

Is bee sting as a serious problem for the children living in the urban areas?

Kentsel alanda yaşayan çocuklar için arı sokması ciddi bir problem midir?

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ABSTRACT

Objective: The purpose of this study is to describe the epidemiologic and clinical characteristics of bee sting cases that attended to our emergency service in the summertime and to emphasize that bee sting is a serious public health problem for the children living in the urban areas.

Materials and Methods: In this study the 156 cases that were admitted to the Emergency Department of Pediatrics of Ankara Training and Research Hospital in the period of June-August 2005.

Results: Of 156 cases, 67 % were male and age range was 1-13 years. Eighty three (53.2%) cases were stung by honey bee. The most frequent location of bee sting was extremities (%64) (particularly the upper hand) and followed by head area (25%). In 10% of cases more than one sting from different areas of the body were present. Cases were admitted on august most frequently (69.2%). Of the patients, 70.5% had local reaction, 23.7% had large local reaction and 5.1% had systemic reaction.

Conclusions: We wanted to emphasize that bee sting cases constitute a serious public health prob-

ÖZ

Giriş: Çalışmanın amacı yaz döneminde acil servise başvuran arı sokmalarının epidemiyolojik ve klinik özelliklerini değerlendirmek ve kentsel alanda yaşayan çocuklar için arı sokmalarının önemli bir halk sağlığı problem olduğunu vurgulamaktır.

Gereç ve Yöntem: Haziran-Ağustos 2005 tarihleri arasında SB Ankara Eğitim ve Araştırma Hastanesi Acil Servisine başvuran 156 hasta dahil edildi.

Bulgular: Yaşları 1-13 yıl arasında değişen 156 hastanın %67'si erkek idi. Hastaların 83 (%53.2)'ü bal arısı tarafından sokulmuştu. Isırılma bölgeleri içinde ilk sırada ekstremiteler (özellikle el sırtı) (%64) ve baş bölgesi ikinci sırada (%25) idi. Hastaların %10'unu birden fazla bölgeden ısırılmıştı. Hastaneye başvuru sıklığı ağustos ayında (%69.2) daha fazla idi. Hastaneye başvuran hastaların reaksiyonları değerlendirildiğinde %70.5'inde lokal, %23.7'sinde geniş lokal ve %5.1'inde sistemik reaksiyondur.

Sonuç: Bu çalışma ile kentlerde arı sokmalarının çocuk acil servis başvurularına neden olan önemli bir halk sağlığı problemi olduğu vurgulanmak istenmiştir.

lem at emergencies departments of pediatrics in the urban areas.

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INTRODUCTION

Bees are the insects that belong to the *Hymenoptera* family. The *Hymenoptera* families most frequently related to allergic reactions are *Apiidae*, *Vespidae*, and *Formicidae*^[1]. In Turkey there are approximately 15.000 different species of *Hymenoptera* insects^[2].

Insect sting allergy can occur at any age, often after a number of uneventful stings, and is more common than previously thought^[1]. The species of the bee, personal sensitivity, the inhabited climate and location are the risk factors in the cases of bee stings. Farmers, hothouse cultivators, bakers, beekeepers and their family members are in a more critical position in this regard^[3-5]. Bees sting can result reactions ranging from local reactions to anaphylaxis^[1,3]. Local reactions are limited to the area contiguous with the sting site. Most large local reactions represent a late-phase IgE-dependent reaction that is mild initially but develops after 12 to 24 hours to a diameter often exceeding 20 cm and occasionally involving the entire limb^[1,4]. Systemic reactions cause signs and symptoms, ranging from mild to life-threatening. Mild systemic reactions may be limited to the skin and consist of flushing, urticaria, and angioedema. More severe systemic reactions can involve bronchospasm, laryngeal edema, and hypotension. Less frequently, gastrointestinal complaints may occur. Almost all systemic reactions are IgE mediated^[1,4]. Systemic allergic reactions are reported up to 3% of adults, and almost 1% of children^[1].

A systemic reaction may occasionally be caused by toxic effects of the vasoactive substances in a large number of stings and may be due to underlying mastocytosis in 1% to 25% of ca-

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ses^[4-6]. A great number of stings can cause life-threatening reactions with renal failure, hemolysis, adult respiratory distress syndrome, or diffuse intravascular coagulation^[7,8].

Data on the characteristics of bee stings seen in urban areas are inadequate. Therefore in this study we analyzed the cases of bee sting which has been an important reason behind the admissions to our child emergency service.

MATERIALS and METHODS

In this study 156 cases that were admitted to the Emergency Department of Pediatrics of Ankara Training and Research Hospital in the period of June-August 2005 were examined prospectively.

The cases were analyzed in terms of their age, gender, time between the moment of stung and admission to the hospital, the species of the bees, the location of the stung and the resulting symptoms. The reactions were grouped in terms of three clinical presentations:

- 1) Local reaction: The presence of pain, erythema, and a swelling which is less than 5 cm at the stung location.
- 2) Large local reaction: It is characterized by presence of pain and a swelling that is more than 5 cm in the location of stung.
- 3) Systemic reactions: The skin, gastrointestinal, respiratory, and cardiovascular systems can be involved. Mild systemic reactions may be limited to the skin. More severe systemic reactions can involve bronchospasm, laryngeal edema, and hypotension.

