and lung function, as measured by spirometry.

When symptoms appear more than two times per week, nocturnal symptoms appear more than twice per month, or FEV_1 is less than 80% of predicted, regular treatment with anti-inflammatory therapy (preferably low-dose inhaled corticosteroids) is recommended and the patient is considered to have "persistent" asthma. The response to therapy, i.e., how the manifestations of asthma have been reduced or removed, is the degree of asthma control achieved. Asthma control has two components: the level of clinical asthma control (symptoms and quality of life) and the risk of future adverse events (exacerbations of asthma, loss of lung function, side effects of the therapy). At each visit, the patient should be assessed for the level of asthma control, adherence to the recommended treatment, and potential side effects of the drugs used. A simplified scheme has been developed to identify patients with controlled, partly controlled, and poorly controlled asthma (1). Several composite control measures have been developed to help the clinician assess asthma control (41-45). According to the guidelines, step-up therapy is advised for patients with asthma that is not well controlled. There are no hard and fast rules on stepping down asthma care, but it is recommended that a reduction in medication be attempted only after at least three months of stability. The lowest dose of medication to maintain stability is offered. At each step, reliever medication with a short-acting β_2-agonists agonist is used for breakthrough symptoms, but increased use implies poor control and the need for step-up therapy.

Significant reductions in the rate of severe exacerbations and improvements in quality of life can be achieved by aiming at achieving guideline-defined asthma control and by adjusting therapy to achieve it (46).

The patient/clinician partnership

4) The last cornerstone of asthma management is the patient/clinician partnership (1). Patient education that fosters a partnership among the patient, his or her family, and those caring for the patient is essential. Self-management education is essential to provide patients with the skills necessary to control asthma and improve outcomes. The goals of asthma care should be discussed and agreed upon by the patient and all members of the health care team, and sites for self- management education outside the usual office setting should be explored. The actions of the medications should be reviewed and the potential complications should be understood. Action plans should be written down and used as guidelines for daily care. An action plan for the acute exacerbation of asthma is essential, including when to use oral corticosteroids, when to call the physician and when to use emergency services. Often however, professionally provided, medically focused action plans do not "fit" with and incorporate the views on asthma held by the patient or caregiver. If this occurs, management strategies will be underutilized (47). Providers of asthma care need to have a patient-centered, partnership-based approach to the joint development and review of action plans.

In the Asthma Insights and Reality surveys (48), 32-49% of patients experiencing severe symptoms believed that their asthma was completely or well controlled, as did 39-70% of patients with moderate symptoms. For asthma sufferers that have frequent symptoms and exacerbations or for those who have a poor perception of their symptoms, the use of handheld peak flow meters can be useful to monitor daily lung function. An action plan for worsening lung function may be extremely helpful in avoiding emergency room visits and near-fatal attacks.

FINAL CONSIDERATIONS

International guidelines have offered a four-pronged approach to asthma care that will improve outcomes for patients and reduce the burden of this disease on families and society in general. The ap-

proach is practical, patient-centered, and easily adapted to the day-to-day management of asthma by all clinicians. Using tools such as spirometry for diagnosis and follow up, advice on environmental avoidance of respiratory irritants, and step-up pharmacologic care, as well as empowering a patient with self-management skills, will optimize asthma care, thereby reducing morbidity and mortality.

