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PREVALENCE OF BEE STING ALLERGY IN 4,992 BOY SCOUTS

By

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The sudden and often fatal anaphylactic reactions to insect stings are well known. At first these deaths were thought to be due to the toxic effect of venom but later most were shown to be due to anaphylactic reactions. In the the nineteenth century, there were scattered reports of deaths due to the poisonous effect of the venom. In 1914, *Waterhouse* (13) in *Lancet* reported that some of these insect sting reactions were due to anaphylactic rather than toxic reactions. There were 229 reported stinging insect deaths in the U.S.A. from 1950-1959, almost twice the number of fatalities from poisonous snakes (5). Although considerable evidence exists in the literature regarding anaphylactic or allergic reactions due to sensitization from Hymenoptera (1-4, 6-13), there has been no definite study of the prevalence of Hymenoptera sting allergy in a normal population.

DEFINITIONS

One of the immediate problems encountered in differentiating insect sting allergy is the often confusing and co-existing different types of reactions which may accompany any insect

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sting. Four general types of reactions may be encountered: a panic reaction, severe local reaction, toxic reaction, and a generalized allergic reaction.

A frequently encountered difficulty was the differentiation of a large local reaction from a generalized allergic reaction. In this study, a local reaction was defined as a wheal, erythema, and swelling localized to the area of the Hymenoptera sting, no matter how large this swelling might be. A systemic or constitutional reaction was defined as generalized hives, wheezing, or shock, occurring shortly after the Hymenoptera sting.

METHOD

The health cards of 4,992 boy scouts age 11-16 attending a local camp* in the summer of 1965 were reviewed. A specific question was asked about any type of allergic reaction the camper may have had. All cards which suggested any possibility of insect sting allergy were removed, and the parents of these boys were sent a questionnaire with specific questions detailing the type of reaction, time interval between sting and symptoms, duration of symptoms, treatment received and name and address of attending physician. The physician so named was sent a second questionnaire, asking for corroboration of the reaction, physical findings, and treatment. From the answers on the combined questionnaires, an attempt was made to differentiate those individuals with a definite generalized allergic reaction to hymenoptera from those with other types of reactions such as a questionable allergic reaction, panic, severe local, or toxic reactions.

RESULTS

Out of a total population of 4,922 boy scouts ranging in age from 11-16 years, 41 claimed they were allergic to "bees". The response to the questionnaires was as follows: thirty-nine out of forty-one parents returned their questionnaires for a response rate of 95 per cent. Thirty out of forty-one physicians responded to their questionnaires for a return rate of 73 per cent.

Fifteen individuals were classified as having a definite allergic reaction and five had a questionable, but probable, al-

* Camp Yawgoog, Rhode Island.

TABLE 1
*Allergic Symptoms from Hymenoptera Sting in 15 Cases
 out of 4,992 Boy Scouts.*

	Definite allergic group	
	No.	%
Generalized urticaria	15	100
Wheezing or shortness of breath	2	13
Unconsciousness	2	13
Total	15	

lergic reaction, for a combined total of 20. In the definitely allergic group 100 per cent had generalized urticaria while 2 had pulmonary complaints and 2 had unconsciousness (Table 1). In the questionable, but probable, allergy group, two individuals described classical angio-edema and generalized urticaria symptoms, but in one case the attending physician could not find his records to confirm these symptoms while in the other case the attending physician thought there was a question of a toxic reaction since the patient was stung by six "bees". The third individual described "chills and sleepiness" immediately after the sting and this was confirmed by the attending physician. Another individual had symptoms of generalized malaise and weakness which required immediate adrenalin and long term hyposensitization according to the physician's records. In the fifth case there was no report by the attending physician and the patient's symptoms were inconclusive. However, the parent reported that the attending physician stated the child was allergic to "bee" sting.

The time interval between the hymenoptera sting and onset of symptoms (Table 2) shows that in the 15 individuals making up the allergic group, 10 had symptoms within 15 minutes, one within 1 hour, one over 1 hour, and 3 had an unknown time interval. In the 5 subjects making up the probable allergic group, 3 had symptoms within 15 minutes, 1 had symptoms within 30 minutes, 2 had an unknown time interval. In the 20

TABLE 2
Time Interval between Hymenoptera Sting and Onset of Symptoms.

Time interval (in minutes)	Definite Hymenoptera allergy No.	Probable Hymenoptera allergy No.	Combined group No.
0-15	10	3	13
15-30	0	1	1
30-60	1	0	
Over 60	1	0	1
Unknown	3	2	5
Total	15	5	20

subjects making up the combined group, 13 had symptoms within 15 minutes, 1 within 30 minutes, 1 over 60 minutes, and 5 were unknown.

Table 3 summarizes our data. Out of 4,992 boy scouts, 15 or 0.30 per cent were found to have a definite Hymenoptera allergy. An additional 5 scouts had a probable Hymenoptera allergy for a combined total of 20 or 0.40 per cent prevalence of Hymenoptera allergy.

DISCUSSION

About half of those individuals who claimed they were allergic to stinging insects on their health cards actually had definite or probable Hymenoptera allergy by our criteria. This marked difference demonstrates the need of data verification. One criticism of our data is that the boy scout health cards asked about any type of allergic reaction rather than specifically asking about "bee sting" allergy. In children that are about to spend two weeks living outdoors, one would assume that parents of these scouts would consider stinging insect reactions. However, this assumption may not be valid.

Factors which tend to give our study lower figures than the general population must take into consideration that the cumu-

TABLE 3
Hymenoptera Allergy.

Total population	Individuals that claimed they were allergic		Definite allergic group		Probable allergic group		Combined group	
	No.	%	No.	%	No.	%	No.	%
4,992	41	0.82	15	0.30	5	0.10	20	0.40

lative prevalence of Hymenoptera allergy should increase with age. A longer life span increases the exposure to stinging insects, which in turn should increase the frequency of Hymenoptera allergy.

Factors which tend to give our study higher figures than the general population are that the boy scouts spend more time outdoors and are therefore exposed to more stinging insects than the average individual in the general population.

Although this study has shortcomings we feel it is of value because there is a lack of information in the literature on prevalence of Hymenoptera allergy, because it may be of some help to the health departments of groups whose primary interest is outdoor camping, and because it may stimulate interest in further work on prevalence of Hymenoptera allergy.

SUMMARY

In a population study of 4,992 boy scouts between the ages of 11-16, 15 or 0.30 per cent could be regarded as having definite Hymenoptera allergy; an additional 5 scouts had a probable Hymenoptera allergy for a combined total of 20 or 0.40 per cent prevalence.

Data from this study was obtained by reviewing health cards of boy scouts, and verifying this information by correspondence with parents and attending physicians of those boy scouts who suggested any possibility of insect sting allergy.

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