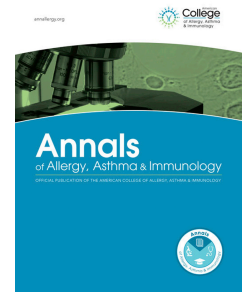


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Diverse Perspectives on Recognition and Management of Anaphylaxis

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Title: Diverse Perspectives on Recognition and Management of Anaphylaxis

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Dr. Camargo has participated on Scientific Advisory Boards for Bryn Pharma and kaleo, Inc.

Dr. Pistiner has served as a consultant for the Allergy and Asthma Foundation of America, kaleo, Inc., DBV Technologies, Novartis; received funding from kaleo, Inc. and the National Peanut Board; and is co-founder of AllergyHome and Allergy Certified Training

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Abbreviations in Figure: AAP, American Academy of Pediatrics; VS, vital signs; BP, blood pressure; HR, heartrate; PSO2, percent oxygen saturation; RR, respiratory rate; NIAID, National Institute of Allergy and Infectious Disease; FAAN, Food Allergy and Anaphylaxis Network.

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Identifying anaphylaxis remains a challenge for both clinicians and patients/caregivers. Despite establishment and validation of diagnostic criteria in acute settings, and improved anaphylaxis management in the emergency department (ED),¹ underdiagnosis and undertreatment of anaphylaxis continue to be reported.² These longstanding gaps highlight the continued need to expand knowledge about anaphylaxis and develop approaches that improve patient outcomes.

The first step to address undertreatment is to improve anaphylaxis recognition. Establishing diagnostic criteria for clinicians to use in the acute setting is a good start, but a wide divide remains between guidance for medical professionals and guidance for patients. Because most anaphylaxis cases occur in the community setting, patients/caregivers should be adequately prepared. Although the message that use of epinephrine is first-line treatment for anaphylaxis seems clear, recognizing the symptoms/signs of anaphylaxis when it occurs remains a barrier. Recognition of anaphylaxis is a key decision point guiding appropriate epinephrine use.

Despite published anaphylaxis diagnostic criteria, even specialists in the field of Allergy/Immunology interpret and apply criteria differently. In an online survey administered through the American Academy of Allergy, Asthma, and Immunology, 10 brief case scenarios were presented to practicing Allergists/Immunologists.³ Among the 133 respondents, there was 100% agreement by Allergists/Immunologists that a scenario represented anaphylaxis for only a single scenario. For the other nine scenarios, there was wide variation (13-82%) in the number of respondents deciding the scenario was anaphylaxis. Recently, a similar survey among 1001 Pediatricians demonstrated comparable variation in recognizing anaphylaxis.⁴ In none of the eight case scenarios was there 100% consensus; agreement ranged from 14-80% for participants

labeling the cases as anaphylaxis. These results parallel what has been reported in retrospective studies of ED cases, where many children who met anaphylaxis criteria were not correctly diagnosed and were not treated with epinephrine.² Patients with anaphylaxis may present to clinicians in a variety of settings (e.g., primary care, specialty care, urgent care, emergency care); thus, uniformity in the diagnosis of and terminology surrounding anaphylaxis would not only improve patient care, but also facilitate communication. Translating anaphylaxis criteria into quick-reference tools that can be used by busy clinicians is ideal.

Challenges in managing anaphylaxis are evident in the community setting. Many patients and caregivers do not recognize anaphylaxis. These reactions are unpredictable and can occur anywhere, requiring caregivers to recognize symptoms/signs while under the stress of being in unfamiliar, public settings. Treatment relies on availability of epinephrine that is dose-appropriate and easy to administer, which exists in the form of autoinjectors. However, studies have identified a range of barriers that impede the timely use of epinephrine for anaphylaxis. These include lack of device availability at the time of need, uncertainty surrounding how to use the device as well as anxiety and fears associated with administering an injectable medication. Adding to these difficulties, clinicians have time-limited patient encounters during which to educate, prepare, and empower patients and caregivers to act in the event of anaphylaxis. User-friendly action plans can serve as tools support patient and caregiver ability to rapidly and accurately identify anaphylaxis and initiate treatment in any setting.

