

Anaphylaxis in Schools and Other Child Care Settings

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Ontario Allergy Society, and Allergy Asthma Information Association*

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Introduction

Two deaths due to severe peanut allergy in Ontario during the summer of 1994 have heightened the public's awareness regarding the potential consequences of anaphylaxis.

Anaphylaxis refers to a collection of symptoms (Appendix 1) affecting multiple systems in the body. The most dangerous are breathing difficulties, and a drop in blood pressure or shock, which are potentially fatal. Common examples of potentially life threatening allergies are to foods and insects; life threatening allergic reactions may also occur to medications, exercise and latex rubber.

The estimated risk of anaphylaxis in the general population is 1% to 2% for insect stings and foods, with a lower reported prevalence for drugs and latex (1). Approximately 50 anaphylactic insect sting deaths and 100 food related deaths are recognized each year in the USA (2,3).

The most important aspect of the management of patients with life threatening allergies is avoidance. In the event of contact with the offending allergen, epinephrine (Adrenaline) by subcutaneous or intramuscular injection is the treatment of choice for anaphylaxis (1). Other medications such as antihistamines, inhaled asthma medications or steroids that subsequently may be given by physicians in treating anaphylaxis must not be regarded as first line medications. **It is imperative that epinephrine be recognized as the drug of choice and all efforts be directed toward its immediate use (4,5). Data clearly shows that fatalities more often occur away from home and are associated with either not using or a delay in the use of epinephrine treatment (3).**

Anaphylaxis is a rare but preventable and treatable event. The Canadian Society for Allergy and Clinical Immunology together with provincial affiliates and allergy organizations have drafted this consensus statement to help simplify the management of anaphylaxis for the public. This is a working document that may be modified as future research dictates.

Identifying the Problem

The diagnosis of allergy with a risk of anaphylactic reactions is based on the history and confirmed with appropriate skin and or blood tests done by specially trained allergy physicians. Treatment protocols can then be physician prescribed for use in the school setting.

Schools should develop a system of identifying children with life threatening allergies in order to prevent anaphylactic reactions. Staff members involved with the child's care must be instructed as to the potentially severe nature and proper treatment of the allergic problem. Review of this information should occur prior to the new school year or special activities (e.g. school trips). Any questions and possible treatment changes should then be addressed.

All teachers must be aware of those students who may require epinephrine treatment. Aids could include identification sheets with the child's name, photograph, specific allergy (e.g. peanut, bee sting, etc.), warning signs of reaction and emergency treatment. This information should be readily available and reviewed by all care givers.

Every child should have their own epinephrine auto-injector device labeled by name and expiry date. In addition each child should be wearing a Medic-Alert bracelet or necklace (badges in the nursery setting), clearly identifying their allergy.

Avoidance Strategies

Avoidance of a specific allergy is the cornerstone of management in preventing anaphylaxis.

Food Avoidance

The foods which commonly produce allergic problems are milk, soy, egg, wheat, fish, shellfish, peanut and tree nuts. Reactions to peanut, nut and shellfish tend to continue to be a life long problem and are usually more severe than are allergic responses to the other foods. Most individuals with allergic reactions to milk, soy, egg and wheat will have lost their sensitivity by the time they are in the public and high school systems (6). However there are still some who will continue to run the risk of having anaphylaxis to these foods.

It is impractical to achieve complete avoidance of all allergenic foods as there can be hidden or accidentally introduced sources. However it is definitely possible to reduce children's exposure to allergenic foods within the school setting.

We therefore feel that education and supervision are also paramount in dealing with issues regarding food allergies. Guidelines for children should include:

There should be no trading and sharing of foods, food utensils and food containers.

All food allergic children should only eat lunches and snacks that have been prepared at home.

Hand washing is encouraged before and after eating.

Surfaces such as tables, toys, etc. should be washed clean of contaminating foods.

The use of food in crafts and cooking classes may need to be restricted depending on the allergies of the students.

It should be stressed that minute amounts of certain foods like peanut when ingested can be life threatening (7). Several children have had skin rashes and stomach upsets just from simply contacting residual peanut butter on tables wiped clean of visible material (7).

