Quandaries in prescribing an emergency action plan and self-injectable epinephrine for first-aid management of anaphylaxis in the community

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Anaphylaxis often occurs in the community in the absence of a health care professional. Prompt administration of self-injectable epinephrine as first-aid treatment in the context of a personalized emergency action plan is the key to survival. There is little argument that physicians should prescribe self-injectable epinephrine for individuals who have already experienced anaphylaxis involving respiratory distress or shock triggered by allergens that might be encountered in the community. A quandary faced by physicians is that additional individuals with identified allergy who have no recognized prior history of anaphylaxis or who have a history of mild symptoms after exposure to a known trigger might also be at risk for subsequent life-threatening anaphylaxis and might also warrant prescription of self-injectable epinephrine. Prescribing for the latter individuals requires considerable clinical judgment and has led to controversy regarding possible overprescription or underprescription of self-injectable epinephrine. A second quandary for physicians occurs with regard to the advice they should give to at-risk individuals about actual use of their self-injectable epinephrine. It is difficult for health care professionals, let alone persons with no health care training, to predict whether anaphylaxis symptoms will occur in an at-risk individual after exposure to a known trigger. Moreover, at the onset of an acute allergic reaction, it is difficult to predict the symptoms that will ultimately develop. We examine these 2 common quandaries and provide examples of clinical scenarios and potential pitfalls in the management of persons identified as being at risk for anaphylaxis in the community. Additional studies of the recognition and treatment of anaphylaxis in the community are needed to develop comprehensive, evidence-based recommendations for its management in this setting. (J Allergy Clin Immunol 2005;115:575-83.)

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The updated practice parameter on anaphylaxis, which appears as a supplement to this issue of the Journal, states that patients who have had anaphylaxis from exposures that may be encountered in non-medical settings should carry self-injectable epinephrine for use if anaphylaxis develops and emphasizes the need for prompt self-injection of epinephrine if acute anaphylaxis is suspected.[1] In a previous evidenced-based approach to the use of epinephrine autoinjectors in a community setting, prescriptions for self-injectable epinephrine were suggested for individuals who experienced a systemic reaction to a trigger that might be encountered in the community if the patient had also experienced a severe reaction (respiratory difficulty or hypotension) or if they were at high risk, as defined by any of the following: asthma, reactions to trace amount of allergen, at risk for repeated exposure with lack of access to emergency care, or comorbidity increasing the risk of a severe reaction.[2] An American Academy of Allergy, Asthma and Immunology Board of Directors Position Statement regarding treatment of anaphylaxis in schools indicated that for patients ''who have had an anaphylactic reaction … epinephrine be given at the start of any reaction occurring in conjunction with exposure to a known or suspected allergen'' and further suggests that physicians can instruct patients who previously experienced severe anaphylaxis, including cardiovascular collapse, after a specific trigger to self-inject epinephrine even before symptoms arise if re-exposure to that trigger occurs.[3]

Although these recommendations appear to be straightforward, in many situations their application to individual patients requires clinical judgment. The first quandary for the physician is to determine which patients who have not actually experienced anaphylaxis as such might also be at risk of anaphylaxis and might also benefit from prescription of self-injectable epinephrine in the context of an emergency action plan. The second quandary concerns interpretation of the words ''when acute anaphylaxis is suspected'' and provision of clear and unambiguous recommendations to patients regarding the circumstances that warrant use of their self-injectable epinephrine. This is no easy task, considering the fact that anaphylaxis is not defined by any specific symptom or sign and that recognition of anaphylaxis in the community and assessment of its severity is usually being undertaken by persons

without medical training, either the individual himself or herself or, for a child, a caregiver. These 2 quandaries regarding self-injectable epinephrine for anaphylaxis occurring in the community are the subject of this perspective.

