by swollen tongue, wheezing, flushing, gastrointestinal symptoms, or hypotension. The reaction was considered mild if the symptoms were primarily limited to generalized urticaria and did not require treatment in an emergency department; the reaction was considered to be moderate if a hospital or emergency department visit was initiated for treatment and the symptoms were treated by swollen tongue, wheezing, flushing, gastrointestinal symptoms, or hypotension; and the event was considered to be severe if there was hypotension.

Results. A total of 898 patients were identified, and a random sample of 70 (9%) cases with a coded diagnosis and 50 (43%) cases with a comment diagnosis underwent additional evaluation. Relevant information on the diagnosis was available for >90% of these cases. Criteria for anaphylaxis was met in 87 of the 120 cases, so that an estimated 675 cases of the total 783 were estimated to have confirmed anaphylaxis, resulting in an incidence of 8.4 cases per 100,000 person-years. Insect stings were responsible for 32% and medications for 30% of cases. Food was implicated in 22% of cases, and more than half of these were due to a tree nut or peanut. Severity of the cases was as follows: mild, 29%; moderate, 45%; severe, 9%; indeterminate, 17%. One death was identified.

Conclusions. In the United Kingdom, the estimated incidence rate of anaphylaxis was 8.4 cases per 100,000 person-years, and ~10% of these cases were life threatening.

Reviewer’s Comments. Although anaphylaxis is a relatively uncommon event, 10% of cases are characterized by hypotension. The estimated percentage of severe, life-threatening events would have been even higher if lower-airway symptoms were considered as a manifestation of severe anaphylaxis. Physicians evaluating patients with suspected allergic reactions should be prepared to treat life-threatening symptoms.

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ANAPHYLAXIS: A 7-YEAR FOLLOW-UP SURVEY OF 46 CHILDREN


Purpose of the Study. To follow children with a previous history of anaphylaxis to determine the clinical course of this syndrome.

Study Population. A total of 76 children referred between 1994 and 1996 with clinical features of anaphylaxis, which included at least 2 indicators (hypotension, inspiratory dyspnea, urticaria/angioedema) within 2 hours of exposure of the suspected causative agents.

Methods. After a mean duration of 7 years, 46 (61%) children were interviewed by telephone.

Results. Of the 46 patients, 14 (30%) had experienced a recurrence of anaphylaxis. Ten had single episodes, 2 had 2 episodes, 1 had 3 recurrences, and 1 had 4 recurrences. None of the patients died or experienced biphasic reactions. Patients who were sensitive to at least 1 food allergen were more likely to have recurrent episodes of anaphylaxis than those without food sensitivity (93% vs 56%; P < 0.04). For 14 of the 46 who experienced recurrence of anaphylaxis, no specific cause was clearly associated with the recurrence. Children with atopic dermatitis at initial presentation (95% vs 31%; P = .004) and those with angioedema and urticaria at the time of the current study (93% vs 37%; P = .0002) were found to be at significantly higher risk for recurrent anaphylaxis.

Conclusions. Patients may have a greater risk for recurrent anaphylaxis if they have atopic dermatitis, angioedema, or urticaria and 1 positive food skin test.

Reviewer’s Comments. This is the first study to help define the natural history of pediatric anaphylaxis. It emphasizes the need for a thorough work-up, education, and provision of autoinjectable epinephrine in all of these patients.

BRADLEY E. CHIPPS, MD
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CLINICAL FEATURES AND ANAPHYLAXIS IN CHILDREN WITH COLD URTICARIA


Purpose of the Study. To characterize the features of cold urticaria in children, focusing particularly on systemic reactions.

Study Population. Thirty children (chart reviewed) who were evaluated over a 3-year period in an academic allergy program and a private practice.