The potential risk of life threatening allergic reactions to airborne food particles such as peanut or shellfish is negligible. Presently we would not recommend a ban based on the risk of reactions from the inhalation route of exposure.

The contents of foods served in school cafeterias and brought in for special events should be clearly identified. Terms that are not readily helpful such as casein, livetin or hydrolyzed vegetable protein, indicating the presence of milk, egg or peanut respectively need to be taught to personnel handling such foods.

Information about these terms is available from national or provincial Allergy Information Associations. (See Appendix 3, Resource Listing).

Food personnel should also be instructed about measures necessary to prevent cross contamination during the handling, preparation and serving of food.

Peanut Avoidance

Peanut allergies require more stringent management plans. They are one of the most common food allergies and the leading cause of food induced anaphylaxis (8).

Exposure to peanut is extensive in North America. Statistics for 1991 estimate that almost 5 billion pounds were consumed in the U.S.A. This is equivalent to 7 lb. per year for each American citizen (9). Canadian estimates are presumed to be comparable.

Reactions to peanuts are often more severe than to other foods such as milk and egg. Peanut is ubiquitous in the food supply and in one study 50% of peanut allergic children had accidental peanut ingestion within one year of follow-up (10).

In view of the nature of peanut allergies we therefore recommend these strong initiatives to control peanut exposure in the schools be instituted.

1) In the nursery, day care setting and earlier public school grades where there are peanut allergic children no peanuts, peanut butter or peanut containing foods should be allowed, since it is extremely difficult to avoid accidental ingestion. It should be recognized that this will reduce but not eliminate the risk of accidental exposure.

2) In the higher public school grades and high school settings complete avoidance policies while desirable may be impractical. If there are common eating areas, no peanut foods should be allowed if there are peanut allergic children. Allergy free classrooms may need to be instituted when appropriate. Public education of the dangers of peanut allergy and requests for cooperation restricting peanut use at school are important.

3) Education of all teachers, staff, and students regarding food allergies and in particular peanuts and nuts should be incorporated into first aid courses.

4) Foods served by the school / nursery / day care for snacks, special programs, etc., should omit peanuts and other nuts, if peanut allergic individuals are present.

Insect Avoidance

Avoidance is more difficult to achieve for this type of allergy but certain precautions by the schools may be helpful:

- 1) Removal of insect nests on or near school property.
- 2) Proper storage of garbage in well covered containers.
- 3) Eating areas should be restricted to inside school buildings.

Other Allergies

Drugs, exercise and latex allergies are rare in the school setting. These should be dealt with on an individual basis.

Treatment Strategies

Accidental food ingestion can occur despite avoidance measures. Treatment must immediately be available for these emergency situations.

Treatment protocols need to be prescribed by a physician. EPINEPHRINE is the only drug which should be used in the emergency management of a child having a potentially life threatening allergic reaction. Epinephrine injection is available in a number of self administration delivery devices (appendix 2). We recommend the epinephrine auto-injector device because of its simplicity of use.

Epinephrine must be kept in locations which are easily accessible and not in locked cupboards or drawers. These locations should be known to all staff members. Children old enough to understand its proper use, should carry their own epinephrine. For younger children the epinephrine device should be kept in the classroom. Backup epinephrine auto-injectors should be available in other school areas such as gyms, assembly rooms, cafeterias, school yards, school buses, etc.

All students regardless of whether or not they are capable of epinephrine self administration will still require the help of others because the severity of the reaction may hamper their attempts to inject themselves. Adult supervision is mandatory.

All individuals entrusted with the care of children need to have familiarity with basic first aid and resuscitative techniques. This should include additional formal training on how to use epinephrine auto-injector devices. Policies for treating anaphylaxis should be implemented.

Training programs may be through public health departments or physician's groups, to ensure that all individuals in schools and other areas of child care (school bus drivers, coaches, camp counselors, lifeguards, ambulance drivers, etc.) are certified in these techniques.

