

Hymenoptera Sensitivity Occurring in Families

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ABSTRACT

A total of 248 patients with systemic reactions to Hymenoptera envenomation were studied. There were 138 adults and 110 children. Twenty-eight of these 248 (11.3%) had family members with histories consistent with Hymenoptera anaphylaxis. These included five mothers and sons, two sister pairs, three pairs of sister-brother, one pair brother-brother, and one pair father-daughter. In one extended family, a father, mother, son, and mother's sister had Hymenoptera sensitivity. Ninety-six consecutive allergic patients without Hymenoptera sensitivity served as controls, and of these, 3.1% had family members with Hymenoptera sensitivity. The occurrence of Hymenoptera sensitivity in families of patients with Hymenoptera sensitivity is statistically different from our controls (11.3% vs 3.1%, $p = 0.0195$). There appears to be a hereditary aspect for Hymenoptera sting sensitivity. (Allergy Proc 15:53-56, 1994)

The purpose of this study is to demonstrate that there is a familial occurrence of Hymenoptera sensitivity. Historically, Maimonides, in the twelfth century, wrote a treatise on asthma in which he discussed his observations on the familial incidence of the disease.¹ Also, studies by Wyman in 1872,² and the more extensive studies by Robert Cook in 1916,³ suggested a genetic basis for the allergic response. More recently in retrospective studies done with children,⁴⁻⁶ it was demonstrated that with a positive history of uniparental allergy, there was an incidence of allergy in 29% of the offspring; and where there was a biparental history of allergy, 47% of the offspring eventually developed allergies. Studies using clinical parameters of immunologically documented IgE reactivity suggested an even

greater hereditary risk of allergic disorders. These were in the magnitude of 50% with uniparental and 70% with biparental history.⁷

In a study of almost 3,000 boy scouts who responded to a questionnaire (which was followed up by a further questionnaire sent to the parents and the family's physician), the frequency of Hymenoptera sensitivity has been quoted as 0.8%.⁸ Another investigation of 187 adult industrial employees studied in Baltimore,⁹ using history alone, suggested an incidence of 3.3% frequency. Charpin¹⁰ and associates, in a study of 2,067 adults between the ages of 20 and 60, who visited a health care center in France for physical examination, found a prevalence of 0.9% with both a history of systemic reaction to insect stings and positive skin tests to venoms.

Not documented in the literature, as far as we can tell, is the question of familial localization of Hymenoptera sensitivity. The goal of this study is to determine if a familial localization of Hymenoptera sensitivity exists.

MATERIAL AND METHODS

The records of 248 patients with systemic reaction to Hymenoptera sting from 1979 to 1994 were evaluated.¹¹⁻¹³ This group was analyzed in order to distinguish any family relationship of Hymenoptera sensitivity. The following data were obtained:

1. Age
2. Sex
3. Nature of allergic response
 - a) Grade I, Local reaction only
 - b) Grade II, Generalized urticaria and/or angioedema
 - c) Grade III, above plus dyspnea, wheeze
 - d) Grade IV, above plus syncope

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Only those with a Grade II, III, and IV reaction were defined as having Hymenoptera sensitivity.

Skin test reactions to venom specific antigens and in most cases venom specific IgE as detected in the serum

by RAST was also documented. Further noted were eosinophil levels and any history of atopy as well as venom-specific treatment.

Ninety-six allergic patients without Hymenoptera

TABLE I

Hymenoptera Study Population										
Patient	Relationship	Age	Sex	IgE	Eos	Grade	Positive ID's	RAST +	Atopy	Treatment
JC	Son	2	M	137	9	2-3	YH, YJ, W, WFH	YH, YJ, W, WFH	-	W, MV
AC	Father	44	M	133	0	3	Same	Same	?AR	MV
MC	Mother	40	F	483	0	3-4	Same	Same, HB	?Atopic	W, MV
CP	Mother's sister	30	F	ND	ND	3	ND	ND	AR	None
WM	Father	41	m	25	6	3	HB	HB ONLY	-	HB
DM	Son	13	M	75	1	2	YH, YJ, W, WFH	YH, YJ, W, WFH	-	W, MV
CC	Sister	6	F	20	4	2	YH, YJ, W, WFH	HB (others ND)	-	W, MV
PC	Sister	12	F	32	0	2	HB, YH, YJ, W, WF	HB, WFH	-	HB, MV
MK	Sister	8	F	35	0	2-3	HB, YH, YJ, W, WFH	YH, YJ	-	HB, W, MV
EK	Brother	12	M	41	2	3	Same	HB, YH, W, WFH	?AR	HB, MV
LH	Sister	14	F	628	11	2	YH, YJ, WFH	YH, WFH	AR, asthma	MV
MH	Sister	7	F	29	5	2-3	YJ	HB (others ND)	-	YJ
SM	Sister	8	F	74	1	3-4	YJ, W, WFH	- to all	AR	W, MV
TM	Brother	11	M	66	5	3	HB, YH, YJ, WFH	YJH, WFH	AR, asthma (pollen IT)	HB, MV
SV	Son	20	M	16	0	2	YJ, WFH	-To all	ASA*	WBE
MV	Mother	49	F	ND	0	2	YH, WFH	-HB, YJ, others ND	Mild atopic	WBE
RB	Brother	50	M	ND	3	3-4	YH, YJ, WFH	HB, YH, YJ, W, WFH	-	MV
WB	Brother	63	M	ND	0	2-3	YH, YJ, W, WFH	YH, YJ, W, WFH	-	W, MV
RM	Mother	39	F	5	0	3	-To all	-To all	?AR	None
TM	Son	8	M	932	5	3	YJ, WFH	YH, YJ, WFH	AR, asthma	MV
DS	Son	40	M	38	3	4	YH, YJ, W, WFH	YH, YJ, W, WFH	-	W, MV
ES	Mother	68	F	ND	ND	3	ND	ND	-	None
MR	Son	33	M	18	1	3	HB, YH, YJ, W, WFH	HB, YH, YJ, W, WFH	-	HB, W, MV
JR	Mother	58	F	ND	ND	3	ND	ND	Drug	WBE
LH	Daughter	4	F	269	2	3	YH, W, WFH	YH, YJ, W, WFH	-	W, MV
MH	Father	40	M	ND	ND	2	ND	ND	-	None
JA	Sister	28	F	43	0	2-3	YJ, W, WFH	HB, YH,	-	W, MV
SN	Brother	13	M	ND	1	2-3	HB, YH, YJ, W, WFH	WFH	-	HB, W, MV

