Inhaled Corticosteroids: Why Do Physicians and Patients Fail to Comply With Guidelines for Managing Asthma?

During the past 30 years, both the prevalence and the mortality associated with asthma have increased. All the various reasons for this increase are still unclear. Some reasons are increased outdoor air pollution, particularly ozone and diesel exhaust particles; more time spent indoors in tight, inadequately ventilated buildings; and physicians becoming more likely to use the diagnosis of "asthma."

In response to this increase, organizations in several countries have convened expert panels to prepare guidelines for the diagnosis and management of asthma. As a result of considerable peer critique, updated revisions of the recommendations have become remarkably consistent internationally. Published reports stress the careful process of consideration by which the panels reached their conclusions. The guidelines are primarily evidence-based and rely heavily on meta-analyses. Also, because of the variability among different patients and in the same patient at different times, the guidelines stress the importance of carefully tailoring the management to fit the individual. The guidelines provide primary care physicians with advice on the best way to provide each patient with effective cost-efficient control of this chronic lymphocytic-eosinophilic inflammatory disease of the airways.

The goals of treating patients are minimal or no chronic symptoms, no limitation of activities, maintenance of personal best pulmonary function, minimum need for short-acting β₂-adrenergic agonists, and minimal adverse effects from medications. Recommendations for achieving these goals include 4 components.

1. Exposure to environmental triggers must be identified and controlled.

2. Patient education—like patients with diabetes, patients with asthma must take responsibility for day-to-day management.

3. Monitoring of pulmonary function—like monitoring glucose in diabetes and blood pressure in hypertension, objective measurement of changing airway obstruction is essential.

4. Pharmacological treatment—the choice of medications depends on the degree of severity of asthma; individualized stepwise changes in treatment are necessary according to change in severity. Short-acting aerosol β₂-adrenergic agonists are the primary treatment to relieve symptoms, but if they are needed more than a few times a week, addition of an aerosol anti-inflammatory corticosteroid is recommended to control the chronic airway inflammation.

In the treatment of asthma, it is important to classify the severity and temporal characteristics of disease because this will, in turn, dictate the method of treatment. Disease classifications and corresponding treatments are as follows.

**Mild, Intermittent Disease.**—No controller treatment is needed. Instead, occasional severe exacerbations should be treated with a short course of oral corticosteroids.

**Mild, Persistent Disease.**—Low-dose inhaled corticosteroids are the preferred controller treatment. Alternatively, cromoglycate or nedocromil, leukotriene antagonists, or sustained-release theophylline may be used.

**Moderately Severe, Persistent Disease.**—Low-dose inhaled corticosteroids plus long-acting β₂-adrenergic agonists are the preferred controller treatment. Alternatively, medium-dose inhaled corticosteroids may be used.

**Severe, Persistent Disease.**—High-dose inhaled corticosteroids and long-acting β₂-adrenergic agonists are the
preferred controller treatment. Oral corticosteroids may also be needed.

The National Asthma Education and Prevention Program and the Global Initiative for Asthma have detailed descriptions of these guidelines. Disappointingly, compliance with the guidelines by primary care physicians and their patients is poor despite convincing evidence that these guidelines improve patients’ quality of life, result in less absence from school or work, and lead to fewer emergency department visits or hospitalizations. Compliance with each of the 4 components (identification of environmental factors, patient education, objective monitoring of airway obstruction, and pharmacological treatment) is equally poor. Poor compliance for elderly patients is a particular concern because of their increased asthma-associated morbidity and mortality.

Reasons that physicians do not follow the guidelines include an incomplete understanding of the environmental triggers and access to efficient methods for advising their patients and families about environmental control and, perhaps most importantly, lack of time in a busy schedule to deal with these issues, even to encourage patients to stop smoking.

