ABSTRACT

Background: The aim of this study was to analyze the frequency of clinical features and the severity of systemic reactions to wasp stings, and to establish their relationship with mean age, sex, and atopy.

Methods: We studied 115 patients who suffered an anaphylactic reaction to wasp sting and showed specific IgE to venoms from Vespula and/or Polistes. In all patients, age, sex and personal history of atopy were registered. Cutaneous, respiratory, cardiovascular and gastrointestinal involvement during the course of the reaction was investigated. Each patient was assigned a severity grade according to a simple two-grade classification based on Müller’s criteria. Bivariable analysis was performed to analyze the associations among mean age, sex and atopy and the symptoms and severity of the reaction.

Results: The mean age was 40.2 years. There were 60 males (52.2 %) and 55 females (47.8 %). Twenty-six patients (22.6 %) were atopic. The percentages of involved systems were as follows: skin 90.4 %, respiratory 54.8 %, cardiovascular 33.9 %, and gastrointestinal 21.7 %. Reactions were mild in 40.8 %, and severe in 59.1 %. The mean age was higher in patients without cutaneous symptoms (p < 0.05). Cardiovascular involvement was more frequent in males (p < 0.05). No other significant differences were found.

Conclusion: The symptoms of systemic reactions to wasp venom most frequently involved the skin, while reactions without cutaneous involvement were more frequent in older patients. Cardiovascular involvement was more common in males. The clinical pattern was not determined by atopy and the variables studied were not related to severity.

Key words: Anaphylaxis. Hymenoptera venom. Hypersensitivity. Venom allergy.

INTRODUCTION

Wasps, apart from bees and ants, are stinging insects belonging to the order Hymenoptera. Anaphylactic reactions to hymenoptera venoms may occur in subjects with an IgE-mediated sensitisation to constituent parts of the venom. These reactions are classified in different ways according their clinical spectrum and severity^1^, although only the Müller’s classification is exclusively proposed for systemic reactions to hymenoptera stings^2^. Clinical studies on anaphylaxis to wasp stings, excluding bee venom allergy, have not been reported so far. We present a study on systemic reactions to wasp sting, based on an analysis of the clinical features in connection with the age, the sex and the personal history of atopy.
MATERIAL AND METHODS

We studied 115 patients who suffered an anaphylactic reaction after wasp sting and showed specific IgE to venoms from *Vespula* (common wasp, yellow jacket) and/or *Polistes* (paper wasp), measured by the Pharmacia CAP System method (Uppsala, Sweden). Age, sex and personal history of atopy were registered for every case. Atopy was defined by IgE-mediated disorders, apart from venom and drug allergy, and proved by a positive skin prick test to airborne and/or food allergens.

All the cases were investigated about cutaneous, respiratory, cardiovascular and gastrointestinal involvement in the course of the reaction. A positive value was given to each item when at least one suggesting symptom was present. Skin symptoms included itching, generalized erythema, urticaria and angioedema. Respiratory symptoms included dyspnoea, throat swelling, hoarseness, chest constriction, stridor and wheeze. Cardiovascular involvement was supposed in case of dizziness, confusion, loss of consciousness or tachycardia were present. Gastrointestinal symptoms included dysphagia, abdominal pain, nausea, vomiting and diarrhoea.

Finally, every case was assigned a severity grade according a simple classification into two levels from...
the Müller’s criteria. Thus, the reaction was considered mild if it was limited to grades I and II. On the other hand, the illness was considered to be severe if there were respiratory and/or cardiovascular involvement (grades III and IV of Mueller) (table I).

The statistical analysis was performed with the software SPSS for Windows (version 12). The relationships between age and symptoms, and age and severity, were assessed by the t-test. Sex and atopy were assessed for their correlation with symptoms and severity by using the chi-square test. Differences were considered statistically significant at p values of less than 0.05.

**RESULTS**

The mean age was 40.2 years (standard deviation: 15.9), with a range of 10 to 80 years, and a median age of 40 years. Male subjects accounted for 60 (52.2 %), and female subjects 55 (47.8 %). Twenty six patients (22.6 %) were atopic individuals. The most frequent symptoms involved the skin (n = 104; 90.4 %), followed, in order of frequency, by respiratory (n = 63; 54.8 %), cardiovascular (n = 39; 33.9 %) and gastrointestinal symptoms (n = 25; 21.7 %). Severity grading of Müller’s criteria resulted in the following: 12 (10.4 %), grade 1; 34 (29.6 %), grade 2; 57
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Figure 3.—Clustered bar charts for atopy and symptoms.

| Atopy | Skin symptoms | p=0.05 | | Cardiovascular symptoms | p=0.05 | | Gastrointestinal symptoms | p=0.05 |
|-------|---------------|--------||-------------------------|--------||--------------------------|--------|
| no    | 81.8%         | 12.8%  | | 75%                     | 25%    | | 75.6%                    | 24.4%  |
| yes   | 23.1%         |        | | 82.1%                   | 17.9%  | | 84%                      | 16%    |

Table I
Severity grading applied to the reactions, from Mueller's criteria

<table>
<thead>
<tr>
<th>Grade</th>
<th>Müller</th>
<th>Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild I</td>
<td>Generalized urticaria, itching, malaise, anxiety</td>
<td></td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>Any of the above, plus two or more of the following: angioedema, constriction in chest, nausea, vomiting, diarrhoea, abdominal pain, dizziness</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Or: Angioedema alone</td>
</tr>
<tr>
<td>Severe III</td>
<td>Any of the above, plus two or more of the following: dyspnoea, wheezing, stridor, dysphagia, dysarthria, hoarseness, weakness, confusion, feeling of impending disaster</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Or: Dyspnoea, wheezing or stridor alone</td>
</tr>
<tr>
<td></td>
<td>IV</td>
<td>Any of the above, plus two or more of the following: fall in blood pressure, collapse, loss of consciousness, incontinence, cyanosis</td>
</tr>
</tbody>
</table>
phylactic reactions regardless of the causal agent higher frequency, as it has been described for anaphylactic reactions to wasp venom involved the skin with a stings risk factor for systemic reactions to Hymenoptera population. Previous studies indicate that atopy is not a atopic individuals was comparable to the general pop-

significant) frequency in females. The importance of this fact is relative, because the difference between up-

The few reactions without skin involvement are sig-

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The mean age was significantly higher in the mean age was 39.8 years in the severe re-
tions. The illness was mild in 41.7 % of men and 40 % of women, whereas it was severe in 58.3 % of men and 60 % of women. The reaction was mild in 39.3 % of non-atopics and 46.2 % of atopics, while it was severe in 60.7 % of non-atopics and 53.8 % of atopics. These results did not show and statistically significant difference. As for the severity, the mean age was 39.9 years in the mild reactions, and 40.76 years in the severe re-
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