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Editorial

Treatment of Severe Acute Asthma is Damage Control

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Although the article in this issue of the Journal by Nievas and colleagues entitled "Treatment of asthma when it becomes severe and requires intensive care" provides a summary of a logical

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sequence of medications for severe acute asthma, we need to be acutely aware that the best impatient care for asthma, whether in the emergency room, general unit in the hospital, or in the Pediatric Intensive Care Unit (PICU) is never good care—it is always damage control.

The unfortunate reality is that hospitalization of children with asthma continues at a high rate despite the availability of effective medications.[1] In fact, asthma is generally highly responsive to available medications, and early use of those medications can generally prevent progression to severe acute asthma, sometimes called status asthmaticus. The issue, then, is one of health care delivery. Hospitalizations and PICU admissions occur because effective medication is not provided prior to the progression of acute symptoms of asthma.

So, what are the medications of greatest importance for preventing the current endemic pattern of urgent care and hospitalizations for asthma? Inhaled corticosteroids are certainly the most effective medications for decreasing daily symptoms. Dyspnea and nocturnal sleep disturbance from asthma respond well to effective use of inhaled corticosteroids,[2-4] sometimes benefitted by the addition of a long acting bronchodilator such as salmeterol or formoterol.[5,6] While important for managing persistent symptoms, these don't reliably prevent exacerbations from viral respiratory infections,[7-9] which are the major contributors to urgent care and hospitalizations because of the profuse inflammatory effect produced in asthmatic airways.[10-14] This appears to be a result of defective innate immunity associated with asthma manifested by a decrease in interferons compared with airways of those without asthma.[15]

Unfortunately, despite some intriguing reports,[16] we have no cure or preventative therapies for these common cold viruses. Therefore we must rely on timely intervention measures if urgent care, hospitalizations, and PICU are to be prevented. The intervention measures in the ambulatory patient involve an inhaled bronchodilator such as albuterol (salbutamol) and an oral corticosteroid. The inhaled bronchodilator must be effectively delivered. However, even when appropriately used, albuterol and similar agents do not alter the course of an exacerbation; they are simply symptom relievers. Although commonly prescribed as scheduled "treatment" during an exacerbation, they can only provide transient airway smooth muscle relaxation. It's the inflammation causing mucosal edema and mucous secretions that results in the progression of an exacerbation.

Systemic corticosteroids, in contrast to bronchodilators, have anti-inflammatory effect and thereby have the potential to alter the clinical course of a viral respiratory infection-induced exacerbation.[17-21] However, the benefit from oral corticosteroids requires consideration of their pharmacodyamics and timely administration. While we have no dose-response relationship data for children, data from adults indicates that larger doses provide earlier and greater effect than smaller doses.[22] Controlled clinical trials in children provide us with doses that have been effective in shortening or preventing

hospitalizations or urgent care requirements and demonstrate that substantial clinical effect can be seen by 3-4 hours after those doses.[17-19]

When should those effective doses of oral corticosteroids be given? Recent data in pre-school age children have addressed which symptoms of a viral respiratory infection-induced asthma exacerbation predict worsening disease. A troublesome cough, often identified by mothers as the child's asthma cough, was the most reliable sign that respiratory distress would follow.[23] Recognizing the delay in onset of systemic (oral) corticosteroids, beginning an adequate dose of oral corticosteroid at that time has the greatest potential to alter the subsequent course and prevent the need for urgent care and hospitalization. When questioned, parents readily recognize the symptoms that will lead to more severe acute asthma and can be taught to intervene based on the predictive early symptoms.

This operative scenario to prevent progression of a viral respiratory infection-induced exacerbation requires advance patient education with the provision of medication, inhaled bronchodilator and oral corticosteroid, on hand. Regularly scheduled visits to assess and reinforce education for both maintenance and intervention measures should replace urgent care visits. This is, in fact, the practice of specialists who care for patients with asthma, and patients who have required urgent care visits, hospitalizations, and particularly PICU admissions should be cared for by physicians with the knowledge and skill to prevent those preventable occurrences.

In summary, treatment algorithms such as that described elsewhere in this issue of the Journal are valuable but should ideally be rarely needed if patients at risk get the health care delivery that prevents the need for those measures.

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ABBREVIATIONS PICU, Pediatric Intensive Care Unit

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