Methods. Cold urticaria was diagnosed based on the patient’s history and was supported by an ice-cube-challenge test using a standard protocol (17 of 30 positive). The degree of symptoms was categorized into 3 types: localized urticaria/angioedema, generalized urticaria and/or angioedema without hypotension or respiratory symptoms, or severe systemic reactions with episodes suggesting respiratory distress and/or hypotension.

Results. There were 17 females, and the mean age of patients was 12 years (range: 2–18.5 years). Mean age of onset of cold urticaria was 7 years. The duration of cold urticaria was 3.2 years (range: 0.5–13.5 years). Data on progression were available for 27 of the 30 patients. Symptoms resolved spontaneously in only 2 patients. Swimming was the only trigger in 10 of the 30 patients; touching cold objects triggered urticaria in 9 patients; and cold weather was a trigger for the remaining 11 patients. Six of the patients experienced other causes of urticaria. The rate of atopic disease in the patient’s families was 89.3%. Response to antihistamine was variable, with 24 of 30 patients responding (8 had a poor response, 7 had a moderate response, and 9 had a good response).

Conclusions. Cold urticaria occurs in children and may be associated with anaphylaxis. No secondary causes were found. The primary determinants for reactions were body surface area exposed, temperature, and duration of exposure. All patients with cold urticaria were counseled and received autoinjector epinephrine.

Reviewer’s Comments. The natural history of cold urticaria, which seems to be primarily idiopathic, has not been well defined in children. There seems to be a higher rate of personal atopy and a family history of atopy in the patients. Counseling should include caution regarding aquatic activity, the most common trigger.

BRADLEY E. CHIPPS, MD
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OUTCOMES OF ALLERGY TO INSECT STINGS IN CHILDREN, WITH AND WITHOUT VENOM IMMUNOTHERAPY

Purpose of the Study. To determine if children outgrow their allergy to insect stings and to determine the long-term efficacy of venom immunotherapy.

Study Population. Subjects included were patients who had a reaction after an insect sting as a child. Reactions varied in severity and included large local reaction, mild (cutaneous) systemic reaction, and moderate-to-severe systemic reactions. Patients in the study either received venom immunotherapy or did not receive venom immunotherapy after their initial reaction.

Methods. Between 1978 and 1985, allergic reactions to insect stings were diagnosed in 1033 children, of whom 356 received venom immunotherapy. A survey of these patients was conducted by telephone and mail between January 1997 and January 2000 to determine the outcome of stings that occurred in the period from 1987 to 1999.

Results. Of the 1033 patients, 512 (50%) responded, with a mean follow-up period of 18 years, a mean duration of venom immunotherapy of 3.5 years in treated patients, and a sting incidence of 43%. Systemic reactions occurred less frequently in patients who had received venom immunotherapy (2 of 64 patients [3%]) than in untreated patients (19 of 111 patients [17%]; \( P = .007 \)). Patients with a history of moderate-to-severe reactions had a higher rate of reaction if they had not been treated (7 of 22 patients [32%]) than if they had received venom immunotherapy (2 of 43 patients [5%]; \( P = .007 \)). In patients who had been treated and had a history of mild (cutaneous) systemic reaction, none of the 21 subjects who received stings had a systemic reaction; however, there was not statistical significance between the rates of reaction when comparing the treated versus the untreated groups. Among the patients who had not received venom immunotherapy, there were no severe systemic reactions after a subsequent sting. Twenty-seven percent of patients who had moderate-to-severe initial reactions sustained subsequent reactions of similar severity (otherwise, the reactions were less severe), and 67% of patients with initial mild (cutaneous) systemic reactions developed moderate systemic reactions on subsequent stings (otherwise, the reactions were less severe than the original [87% had no subsequent systemic allergic reaction]).

Conclusions. A clinically important number of children do not outgrow allergic reactions to insect stings. Venom immunotherapy in children leads to a significantly lower risk of systemic reaction to stings even 10 to 20 years after treatment is stopped, and this prolonged benefit is greater than the benefit seen in adults.

