THE EFFECTIVE PHYSICIAN

Asthma Management in the ED

BY WILLIAM E. GOLDEN, M.D., AND ROBERT H. HOPKINS, M.D.

Background

Optimal asthma care requires strategies for long-term control and for management of acute exacerbations. A task force representing the American Academy of Allergy, Asthma, and Immunology; the American Academy of Emergency Medicine; and the American Thoracic Society developed guidelines for emergency department (ED) management of asthma as a part of recent efforts to improve asthma care in the United States. This column will highlight emergent asthma care in adults.

Conclusions

Asthma patients should have a written action plan with instructions on when and how to escalate asthma treatment with inhaled short-acting beta-agonists (SABA) or short-course oral corticosteroids (in appropriately selected patients), and instructions for expedited communication with the physician and for seeking ED care for severe symptoms. They should also be given a list of the signs and symptoms of worsening asthma, and of triggers that lead to exacerbations.

The severity of an asthma exacerbation is best quantified by the percentage of predicted forced expiratory volume in 1 second (FEV_1) or peak expiratory flow (PEF). Mild to moderate exacerbation is categorized by an FEV_1 or PEF that is 40% or higher than predicted; severe exacerbation is defined as an FEV_1 or PEF less than 40% of predicted.

Mild asthma exacerbations can usually be managed at home, but prompt care for moderate and more severe exacerbations is critical.

Risk factors for asthma-related death include previous asthma exacerbation requiring ICU admission, more than two asthma-related admissions or three ED visits in the past year, an acute-care asthma visit within the past month, use of more than two short-acting bronchodilator canisters in the past month, and comorbid cardiovascular, lung, or psychiatric disease.

Implementation

Acute asthma should be assessed with a brief history and exam, pulse oximetry, and FEV_1 or PEF measurement.

FEV_1 or PEF should be measured serially at presentation, 30 minutes, and 60 minutes after initial treatment to evaluate severity and the need for hospital admission. Inability to obtain these data should not delay treatment.

High-dose inhaled SABA plus ipratropium (via nebulizer or metered-dose inhaler with a valved holding chamber) should be started following rapid initial assessment for patients with severe exacerbations. This should be repeated every 20 minutes or administered continuously for the first hour of ED care. There is no proven advantage of injected beta-agonists over inhaled therapies.

Oxygen should be administered to maintain arterial oxygen percent saturation of 90% or more; a saturation of more than 95% is recommended in pregnant women and patients with underlying heart disease.

Oral prednisone at 40-80 mg daily should be given early in ED care to all patients with moderate to severe exacerbations. Similar doses of prednisone are recommended for patients with milder exacerbations who either do not respond to initial treatment or who have been recently treated with oral corticosteroids. Steroids should be continued until a PEF 70% or more than predicted (or personal best) is achieved—usually 3-10 days.

Patients who regularly take corticosteroids should be given high doses of prednisone, even for mild exacerbations.

Treatment with intravenous magnesium may be useful in patients with impending respiratory failure who have not responded to the initial hour of aerosol-based therapy, oxygen, and prednisone. Heliox-driven SABA aerosols can also be considered in this situation, but they are not well studied.

Patients with respiratory failure should be intubated semi-electively if possible and should be comanaged by a physician expert in ventilator management.

Most patients with asthma exacerbations require no additional laboratory testing. Arterial blood gas measurement can be useful in assessing patients with suspected hypoventilation, severe respiratory distress, and FEV_1 or PEF less than 25% predicted following initial treatment. Obtaining a baseline ECG and monitoring cardiac rhythm are reasonable in patients over 50 and those who have known chronic heart disease or chronic obstructive pulmonary disorder. Blood counts and chest radiography are not routinely recommended.

More than two-thirds of patients are expected to respond to the initial hour of inhaled therapies. Inhaled therapies can be individualized following the initial hour of treatment based on the patient's response.

Patients who respond to treatment should be observed for 30-60 minutes following their last bronchodilator treatment and may be discharged if PEF or FEV_1 measurements are more than 70% predicted (or personal best) and symptoms are minimal. Adequate follow-up and patient education are essential.

The full text of the guideline contains a treatment algorithm.