Statistical Analysis

SPSS 10.0 package program was used in statistical analysis. The definitions were provided

as number and percentage for discrete variables and mean and standard deviation for continuous variables. Mann-Whitney-U test was used for constant variables that were not suitable for normal distribution of the two groups. $p < 0.05$ was considered statistically significant.

RESULTS

During the study period of 3 months, we evaluated 156 cases with bee-sting admitted to emergency department of pediatrics. Of 156 cases, whose age range was 1-13 years, 105 (67%) were male. While the mean age of the boys was 7.0 ± 2.6 years, that of the girls was 6.1 ± 1.8 years ($p < 0.05$). While 83 (53.2%) of the cases were stung by honey bee, 73 (46.8%) of them were not able to recognize the bee (Table 1).

The most frequent location of bee sting was extremities (64%) (particularly the upper hand) and followed by head area (25%). In 10% of cases more than one sting from different areas of the body were present.

Cases were admitted on August most frequently (69.2%). The admission to the hospital was in the first one hour in 12% of the cases, in the first eight hours in 42.3% of the cases and in the first 24 hours in 45.5% of the cases.

Of the patients, 70.5% had local reaction, 23.7% had large local reaction and 5.1% had systemic reaction. 0.6% of the patients applied to the hospital without any symptoms (Figure 1).

Mean age of the eight cases having systemic reaction was 8.1 ± 2.7 years. Mean age of the 148 cases without systemic reactions were 6.9 ± 2.8 years ($p > 0.05$).

None of the cases were injected adrenalin at home. Ten (15.6%) of the cases were injected adrenalin in the health centers that they applied at the first instance. Eight cases having systemic reactions (5.1%) were consulted to the pediatric allergy unite. Eight patients whose systemic reactions to bee stings testing for venom-specific IgE can be performed by skin testing

Table 1. Characteristic of the patients

| | n | % |
|--------------------------------|------|------|
| Sex | | |
| Male | 105 | 67 |
| Female | 51 | 33 |
| Age (year) | | |
| Minimum-maximum | 1-13 | |
| Months of application hospital | | |
| August | 108 | 69.2 |
| July | 42 | 26.9 |
| June | 6 | 3.8 |

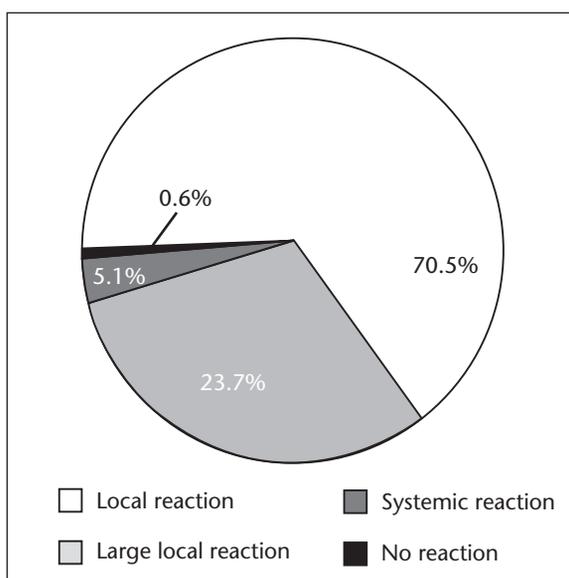


Figure 1. Reaction type of the patients.

and in vitro testing. The family and/or the patient himself/herself were informed about anaphylaxis.

DISCUSSION

In our study we found 1% of the total admissions to our child emergency service in the period of June-August 2005 were the cases of bee stings. In the literature majority of the related studies are conducted on adults. In our country there are not many studies conducted on the characteristics of bee-stings in the childhood period.

Sixty seven percent of our cases were male and this was compatible with the studies in the literature in terms of gender^[9,10]. Although in the literature the most frequently biting bee type has been reported as the yellow jackets, in our study it was the honey bees^[1,3,11]. We should keep in mind that the information provided by the frightened children and their families who were in panic could be misleading, especially when we consider the fact that quite a majority of our cases were not able to recognize the bee.

While most sting reactions are localized and self-limited, some lead to large local reactions or to systemic allergic reactions or anaphylaxis and cause death. In the studies conducted both in our country and abroad, the risk of systemic reaction development in children was reported to be lower than in adults^[1,3,12,13]. The risk of development of systemic reaction as a result of bee sting has been reported as 0.15-0.8% in children and 0.3-7.5% in adults^[4]. In 5.1% of our cases systemic reaction was identified. In Turkey severe and mild systemic reaction ratio was found 2.2-5.3%^[12]. In elder children symptoms regarding bee stings are much more severe and related mortality rate is much higher^[1,4]. In our study, those having systemic reactions were older but the difference was not statistically significant. In our study, those having systemic reactions applied in the first four hours and those having large local reactions applied after 24 hours; which was compatible with the literature^[3,9,14].