SCOPE OF THE PROBLEM

Data on the epidemiology of anaphylaxis in the general population are sparse and influenced by definitions, coding issues, and misclassification errors. A population-based study of anaphylaxis from any cause in Olmsted County, Minnesota, using data collected in the mid-1980s (possibly before the increase in allergic disease), calculated an annual occurrence rate of 30 per 100,000 person-years[4] and raised the concern that anaphylaxis is frequently not recognized by patients and physicians. This estimate does not account for persons at risk who might warrant a prescription of self-injectable epinephrine but have not experienced a reaction; this group could exceed 3% to 4% (300-400 per 100,000 person-years), even with conservative estimates.[5] In other recent studies of cases of anaphylaxis caused by a variety of triggers occurring in the community, presenting to an emergency department, or both, occurrence rates range from about 8 to 11 per 100,000 person-years[6-8] to as high as 590 per 100,000 persons,[9] and almost certainly reflect underestimates.[7,10]

In recent population-based surveys of peanut, tree nut, and seafood allergy in the United States, considering only individuals who reported respiratory or multiple organ system reactions and making a generous assumption that 25% might have both seafood and peanut-nut allergy, about 1.5% of the general population could be at risk for anaphylaxis to these foods.[11,12] Among children, real-time reporting from the Canadian Pediatric Surveillance Program indicated that food allergy is a primary trigger of anaphylaxis in children (81% of reactions), and only 32% of episodes of anaphylaxis were treated with epinephrine.[13] From 1995 through 2000 in the general population of the province of Manitoba, Canada, 950 of 100,000 persons (nearly 1% of the population) had self-injectable epinephrine dispensed[14] in response to physicians' decision making regarding risk of recurrent anaphylaxis in the community. This rate of dispensing might seem high; however, only a small fraction (10% to 32%) of those who experience anaphylaxis are typically prescribed self-injectable epinephrine.[11,12,15] One might extrapolate from these various studies that conservative prescription of self-injectable epinephrine for at least 1% of the general population or possibly to approximately 3% to 4% who could be at risk might carry an enormous cost to the health care system, although it would undoubtedly save additional lives.

Concern has been raised that the risks of poor outcomes and the need for self-injectable epinephrine are overestimated, at least in regard to food allergy in young children. Macdougall et al[16] reviewed death certificates and surveillance reports in the United Kingdom and Ireland that identified 0.006 deaths and 0.19 severe reactions per 100,000 children up to 15 years of age. Extrapolation for a food allergy rate of 5% would indicate a risk of death for a child with food allergy to be 1 in 800,000. Although these data were presented as in some sense reassuring, the age group identified and the definitions of severity (cardiopulmonary arrest, inotropic support, fluid bolus, >1 dose of epinephrine or bronchodilator) likely underestimated the number of affected children with significant morbidity. Kemp[17] made suggestions in regard to prescription of self-injectable epinephrine and included the observations by Macdougall et al[16] to suggest young children were not at high risk, and he additionally suggested that prescriptions were appropriate for risk factors such as asthma, prior reactions involving the respiratory tract, peanut-tree nut allergy, reactions to trace exposures, and a strong positive allergy skin test response. Another concern that might be raised about lowering the threshold for prescribing self-injectable epinephrine to include persons who are not obvious candidates is that such persons might unnecessarily experience an adverse effect on quality of life if they view the prescription as the physicians' confirmation of a potentially deadly malady.[18,19]

FIRST QUANDARY FOR THE PHYSICIAN: WHICH PATIENTS REQUIRE PRESCRIPTION OF SELF-INJECTABLE EPINEPHRINE?

Recognizing that a person has experienced anaphylaxis from a trigger encountered in the community is the first step toward a decision to prescribe self-injectable epinephrine. However, there is as yet no universal consensus definition or diagnostic description of anaphylaxis, as stated in the National Institutes of Health report in this issue of the Journal.[20] The text of the practice parameter in this issue of the Journal[1] describes anaphylaxis as an acute life-threatening reaction with varied clinical presentations, in which respiratory compromise and cardiovascular collapse cause the most concern. Where does the risk assessment for prescription of self-injectable epinephrine fit in regard to this definition? It is straightforward to suggest that persons with a previous episode of anaphylaxis characterized by respiratory or cardiovascular compromise to a trigger that might be encountered outside the hospital should carry self-injectable epinephrine, but only about 70% of individuals with anaphylaxis have respiratory symptoms, and even fewer, only about 10%, experience cardiovascular symptoms.[6,13] In addition, physicians cannot assume that patients and caregivers necessarily recognize and report all symptoms because even trained health care professionals underrecognize anaphylaxis.[4,10]

Up to 10% of individuals with anaphylaxis have no obvious skin manifestations (eg, urticaria, angioedema, flushing, and itching); nevertheless, urticaria and angioedema are the most common manifestations of anaphylaxis,[13,21,22] and they might also be the first symptoms in