
Management of stinging insect hypersensitivity: a 5-year retrospective medical record review

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Background: The Joint Task Force on Practice Parameters for Allergy and Immunology recommends that patients with a history of a systemic reaction to an insect sting be educated on ways to avoid insect stings, carry injectable epinephrine for emergency self-treatment, undergo specific IgE testing for stinging insect sensitivity, and be considered for immunotherapy.

Objective: To review frontline providers' documented care and recommendations for imported fire ant and flying insect hypersensitivity reactions.

Methods: A retrospective medical record review was performed of emergency department and primary care clinic visits between November 1, 1999, and November 30, 2004. Using *International Classification of Diseases, Ninth Revision*, codes, medical records were selected for review to identify patients with potential insect hypersensitivity.

Results: A total of 769 medical records from patients who experienced an insect sting were reviewed. Of 120 patients with a systemic reaction, 66 (55.0%) received a prescription for injectable epinephrine, and 14 (11.7%) were given information regarding avoidance of the offending insect. Forty-seven patients with systemic reactions (39.2%) were referred to an allergist. Of 28 patients who kept their appointments and underwent skin testing, 3 had negative results and 25 (89%) had positive results and were advised to start immunotherapy.

Conclusion: Adherence to the stinging insect hypersensitivity practice parameter recommendations is poor. Many patients who have experienced a systemic reaction after an insect sting and have sought medical care are not afforded an opportunity for potentially lifesaving therapy.

Ann Allergy Asthma Immunol. 2006;97:223–225.

INTRODUCTION

The Joint Task Force on Practice Parameters for Allergy and Immunology has made recommendations that patients with a history of a systemic reaction to an insect sting be educated on ways to avoid insect stings, carry injectable epinephrine for emergency self-treatment, undergo specific IgE testing for stinging insect sensitivity, and be considered for immunotherapy.¹ Previous surveys^{2,3} have reported the frequency with which these preventive measures are achieved and patient demographics for those receiving treatment. Overall, these surveys have revealed inadequate adherence to the recommendations. With more than 40 deaths each year in the United States being attributed to insect sting anaphylactic reactions and 3% of adults experiencing potentially life-threatening systemic reactions to insect stings, this lack of adherence is a significant concern.^{4,5} The present study directly reviewed frontline providers' documented care and recommendations for imported fire ant and flying insect hypersensitivity reactions.

METHODS

A retrospective medical record review was performed at emergency department and primary care clinic visits between November 1, 1999, and November 30, 2004. Using *International Classification of Diseases, Ninth Revision*, codes

989.5, E905.3, and E905.5, medical records were selected for review to identify patients with potential insect hypersensitivity. Other anaphylaxis and individual symptom codes were not used in identifying medical records to be reviewed. All reviewed medical records came from 2 military medical facilities. One facility is a major medical center with medical training programs and an allergy department on site located in San Antonio, TX, and the other facility is a military outpatient care clinic located in Charleston, SC, that does not have training programs or an allergist (although civilian allergists are locally available). Both facilities are located in areas where imported fire ants are endemic. There are no costs to the patients for medical care, prescriptions, or referral visits at these facilities. The information obtained from the medical records included the following: patient age, place of visit, insect that caused the event (if known), description of event, significant physical examination findings, treatment rendered, and whether patients were given information on avoidance of the involved insect, injectable epinephrine, and referral to an allergist. For patients seen by an allergist, skin test data and immunotherapy recommendations were recorded. The χ^2 test was used to evaluate for statistical differences between facilities in epinephrine use and prescription rates along with rates of referral. It was also used to evaluate differences in referral rates based on age.

RESULTS

A total of 769 medical records from patients who experienced an insect sting were reviewed. There were 120 encounters

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Received for publication December 21, 2005.

Accepted for publication in revised form January 17, 2006.

suggestive of a systemic reaction, which accounted for 15.6% of insect-related visits. Flying hymenoptera accounted for 59 of the systemic reactions (49.2%), imported fire ants for 46 (38.3%), scorpion stings for 5 (4.2%), and an unspecified insect for 10 (8.3%).

Most of the systemic reactions (77.5%) involved patients 16 years or older. Of the 27 reactions that involved patients younger than 16 years, 10 (37%) were cutaneous only. Airway or respiratory symptoms, including swelling in the throat, tongue swelling, difficulty breathing, wheezing, shortness of breath, and chest tightness, were present in 85 systemic reactions (70.8%), whereas systemic cutaneous symptoms consisting of hives or angioedema at areas distant from the sting site occurred in 70 (58.3%). Multisystem involvement occurred in 57 patients (47.5%).