Reference

Camargo C.A., et al. Managing asthma exacerbations in the emergency department: Summary of the National Asthma Education and Prevention Program Expert Panel Report 3 guidelines for the management of asthma dxacerbations. J. Emerg. Med. 2009;37(2S):S6-17.

DR. GOLDEN (left) is professor of medicine and public health and DR. HOPKINS is program director for the internal medicine/pediatrics combined residency program at the University of Arkansas, Little Rock. Write to Dr. Golden and Dr. Hopkins at our editorial offices or imnews@elsevier.com.

Small-Particle Steroids Target Resistant Asthma

BY BRUCE JANCIN

KEYSTONE, COLO. — Small-particle–size inhaled corticosteroids may provide increased clinical efficacy in tough-to-control asthma with marked distal airways inflammation.

"A lot of our asthma patients are really easy to treat—it doesn't matter what medication you use, so long as there's an inhaled steroid in there," Dr. Richard J. Martin said at a meeting on allergy and respiratory disease. "But we should really ask in some of our more difficult-to-control patients if we are missing the inflammatory response in the distal lung."

Only a few inhaled corticosteroid (ICS) products have the requisite median particle diameter (less than 2 mcm) needed to reach the alveolar tissue in the distal tracheobronchial tree, including beclomethasone dipropionate HFA (QVAR), flunisolide HFA (Aerospan), and ciclesonide (Sepracor). All three contain ultrafine particles in a solution aerosol; other ICSs consist of larger particles in a suspension aerosol, explained Dr. Martin, chairman of the department of medicine at National Jewish Health and professor of medicine at the University of Colorado, both in Denver.

'We should really ask … if we are missing the inflammatory response in the distal lung.'

DR. MARTIN

The final word isn't in yet as to whether ICS particle size alters treatment outcomes in asthma. Long-term double-blind comparative trials with multiple end points are needed. But the short-term results are positive, Dr. Martin noted, and anecdotal clinical experience has been favorable.

Most encouraging of all are the findings of a recently presented but not yet published large, real-world study using the United Kingdom General Practice Research Database, Dr. Martin continued at a meeting sponsored by National Jewish Health.

That was a 1-year retrospective study involving more than 4,000 asthma patients. They were on one of three ICSs: large-particle fluticasone, large-particle beclomethasone with a now-banned chlorofluorocarbon propellant, or ultrafine-particle beclomethasone in a solution aerosol—that is, QVAR.

At the end of 1 year, there were significantly more asthma exacerbations requiring an unscheduled office visit and a course of oral steroids in the fluticasone and beclomethasone CFC groups than with beclomethasone HFA, despite the fact that the small-particle ICS was used at half the dose of beclomethasone CFC.

Moreover, the odds of asthma control were significantly worse with large-particle beclomethasone than with QVAR.

High-resolution CT studies have documented that narrowing and hyper-responsiveness of the small airways are common in asthma patients. Because the combined surface area and total volume of the distal airways are far greater than for the central airways, inflammatory changes in the distal airways can make treatment much more difficult.

Inflammation in the large airway often is uncoupled from that in the distal airway. That may explain the normal measurements of forced expiratory volume in 1 second (FEV_1) often present in asthma patients.

Radio-labeled drug deposition studies show that 80%-85% of large-particle ICS in suspension aerosol never reaches the lungs, being deposited instead in the oropharynx.

In contrast, 56% of beclomethasone HFA and 68% of flunisolide HFA particles are deposited in the lung. When those products are used with a spacer to filter out the larger particles, drug deposition in the oropharynx declines, the physician said.

One obstacle is the lack of a simple, noninvasive means of measuring distal airway inflammation that could be used to guide the decision to prescribe a small-particle ICS.

For now, the practical approach is to consider turning to a small-particle ICS when asthma patients aren't well controlled on a large-particle product. It's made a real difference in his own practice, Dr. Martin said. ■

Disclosures: *Dr. Martin has served on the advisory board and speakers bureau for Teva Pharmaceutical Industries, which markets QVAR. He is also a consultant and/or adviser to Genentech, Novartis, Schering-Plough, AstraZeneca, GlaxoSmithKline, and Kalobios Pharmaceuticals.*