

Mayo Clinic Proceedings

Toward the Optimal Control of Asthma

The optimal management of asthma is not simple. Our best current understanding of how asthma should be diagnosed and treated is summarized in the Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma.¹ Although 417 pages long, this document still only summarizes the full complexity of asthma management.

For those who have not read and reread the Expert Panel Report, the review by Wechsler² in the current issue of *Mayo Clinic Proceedings* concisely captures the key points of the guidelines, while providing some context from an asthma specialist's point of view. Both the Expert Panel Report and Wechsler's review summarize the current knowledge base of asthma management plus experts' opinions on how to proceed.

To summarize even further, 9 essential components of asthma management are relevant to most patients with asthma, particularly persistent asthma: (1) confirming the diagnosis of asthma; (2) assessing asthma control (and severity); (3) measuring lung function with spirometry; (4) prescribing asthma medications using the step-care guide; (5) using a peak-flow or symptom-based written asthma action plan; (6) ensuring adherence to the management plan; (7) reassessing the patient at regularly scheduled asthma-evaluation visits; (8) reducing exposure to triggers, including aeroallergens; and (9) referring patients with less than optimally controlled asthma to an asthma specialist.

The challenge is that suboptimal performance with even 1 component can lead to suboptimal control of asthma. For example, if components 2 through 9 are addressed optimally, but the patient does not actually have asthma, then

the clinical outcome is likely to be poor. Studies show that physicians seldom schedule visits for asthma.³ Therefore, it is no surprise that asthma medications are seldom stepped down, and opportunities to enhance medication adherence are few. If appropriate asthma medications are prescribed but adherence to medication use is poor, then clinical outcomes may be poor as well.

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This importance of adherence to asthma medication use is highlighted by the results of the "real-world" asthma study by Tan et al⁴ published in this issue of *Mayo Clinic Proceedings*. Tan et al examined administrative claims data from 8 US commercial health plans to look for associations between asthma medication use and health care utilization. A major finding of the study was that patients using leukotriene modifiers (primarily montelukast) had lower odds (0.80) of asthma-related hospitalizations or emergency department visits compared with patients using inhaled corticosteroids. Patients receiving leukotriene modifier therapy also used short-acting bronchodilators less than patients treated with inhaled corticosteroids.

These results are initially somewhat surprising because head-to-head clinical studies consistently show that inhaled corticosteroids are more efficacious in the treatment of asthma than leukotriene modifiers.^{5,6} An answer to this apparent contradiction emerges from the subset analysis of the larger study. When only patients with high adherence to medications were examined (>80% adherence), patients receiving leukotriene modifier therapy actually had higher odds (1.74) of asthma-related hospitalizations or emergency department visits compared with patients using inhaled corticosteroids. The study results still favored leukotriene modifiers for short-acting bronchodilator use, even in the adherent subgroup.

Further analysis of the study by Tan et al⁴ shows that only 3.4% of patients prescribed inhaled corticosteroids met criteria for good adherence (ie, took 80% of prescribed doses). This is a dismal and discouraging finding, espe-

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cially because all study patients were enrolled in a commercial health plan. One can speculate that patients with asthma who have poor or no health insurance might fare even worse.

The results of this study highlight the stark difference between what is anticipated regarding the efficacy of a treatment on the basis of clinical trial findings vs its actual effectiveness in real-world conditions. Both leukotriene modifiers and inhaled corticosteroids are efficacious in the treatment of asthma, and clinical studies show that inhaled corticosteroids are more efficacious than leukotriene modifiers. However, the study by Tan et al⁴ suggests that the use of leukotriene modifiers is more effective than inhaled corticosteroids in real-world conditions.

So what might be the optimal strategy for patients with mild or moderate persistent asthma? One choice, supported by the results of the study by Tan et al,⁴ is to use leukotriene modifiers as first-line treatment. A second choice, as supported by clinical studies and recommended by the Expert Panel Report, is to use inhaled corticosteroids as the preferred initial treatment. Tan et al support the second choice, with the exhortation for clinicians to (somehow) improve adherence.

Wechsler² outlines a third strategy based on assessment of asthma control. As stated in the Expert Panel Report as well as other asthma guidelines,^{7,8} the clinician should assess asthma control (by history, spirometry, and tools such as the Asthma Control Test^{9,10}). Treatment, particularly asthma medications, should be modified (stepped up or stepped down) on the basis of the level of asthma control. Excellent asthma control, prevention of asthma exacerbations, and minimization of the adverse effects of medication are the management objectives. This approach encourages individualization of treatment and integrates individual variation in medication response and adherence. Thus, leukotriene modifiers might result in excellent asthma control for one patient, whereas another patient might achieve excellent control with an inhaled corticosteroid.

Ultimately, improved asthma control will be achieved through improvement of asthma care delivery. Each physician can start by knowing what constitutes optimal asthma care (that is, knowing what should be achievable for the patient with asthma). For those without the time or inclination to read the entire Expert Panel Report, reviews such as the one authored by Wechsler² and others like it^{11,12} serve as excellent outlines. Physicians engaged in the maintenance of certification process¹³ can complete asthma-specific performance-in-practice modules. These modules allow

physicians to profile their own asthma practice, with the opportunity to demonstrate measurable improvement.

Further improvement in asthma outcomes can be accomplished through redesign or improvement of asthma care delivery systems. The diagnosis and treatment of asthma are sufficiently complex to warrant robust system support for the busy clinician. Although national asthma measures and benchmarks have been proposed, these improvement activities are best accomplished at the local level. If such systems are successfully implemented, clinically relevant process and outcome measures might someday show that what should be achievable on the basis of clinical trial findings is in fact achieved in real-world conditions.

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