The guidelines recommend bringing the patient and family directly into the day-to-day management, and educational pamphlets are available. An aggressive asthma self-management education program substantially improves the outcome of treatment. However, creation of individualized written action plans, explanation of the effects of medications, and instruction in inhaler technique all place heavy demands on physicians’ time.

Surveys have indicated that primary care physicians’ inability to perform spirometry or even peak flow measurements and inexperience in their interpretation are the main barriers to their compliance. Practical monitoring of pulmonary function requires that the result of the test be available at the time of the patient visit. In large practice settings, network computing systems achieve this, but spirometry is often unavailable in smaller offices. Inexpensive, convenient equipment for spirometry is now available, but primary care physicians need to ensure quality control when they use this equipment.

Failure to prescribe inhaled corticosteroids for patients with persistent, even mild persistent, asthma has a major adverse impact on the quality of life and health care costs. The main reason physicians do not prescribe inhaled corticosteroids is not lack of time, availability of equipment, or educational support. It is disagreement with the recommendation, especially concern about safety and adverse effects.

The study by Kemp et al in this issue of the Mayo Clinic Proceedings should help allay these concerns. This prospective 2-year placebo-controlled study of the possible adverse effects of daily inhalation of aerosol fluticasone, a topical corticosteroid, on bone mineral density and function of the hypothalamic-pituitary-adrenal axis and on development of cataracts or glaucoma showed that the low dose advised for mild, persistent asthma had no adverse effect. The dose that was 5 times higher, advised for severe asthma, had a minimal, transient effect on cortisol production. At the end of the 2-year study, baseline blood cortisol concentrations and cortisol response to stimulation by corticotropin were normal. Can the results of this study be extended to other topical corticosteroids and to other aerosol delivery systems? Not necessarily. Although it is impractical to conduct large-scale prospective controlled trials comparing all the different available formulations, the results reported from most studies of different inhaled corticosteroids and different delivery systems have shown similar efficacy and safety. The critical point is that inhaled corticosteroids do not have the clinically important adverse effects on bone mineral density, cortisol production, and glucose metabolism caused by equivalently effective doses of oral glucocorticoids like prednisone.

An important point in the study by Kemp et al is the use of a metered dose inhaler propelled with chlorofluorocarbon (CFC). Because of environmental concerns about CFC damage to the ozone layer, this delivery system is rapidly being supplanted by dry powder delivery systems or metered dose inhalers with the corticosteroid dissolved in hydrofluoroalkane. These newer delivery systems usually require a lower dose to control asthma compared with CFC metered dose inhalers and provide better deposition in the smaller airways that may reduce the poorly reversible obstruction from airway remodeling in patients with more severe disease. However, efficacy of aerosol treatment depends substantially less on the device than it does on the patient’s skill in using it. As physicians, we take it for granted that all patients can swallow a pill, but we should not assume that all patients can use an inhaler. Using an inhaler is like riding a bicycle; it is a skill that has to be learned by coaching and experience.

Reasons that patients do not follow the advice from guidelines include a lack of education, particularly that asthma is a chronic inflammatory disease and the importance of controlling the environmental causes of inflammation; a lack of feeling that they are active participants in their care; a belief that inhaled corticosteroids are not needed during asymptomatic periods; and a concern about adverse effects. Not surprisingly, patients with asthma severe enough to require hospital care are more likely to comply. For some, the cost of medications is a substantial barrier.
What else can be done to improve compliance besides convincing primary care physicians that control of airway inflammation is safe and effective? Physicians need to be convinced that objective measure of lung function is worthwhile, and spirometry equipment must be available.15 Specialy trained nurse practitioners can be invaluable, especially in taking time to communicate with the patient and family. Local asthma support groups can provide patient and public education about the efficacy and safety of inhaled corticosteroids. Maybe it would also help to avoid the s word and simply call the medications glucocorticoids.

Charles E. Reed, MD
Division of Allergic Diseases and Internal Medicine
Mayo Clinic College of Medicine
Rochester, Minn