Reviewers’ Comments. This study demonstrates that a significant number of children do not outgrow their insect allergy and that venom immunotherapy can have long-lasting protective effects. Venom immunotherapy should be offered to children with systemic reactions who test positive for venom-specific IgE (performed by skin testing and serum tests only if skin tests are negative); however, it is not usually recommended for children \( \geq 16 \) years old who have generalized cutaneous reactions without other symptoms. Venom immunotherapy is also generally not recommended for persons with large local reactions. The study emphasizes the important role of allergen immunotherapy in the treatment of a potentially fatal allergic disorder.

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The Upper Airway

THE DIAGNOSTIC ACCURACY OF COMPUTED TOMOGRAPHY IN PEDIATRIC CHRONIC RHINOSINUSITIS


Purpose of the Study. To determine the accuracy of computed tomography (CT) in the diagnosis of pediatric chronic rhinosinusitis (CRS).

Study Population. The sinus CT scans of 2 cohorts of children were evaluated and compared prospectively. The “diseased” cohort consisted of 66 children (mean age: 8 years) who were scheduled to undergo endoscopic sinus surgery for medically refractory CRS. The second “nondiseased,” control cohort consisted of 192 children (mean age: 9 years) who were undergoing CT scans for reasons other than sinusitis.

Methods. Sinus CT scans were scored according to the Lund-Mackay system. The Lund-Mackay staging system scores each sinus (anterior ethmoid, posterior ethmoid, maxillary, frontal, and sphenoid sinuses) according to the following scale: 0, no opacification; 1, partial opacification; 2, complete opacification. The ostiomeatal complex is scored as 0 (not occluded) or 2 (occluded). The left and right sides are staged separately. The scores are summed so that the total Lund score may range from 0 to 24 for each patient. The authors adapted the Lund-Mackay staging system for young children by assigning a null value to undeveloped sinuses. The corresponding Lund score was then scaled up to range from 0 to 24 by scaling with the factor \( \frac{12}{n} \), where \( n \) represents a number of scoreable ( pneumatized) sinuses. The Lund scores of the diseased and control groups were compared. The diagnostic accuracy of the CT scan in distinguishing diseased patients from control patients was established by using the receiver operating characteristic curve. Sensitivity, specificity, and predictive value analyses were also conducted. The authors calculated predictive values at different base-rate prevalence values.

Results. The diseased group exhibited a mean Lund score of 10.4 (95% confidence interval [CI]: 9.2, 11.5), and the control group exhibited a mean Lund score of 2.8 (95% CI: 2.4, 3.2). The area under the curve for the receiver operating characteristic was 0.923 (\( P < .001 \)), indicating excellent diagnostic accuracy for CT scans. Adopting a Lund score cutoff of 5 to represent true disease, the CT scan demonstrated a sensitivity and specificity of 86% and 85%, respectively. Lund scores of \( \geq 2 \) have an excellent negative predictive value, whereas Lund scores of \( \geq 5 \) have an excellent positive predictive value. The authors demonstrated a decline in diagnostic accuracy of the CT scan with decreasing base-rate prevalence of the disease by calculating positive and negative predictive values at base-rate prevalences of 0.2, 0.5, and 0.8.

Conclusions. The sinus CT scan demonstrates excellent diagnostic accuracy for the diagnosis of pediatric CRS, with excellent sensitivity and specificity. The predictive value depends substantially on the base-rate prevalence of CRS in the population being evaluated. The authors established Lund score ranges for CT scans of children with sinusitis: 0 to 2, normal; \( \geq 5 \), positive for sinusitis; 3 to 4, equivocal.

Reviewers’ Comments. Although CT is considered the gold standard for diagnosis of CRS, its sensitivity, specificity, and diagnostic accuracy have not been well established in children. This study uses quantitative Lund
Outcomes of Allergy to Insect Stings in Children, With and Without Venom Immunotherapy

Jennifer Maloney and Scott H. Sicherer

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