REFERÊNCIAS

1. Global strategy for asthma management and prevention (GINA) updated December 2011. Available at http://www.ginasthma.org/uploads/users/files/GINA_Report_2011.pdf
2. Braman SS The Global Burden of asthma Chest 2006;130;4S-12S
3. WHO asthma fact sheet #307 May 2011 Available at www.who.int/entity/mediacentre/factsheets
4. Fuhrman C, Dubus JC, Marguet C, et al. Hospitalizations for asthma in children are linked to undertreatment and insufficient asthma education J Asthma. 2011;48:565-71.
5. Stupka E, deShazo R Asthma in seniors: Part 1. Evidence for underdiagnosis, undertreatment, and increasing morbidity and mortality. Am J Med. 2009;122:6-11.
6. Backer V, Nolte H, Pedersen L et al. Unawareness and undertreatment of asthma: follow-up in a different geographic area in Denmark. Allergy. 2009; 64:1179-84.
7. de Benedictis D, Bush A. The challenge of asthma in adolescence. Pediatr Pulmonol. 2007;42:683-92.
8. Mattos W, Grohs LB, Roque F, et al. Asthma management in a public referral center in Porto Alegre in comparison with the guidelines established in the III Brazilian Consensus on Asthma Management. J Bras Pneumol. 2006;32:385-90.
9. Braman SS, Hanania NA. Asthma in older adults. Clin Chest Med. 2007 ;28:685-702.
10. Masoli, M, Fabian, D, Holt, S, et al Global Initiative for Asthma (GINA) program: the global burden of asthma: executive summary of the GINA Dissemination Committee report. Allergy 2004;59,469-478
11. Ashrad SH. Primary prevention of asthma and allergy J Allergy Clin Immunol. 2005;116:3-14
12. Gaffin JM, Phipatanakul W. The role of indoor allergens in the development of asthma. Curr Opin Allergy Clin Immunol. 2009;9:128-35
13. Sporik R, Holgate ST, Platts-Mills TA, et al. Exposure to house-dust mite allergen(Der p I) and the development of asthma in childhood. A prospective study. N Engl J Med 1990;323:502–7.
14. Vervloet D, Charpin D, Haddi E, et al. Medication requirements and house dust mite exposure in mite-sensitive asthmatics. Allergy 1991;46:554–8
15. Piacentini GL, Martinati L, Fornari A, et al. Antigen avoidance in a mountain environment: influence on basophil releasability in children with allergic asthma. J Allergy Clin Immunol 1993;92:644–50.
16. Simon HU, Grotzer M, Nikolaizik WH, et al High altitude climate therapy reduces peripheral blood T lymphocyte activation, eosinophilia, and bronchial obstruction in children with house-dust mite allergic asthma. Pediatr Pulmonol 1994;17:304–11.
17. Morgan WJ, Crain EF, Gruchalla RS, et al. Inner-City Asthma Study Group. Results of a home-based environmental intervention among urban children with asthma. N Engl J Med 2004;351:1068–80.
18 Peroni DG, Piacentini GL, Costella S, et al. Mite avoidance can reduce air trapping and airway inflammation in allergic asthmatic children. Clin Exp Allergy 2002;32:850–5.
19 Wood, RA Chapman MD, Adkinson NF, Jr. et al The effect of cat removal on allergen content in household-dust samples J Allergy Clin Immunol. 198;83:730-4
20 Phipatanakul W, Cronin B, Wood RA, et al. Effect of environmental intervention on mouse allergen levels in homes of inner-city Boston children with asthma. Ann Allergy Asthma Immunol 2004;92:420–5.
21. Morgan WJ, Crain EF, Gruchalla RS, et al.; Inner-City Asthma Study Group. Results of a home-based environmental intervention among urban children with asthma. N Engl J Med 2004;351:1068–80.
22. Krieger JW, Takaro TK, Song L, Weaver M. The Seattle-King County Health Homes Project: a randomized, controlled trial of a community health worker intervention to decrease exposure to indoor asthma triggers. Am J Public Health 2005;95:652–659.
23. Kercsmar CM, Dearborn DG, Schluchter M, et al. Reduction in asthma morbidity in children as a result of home remediation aimed at moisture sources. Environ Health Perspect 2006;114:1574-80.
24. Kattan M, Stearns SC, Crain EF Cost-effectiveness of a home-based environmental intervention for inner-city children with asthma J Allergy Clin Immunol 2005;116:1058-63
25. Abbey DE, Petersen F, Mills PK, Beeson WL. Long-term ambient concentrations of total suspended particulates, ozone, and sulfur dioxide and respiratory symptoms in a nonsmoking population. Arch Environ Health 1993;48:33–46.
26. Moseholm L, Taudorf E, Frosig A. Pulmonary function changes in asthmatics associated with low-level SO2 and NO2 air pollution, weather, and medicine intake. An 8-month prospective study analyzed by neural networks. Allergy 1993;48:334–44.
27. Garrett MH, Hooper MA, Hooper BM, Rayment PR, Abramson MJ. Increased risk of allergy in children due to formaldehyde exposure in homes. Allergy 1999;54:330–7.
28. Jaakkola JJ, Parise H, Kislitsin V, Lebedeva NI, Spengler JD. Asthma, wheezing, and allergies in Russian schoolchildren in relation to new surface materials in the home. Am J Public Health 2004;94:560–2.
29. Rumchev K, Spickett J, Bulsara M, Phillips M, Stick S. Association of domestic exposure to volatile organic compounds with asthma in young children. Thorax 2004;59:746–51.
30. Garrett MH, Hooper MA, Hooper BM, Abramson MJ. Respiratory symptoms in children and indoor exposure to nitrogen dioxide and gas stoves. Am J Respir Crit Care Med 1998;158:891–5.
31. Withers NJ, Low L, Holgate ST, et al. The natural history of respiratory symptoms in a cohort of adolescents. Am J Respir Crit Care Med 1998;158:352–7.
32. Howden-Chapman P, Pierse N, Nicholls S et al. Effects