Antihistamines (H_1 blockers) were the most commonly used medications in the treatment of systemic reactions. Antihistamine use was documented in 106 patients (88.3%), followed by corticosteroids in 76 (63.3%), H_2 blockers in 45 (37.5%), and epinephrine in 25 (20.8%). The medical center site treated 16 (17%) of 95 patients with epinephrine vs 9 (36%) of 25 patients at the clinic site; this difference approached statistical significance ($P < .07$). Of patients who had a systemic reaction, 66 (55.0%) received a prescription for injectable epinephrine, and 14 (11.7%) were given information regarding avoidance of the offending insect. Comparison revealed that the medical center site provided 53% of its patients who experienced a systemic reaction with a prescription for injectable epinephrine vs 64% at the clinic site ($P < .43$). Twenty-five percent of the patients who experienced a local-only reaction to either an imported fire ant or a flying Hymenoptera sting received antibiotic drugs.

Of the patients with systemic reactions, 47 (39.2%) were referred to an allergist. Of these referrals, 20 were made at the initial visit. The emergency department was the place of evaluation for most (86.7%) of the systemic reactions. Of the 104 initial emergency department visits, 17 (16.3%) resulted in an allergy referral at that initial encounter. Sixteen systemic reactions were initially evaluated in 1 of the primary care clinics, and 3 of these (19%) were referred at that visit for further evaluation. When comparison was made in terms of all systemic reactions, 10 (33%) of the 30 patients with systemic cutaneous-only symptoms were referred compared with 9 (27%) of the 33 patients with only respiratory/airway symptoms. Referrals were given to 28 (49%) of the 57 patients who had multisystem involvement. The rate of referral was higher in patients younger than 16 years compared with those 16 years and older (63% vs 32%; $P < .008$). Referrals were placed for 17 (68%) of the 25 patients who received epinephrine as a treatment and for 9 (64%) of the 14 patients who had documented avoidance recommendations. All 3 patients who required hospitalization were also referred. Overall, the medical center site referred 41% of all patients with systemic reactions vs 32% at the clinic site ($P < .55$).

Of the patients referred to an allergist, 34 (72%) with a systemic reaction kept their appointments. Twenty-eight of

the 34 patients underwent skin testing. Three of these patients had negative test reactions, whereas 25 (89%) had positive skin test reactions and were advised to start immunotherapy. Six evaluated patients were not tested secondary to antihistamine use, significant comorbidities, intolerance to testing, a nonsuggestive history at the time of evaluation, and cutaneous-only reactions in patients younger than 16 years.

DISCUSSION

These results indicate that adherence to the stinging insect hypersensitivity practice parameter recommendations is poor, even though similar recommendations are found in textbooks from the primary care specialties, including emergency medicine.⁶⁻⁸ It is apparent that many patients who have experienced a systemic reaction after an insect sting and have sought medical care are not afforded an opportunity for potentially lifesaving therapy. Potential factors that we suspect may contribute to the deficiency in referrals include a physician's inadequate exposure to the field of allergy, reliance on injectable epinephrine for treating reactions, and potentially differing opinions in what constitutes a significant reaction. Baptist and Baldwin⁹ demonstrated that physicians who took an allergy/immunology rotation during residency thought that they knew the types of cases seen by an allergist, believed that immunotherapy was effective (allergic rhinitis), and were more likely to have referred a patient to an allergist, which emphasizes the importance of exposure to the practice of allergy.⁹ Other factors, such as a lack of awareness regarding immunotherapy effectiveness and disbelief in immunotherapy, have been reported previously by DeBari et al.¹⁰

Another concerning finding in the study population was the acute management of systemic reactions. The order of medication preference mirrors what was found by Brown et al¹¹ in a study reviewing emergency department anaphylaxis cases. The underuse of epinephrine may be related to differences of opinion regarding which symptoms are considered necessary to make the diagnosis of anaphylaxis. Many patients who had cutaneous-only symptoms may not have received epinephrine owing to the lack of respiratory or cardiovascular symptoms.

The present study relied on the observations and documentation from multiple different providers in describing the data. Classifications of whether reactions were systemic were solely based on this documentation. The 58% of patients with cutaneous symptoms in this study is lower than the 94% reported by Brown et al.¹¹ This difference may be due to the fact that we used only systemic cutaneous symptoms of urticaria and angioedema in our data. Another possible problem with relying on medical record documentation is that some of the reactions we classified as systemic that involved only respiratory/airway symptoms could potentially be anxiety related rather than due to hypersensitivity, although the provider's clinical impression was believed to be an allergic reaction.

It seems that in our population, age and the requirement for hospitalization are associated with increased referral rates. There also were higher referral rates among patients who had

received avoidance recommendations and those who had received treatment with epinephrine. One could conclude that providers who follow one of the Joint Task Force recommendations are more likely to adhere to the other recommendations as well. Overall, this retrospective medical record review highlights the disassociation of actual patient care from the recommendations made. Ultimately, adherence to all the management recommendations will likely improve if only one recommendation, allergy referral, is initiated by nonallergists. To increase venom referrals, a direct public/patient education campaign on the treatment options available for insect hypersensitivity may be required to increase the awareness of those at risk.

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