Treatment and diagnostic test indicated is predicated on the type of reaction that occurs. The indications for testing for venom-specific IgE vary with the patient population and are different in adults and children. Skin testing is not indicated in patients 16 years of age or younger and who have had local reaction and large local reactions^[5]. The patients who had systemic allergic reactions must refer to pediatric allergy unit.

Rapid recognition and treatment of anaphylaxis are critical. The first line treatment must be intramuscular adrenalin injection and this was applied to our patients who had systemic reaction. The cases and their relatives must be well informed about how to avoid contact with bees and what to do when a new sting happens. Despite the widespread opinion, there is no evidence that bright-colored clothes or perfume smells have a direct effect on bee stings. Bee stings generally occur as a result of sudden and tight contacts. Therefore even if there would be a personal guarding, this should be done against these sudden and direct contacts. White and light-colored clothing may work in cases of colonial attacks by the bees^[15]. Adrenalin autoinjector should be prescribed and its use must be described in detail to the patient. It must be emphasized that autoinjector should be the first line treatment and it can be life saving in case of a systemic reaction to bee-sting. Referral of patients who have experienced anaphylaxis for possible venom immunotherapy can prevent future severe episodes of anaphylaxis resulting from stings. Venom immunotherapy for children who have had a systemic allergic reaction is safe and effective. It is not indicated in children less than 16 years of age who present with a systemic allergic reaction involving only cutaneous manifestations and large local reactions^[3-5].

Although bee sting is usually thought to be mainly a problem in the rural areas, in our country, bee sting is also a serious public health problem in the urban areas. By conducting this study we wanted to draw attention to the importance of improving primary health care and preventive health services.

We hope our study reflects the epidemiology of childhood bee stings and pinpoints the necessary precautions that should be taken.

REFERENCES

1. Golden DB. Insect sting and venom immunotherapy: a model and a mystery. *J Allergy Clin Immunol* 2005;115:439-47.
2. Özbek H. Vespidae (Hymenoptera) türlerinin zararları ve korunma yolları. *Atatürk Üniversitesi Ziraat Fakültesi Ziraat Dergisi* 1983;14:4-8.
3. Bonifazi F, Jutel M, Bilo MB, Birnbaum J, Muller U; EAACI Interest Grup on Insect Venom Hypersensitivity. Prevention and treatment of hymenoptera venom allergy. *Guidelines for clinical practice. Allergy* 2005;60:1459-70.
4. Bilo MB, Bonifazi F. The natural history and epidemiology of insect venom allergy clinical implications. *Clin Experiment Allergy* 2009;39:1467-76.
5. Bilo BM, Rueff F, Mosbech H, Bonifazi F, Oude-Elberink JN; EAACI Interest Group on Insect Venom Hypersensitivity. Diagnosis of Hymenoptera venom allergy. *Allergy* 2005;60:1339-49.
6. Fricker M, Helbling L, Schwartz L, Müller U. Hymenoptera sting anaphylaxis and urticaria pigmentosa: clinical findings and results of venom immunotherapy in ten patients. *J Allergy Clin Immunol* 1997;100:11-5.
7. Daher Ede F, da Silva Junior GB, Bezerra GP, Pontes LB, Martins AM, Guimaraes JA. Acute renal failure after massive honeybee stings. *Rev Inst Med Trop Sao Paulo* 2003;45:45-50.
8. Gawlik R, Rymarczyk B, Rogala B. A rare case of intravascular coagulation after honey bee sting. *J Investig Allergol Clin Immunol* 2004;14:250-2.
9. Incorvaia C, Senna G, Mauro M, Bonadonna P, Marconi I, Asero R, et al. Prevalance of allergic reactions to Hymenoptera stings in northern Italy. *Eur Ann Allergy Clin Immunol* 2004;36:372-4.
10. Clark S, Long AA, Gaeta TJ, Camargo CA Jr. Multicenter study of emergency department visits for insect sting allergies. *J Allergy Clinic Immunol* 2005;116:643-9.
11. Mingomataj E, Ohri D, Dhimitri V, Priftanji A, Qirko E, Pani L, et al. Hymenoptera sting anaphylactic reactions in the Mediterranean population of Albania. *J Investig Allergol Clin Immunol* 2003;13:272-7.
12. Kalyoncu AF, Demir AU, Ozcan U, Ozkuyumcu C, Sahin AA, Baris YI. Bee and wasp venom allergy in Turkey. *Ann Allergy Asthma Immunol* 1997;78:408-12.
13. Golden DB, Kagey-Sobotka A, Norman PS, Hamilton RG, Lichtenstein LM. Outcomes of allergy to insect stings in children, with and without venom immunotherapy. *N Engl J Med* 2004;12:668-74.
14. Fernandez J, Soriano V, Mayorga L, Mayor M. Natural history of Hymenoptera venom allergy in Eastern Spain. *Clin Exp Allergy* 2005;35:179-85.
15. Grene A, Breisch NL. Avoidance of bee and wasp stings: an entomological perspective. *Curr Opin Allergy Clin Immunol* 2005;5:337-41.