

Personal protection against fire ants: what are the options?

The article entitled “Personal Protection Measures Against Fire Ant Attacks” by Jerome Goddard, PhD, in this issue of the *Annals* is written by an entomologist and thus represents a different perspective on insect sting reactions than what is usually found in medical journals devoted to allergic diseases.¹ Rather than the typical focus of these journals, this study addresses insect behavior and ability to inflict stings. This view is useful, because despite the almost universal acceptance that insect sting avoidance measures should be an important part of the management of Hymenoptera sting allergy, only a few studies have analyzed the effectiveness of these measures.^{2,3} The study explores the use of simple barriers and repellants against imported fire ant stings and provides some needed evidence to guide these recommendations.

The study found that socks represent a substantial barrier to fire ant stings. In fact, under the conditions of this study, fire ants did not sting through any of the socks evaluated. Socks also extended the time required for ants to reach bare skin. These findings provide helpful information for the management of fire ant allergy, especially in areas where fire ants have been established for a number of years and where colony populations are dense. In such areas, high annual sting attack rates in the range of 50% to 80% can be found.^{4,5} Empiric recommendations to reduce the likelihood of future fire ant stings typically include the wearing of socks and shoes, diligent ongoing efforts to eradicate and prevent recurrence of mounds, monitoring carefully for the presence of new or reemerging colonies, and not sitting or lying on the ground. Although chemical treatment can successfully kill fire ants, reinfestation is common. Although the study found that socks are useful barriers, the protection they provide is not absolute. Given the high sting attack rates and limited effectiveness of avoidance measures, it is not surprising that in the past 15 years of managing fire ant allergy in areas of heavy fire ant infestation, patients with allergy to fire ant venom can rarely completely avoid further stings during a 3- to 5-year period, even when the patient and family use the most diligent efforts to avoid future stings. Successful avoidance is particularly difficult to accomplish for young children, whose outdoor play and inability to recognize ants and their mounds serve as impediments. The difficulty in avoiding stings and associated parental concern is often compounded if nonparental caregivers, such as daycare workers or teachers, are providing supervision.

In addition to analyzing the effectiveness of barriers, the investigator also evaluated the effects of insect repellents on reducing the numbers of fire ant stings. None of the products tested demonstrated efficacy in repelling fire ants in this study.¹ This is unfortunate, because safe and effective repellents could potentially be beneficial.

It is common for imported fire ants to inflict multiple stings. On rare occasions, usually involving immobile or impaired people, fire ants can inflict several hundred or even thousands of stings.⁶ More commonly, however, an individual receives only a few to 25 or perhaps 50 stings. For nonallergic patients, this typically causes only local pain, erythema, and edema that lasts a few days. For these persons, a reduction in the number of stings would be expected to limit the pain and the local reaction. For patients who are allergic to fire ant stings, it is not possible to state what impact reducing the number of stings to something other than zero would have on the likelihood that an allergic reaction will occur. Stated another way, what is the incremental reduction in risk of anaphylaxis if, for example, a patient allergic to fire ant venom receives 5 stings from an exposure that would usually produce 50 stings or receives 1 sting from an exposure instead of 10 stings? Many patients report reactions triggered by only 1 or 2 stings, yet other patients provide histories that they have tolerated isolated single stings without allergic reactions but consistently react after receiving larger numbers of stings. Unfortunately, no data are available to help answer this question, and a meaningful collection of these data would be challenging. Currently, any answer to this question would be speculative and likely variable from patient to patient and might be influenced by other factors, such as the concentration of antigen in the venom.

During the last 30 years an increasing body of knowledge has emerged to help practitioners and patients manage fire ant venom allergy, and recent advancements continue to enhance the provision of care. Current strategies use avoidance measures to decrease the probability of stings, immunotherapy when indicated to reduce the likelihood that future stings will cause anaphylaxis, and self-administered injectable epinephrine to treat anaphylaxis.⁷⁻⁹ Evidence has continued to accumulate in recent years to support the effectiveness of immunotherapy with imported fire ant whole body extract. A study by Tankersley et al⁹ found that only 1 of 56 patients treated with fire ant whole body extract immunotherapy reacted to sting challenge. Treatment of anaphylaxis also continues to

advance. For example, even though epinephrine has been the mainstay of treatment of anaphylaxis for decades, we continue to learn how to use it most effectively.^{10,11} We now have some evidence, as presented in this study, to support certain of our recommendations to reduce the likelihood of fire ant stings. Previously, these recommendations were based on common sense; now evidence exists to justify them.

Imported fire ants, long a problem in the southeastern United States, are now spreading beyond that region of the country. Although their spread is expected to stop at some point due to cold intolerance, that point is not clearly delineated. Allergists naturally focus on the capacity of the stings to cause reactions, but these ants cause nonmedical problems as well, such as damage to agricultural equipment, crops, livestock, and native organisms. For all of these reasons, efforts are under way to attempt to identify effective ways to reduce the presence of fire ants in established territories and to limit their spread. Areas of research include the use of chemicals and biologic agents. Thus far, effective methods suitable for broad application have not been found. Unless greater success can be achieved, imported fire ants and their deleterious effects, including the ability to cause allergic reactions, can be expected to remain an expanding problem. It is hoped that methods to treat or perhaps prevent fire ant allergy therapy will also continue to expand.

JOHN E. MOFFITT, MD
Office of the Vice Chancellor for Health Affairs
The University of Mississippi Medical Center
Jackson, Mississippi

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