HB = Honey bee, YH = yellow hornet, YJ = yellow jacket, W = wasp, WFH = white faced hornet, WV = mixed vespid, WBE = whole body extract, AR = allergic rhinitis, ND = not done, - = Negative, * = urticaria/angioedema.

sensitivity seen consecutively in our private office served as controls. The statistical method used to calculate probability was the Fisher exact test.

RESULTS

Of the 248 patients studied, 28 individuals were closely related for a rate of 11.3% (see Table I). There were 14 males and 14 females, and 138 were adults and 110 children.

Of the 96 controls 52 were male and 44 were female; 30 were children under the age of 16. Of the 96, 77 had respiratory allergies, eight with atopic dermatitis, ten with a combination of both, and one with gastrointestinal allergy. Of these 96 controls, with combined respiratory and dermal allergies, three (3.1%) gave a family history of Hymenoptera sensitivity in the mother, brother, or maternal uncle. This difference between our study group and control was statistically significant (11.3% vs 3.1%, $p = 0.0195$), Table II.

DISCUSSION

In the study group, Hymenoptera anaphylactic reactions were hives/angioedema in seven, and respiratory or cardiovascular reactions noted in twenty-one (Table I).

Total eosinophil counts and total IgE concentrations (commercial laboratory) were not helpful in predicting which patients were atopic individuals, nor could these laboratory measures identify those patients with systemic anaphylactic reactions (Table I).

RAST testing was in full agreement with skin testing in seven patients; it did not give similar results in eleven others.

Results of skin testing shown in Table I indicates multiple positive reactions to venom in all but two patients (MH, WM); one reacted to yellow jacket and the other to honey bee. Another two patients (SV, MV) reacted to yellow jacket and white-faced hornet.

Similar positive antibody responses to venoms tested (YH, YJ, W, WFH) were found in a father, mother, and son (JC, AC, MC) and a sister and brother (MK, EK) (yellow hornet, yellow jacket, wasp, white-faced hornet, and honey bee).

Immunotherapy with appropriate venoms was given to twenty-one patients. Whole body extract had been given before 1979 in three patients. No treatment was given to four, and one patient refused treatment.

Our results demonstrate that there is a hereditary aspect to Hymenoptera sensitivity since 11.3% of our study population had one or more family members with Hymenoptera sensitivity compared to 3.1% of our controls ($p = 0.0195$).

TABLE II

Family Members with Hymenoptera Allergy				
Diagnosis	Total	No.	%	P Value*
Hymenoptera allergy	248	28	11.3	$p = 0.0195$
Controls	96	3	3.1	

* As calculated by the Fisher-exact test.

SUMMARY

- 1) A total of 248 patients with systemic reactions to Hymenoptera envenomation were studied. There were 138 adults and 110 children.
- 2) Twenty-eight of 248 patients (11.3%) had family members with Hymenoptera sensitivity. These patients included five mothers and sons, two sister pairs, three pairs of sister-brother, one pair brother-brother, and one pair father-daughter. In one extended family, a father, mother, son, and mother's sister had Hymenoptera sensitivity.
- 3) Ninety-six consecutive allergic patients without Hymenoptera allergy served as controls, and these patients (3.1%) had family members with Hymenoptera allergy.
- 4) The occurrence of Hymenoptera sensitivity in families of patients with Hymenoptera allergy is statistically different from our controls (11.3% vs 3.1%, $p = 0.0195$).
- 5) The data from this study suggest that there is a hereditary aspect for Hymenoptera sting allergy.

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