Anaphylaxis recognition is particularly challenging among infants. This age group poses unique diagnostic complexities for several reasons: (1) anaphylaxis criteria have not been validated for

this age group; (2) infants cannot describe symptoms; (3) many potential signs of anaphylaxis can overlap with normal infant behaviors; and (4) anaphylaxis symptoms/signs may be difficult to differentiate from other disorders presenting in infancy. There is heightened awareness of infant anaphylaxis in recent years since the publication of peanut allergy prevention guidelines to introduce peanut in the first year of life to infants who meet defined allergy risk criteria. An essential topic during conversations between clinicians and caregivers surrounding early peanut introduction is identification of acute allergic reactions, including anaphylaxis. It can be a challenge to convey to new parents how to recognize anaphylaxis because emergency action plans and commonly used educational materials list symptoms/signs that may be difficult to apply to infants (e.g., weak pulse, feeling of “doom,” confusion, altered consciousness, or agitation). A recent survey describes the presentation of anaphylaxis in infants and toddlers from the caregiver perspective, noting that modifying some of the standard language related to symptoms/signs in infants may help facilitate education of parents in identifying severe allergic reactions.⁵ Given the variability in anaphylaxis recognition even among clinicians,^{3,4} the task of educating parents to recognize its many facets will remain challenging despite our best efforts. These recent publications highlight the continued need to improve the recognition of anaphylaxis, both in the medical and community settings.

While there may be challenges in identifying when an acute reaction should be labeled as anaphylaxis, there is strong guidance to support early epinephrine administration for all patients experiencing anaphylaxis. Results of the case scenario survey among Allergists/Immunologists noted some discordance between anaphylaxis diagnosis and epinephrine treatment.³ In nine of the cases, a subset of participants (2-17%) chose not to administer epinephrine even though they

70 felt the case represented anaphylaxis. Similarly, the Pediatrician study found a lack of consensus
71 for epinephrine use among those who identified the case as anaphylaxis; 2-13% of survey
72 respondents who diagnosed the case as anaphylaxis opted not to treat with epinephrine.⁴ These
73 findings suggest ongoing lack of agreement for using epinephrine to treat anaphylaxis. Since
74 these studies presented hypothetical case scenarios, barriers such as access to medication and
75 concerns about epinephrine were unlikely to be relevant. The hesitancy to use epinephrine in
76 such cases requires further investigation.

77
78 With the continued rise in IgE-mediated allergies, anaphylaxis will remain an important public
79 health concern. Current resources, including the anaphylaxis diagnostic criteria and American
80 Academy of Pediatrics Allergy and Anaphylaxis plan, are good starting points and important to
81 include in clinician and patient/caregiver education. Allergists/Immunologists have played a
82 leading role in research and education related to anaphylaxis and are best positioned to move the
83 field forward by addressing identified gaps and continuing to educate other clinicians and the
84 wider community (Figure 1). Developing simpler criteria that are uniformly used by specialists
85 within Allergy/Immunology – and that can be easily understood and applied by other clinicians
86 and caregivers during stressful acute allergic events – could potentially bridge the gaps in
87 anaphylaxis recognition and treatment in the community setting; gaps that have been reported for
88 decades. Identifying factors for the discordance in anaphylaxis diagnosis and epinephrine
89 administration noted in recent studies will be essential as it may contribute to mixed messaging
90 to patients and families. Equally important is continued advocacy efforts led by
91 Allergists/Immunologists to support wider access to epinephrine autoinjectors, including

- 92 implementation of stock epinephrine in schools and increasing affordability of epinephrine
93 autoinjectors.

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- 1 Figure 1: Recognition and Treatment of Anaphylaxis: Setting and Perspective Matter
- 2 Abbreviations: AAP, American Academy of Pediatrics; VS, vital signs; BP, blood pressure; HR,
- 3 heartrate; PSO₂, percent oxygen saturation; RR, respiratory rate; NIAID, National Institute of
- 4 Allergy and Infectious Disease; FAAN, Food Allergy and Anaphylaxis Network.

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