of improved home heating on asthma in community dwelling children: randomised controlled trial. BMJ. 2008;337:469-476
33. Ostro BD, Lipsett MJ, Mann JK, Wiener MB, Selner J. Indoor air pollution and asthma. Results from a panel study. Am J Respir Crit Care Med 1994;149(6):1400–6.
34. Chaudhuri R, Livingston E, McMahon AD,et al Effects of smoking cessation on lung function and airway inflammation in smokers with asthma. Am J Respir Crit Care Med. 2006;174:127-33
35. Chalmers GW, Macleod KJ, Little SA, et al Influence of cigarette smoking on inhaled corticosteroid treatment in mild asthma. Thorax. 2002;57:226-30
36. 40. Sippel JM, Pedula KL, Vollmer WM, et al Associations of smoking with hospital-based care and quality of life in patients with obstructive airway disease. Chest 1999;115(3):691–6.
37. Ehrlich R, Jordaan E, Du TD, et al Household smoking and bronchial hyperresponsiveness in children with asthma. J Asthma 2001;38:239–51.
38. Radon K, Busching K, Heinrich J, et al. Passive smoking exposure: a risk factor for chronic bronchitis and asthma in adults? Chest 2002;122:1086–90.
39. Malo JL, Lemiere C, Gautrin D, et al. Occupational asthma. Curr Opin Pulm Med 2004; 10:57-61
40. Tarlo SM, Balmes J, Balkissoon R, et al Diagnosis and management of work-related asthma: American College Of Chest Physicians Consensus Statement.Chest. 2008;134(3 Suppl):1S-41S.
41. Juniper EF, Guyatt GH, Feeny DH, et al Measuring quality of life in children with asthma. Qual Life Res 1996;5:35–46.
42. Juniper EF, O'Byrne PM, Guyatt GH, et al. Development and validation of a questionnaire to measure asthma control. Eur Respir J 1999;14:902–7.
43. Bayliss MS, Espindle DM, Buchner D, et al. A new tool for monitoring asthma outcomes: the ITG Asthma Short Form. Qual Life Res 2000;9:451–66.
44. Marks GB, Dunn SM, Woolcock AJ. An evaluation of an asthma quality of life questionnaire as a measure of change in adults with asthma. J Clin Epidemiol 1993;46:1103–11.
45. Nathan RA, Sorkness CA, Kosinski M, Schatz M, Li JT, Marcus P, Murray JJ, Pendergraft TB. Development of the Asthma Control Test: a survey for assessing asthma control. J Allergy Clin Immunol 2004;113:59–65.
46. Pereira ED, Cavalcante AG, Pereira EN, et al Asthma control and quality of life in patients with moderate or severe asthma. J Bras Pneumol. 2011;37:705-711 Asthma control improves quality of life.
47. Ring N, Jepson R, Hoskins G, et al Understanding what helps or hinders asthma action plan use: a systematic review and synthesis of the qualitative literature. Patient Educ Couns. 2011;85:e131-43.
48. Rabe KF, Vermeire PA, Soriano JB, et al. Clinical management of asthma in 1999: the Asthma Insights and Reality in Europe (AIRE) study. Eur Respir J 2000; 16:802–807