Educational material is available from The Anaphylaxis Project of The Allergy Asthma Information Association. (See Appendix 3, Resource Listing). In this package there are two important forms that we would encourage to be completed. One is a consent form to be signed by the parents that allows the school to administer epinephrine. The second document is the Emergency Allergy Alert (protocol) Form. (See Action Plan, General Recommendations).

The Food Allergy Network in the United States has also just completed an education packet and video on care of children with food allergies and anaphylaxis for schools. (See Appendix 3, Resource Listing).

A potential barrier to the use of epinephrine is the fear of litigation. Common law protects the care givers in life threatening situations when they provide assistance in a reasonable and acceptable manner. The administration of epinephrine as outlined in this document is now regarded as acceptable treatment for anaphylaxis.

Parents should be advised therefore to never sign a waiver absolving the school of responsibility if epinephrine was not injected.

A position statement regarding the management of anaphylaxis has been drafted by the Allergy section of the Canadian Pediatric Society and serves as another source of information (11).

Use of Epinephrine

There are no contraindications to the use of epinephrine for a life threatening allergic reaction. Epinephrine must be administered as early as possible after the onset of symptoms of severe allergic response. Individuals with a need for epinephrine will not always have predictable reactions.

Reports have shown that adequate warning signs are not always present before serious reactions occur (12).

It is therefore recommended that epinephrine be given at the start of any reaction occurring in conjunction with a known or suspected allergy contact. In situations where there has been a history of a severe cardiovascular collapse to an allergen the physician may advocate that epinephrine be administered immediately after an insect sting or ingestion of the offending food and before any reaction has begun.

ALL individuals receiving emergency epinephrine must immediately be transported to hospital. Epinephrine in the majority of cases will be effective after one injection. However, further treatments may be required and therefore observation in a hospital setting is necessary.

Additional epinephrine must be available during transport and may be administered every 15 to 20 minutes (7). This should only be given in situations where the allergic response is not under adequate control: i.e. the patient's breathing becomes more labored or the patient has a decreasing level of consciousness. The need for multiple injections indicates the need for other emergency drugs. Therefore it is important when planning trips or camping outdoors that a hospital be within an hour travel time or there is easy access to police, fire or ambulance emergency services.

Despite the initial adequate therapy of an actual life threatening episode of anaphylaxis repeat attacks have occurred up to 8 hours later without additional exposure to the offending allergen (13). Observation for 4 hours in an emergency facility is strongly recommended for other individuals with milder reactions.

References

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Appendix 1

COMMON SYMPTOMS AND SIGNS OF ALLERGIC REACTIONS

May be a combination of any of the following:

Hives
Itching (of any part of the body)
Swelling (of any body parts)
Red watery eyes
Runny nose
Vomiting
Diarrhea
Stomach cramps
Change of voice
Coughing
Wheezing
Throat tightness or closing
Difficulty swallowing
Difficulty breathing
Sense of doom

Dizziness
Fainting or loss of consciousness
Change of colour

Appendix 2

Epinephrine is available in a preloaded syringe (Ana-Kit; Hollister Stier, Etobicoke, Ont.) or in a spring-loaded, self injectable system (EpiPen; AllereX Laboratory Ltd; Kanata, Ont.)

EpiPen is available in two forms EpiPen Jr. and EpiPen. The EpiPen Jr., contains 2.0 ml of epinephrine 1:2000 dilution. One injection delivers 0.3 ml of fluid which contains 0.15 mg of epinephrine. This is used for those weighing 15 kg (33 lb.) or less. The EpiPen contains 2.0 ml of epinephrine 1:1000 dilution. One injection delivers 0.3 ml of fluid which contains 0.3 mg. of epinephrine. This is used for those weighing greater than 15 kg (33 lb.).

A brochure outlining most of the aspects of handling and administering the Epinephrine auto-injector is entitled "For all allergic emergencies" and is available from AllereX Lab Ltd; 580 Terry Fox Drive, Suite 408, Kanata, Ontario K2L 4B9; Telephone No. (613) 592-8200. All those responsible for using EpiPens should be familiar with these instructions. A training EpiPen device is available from the same company. this can provide individuals with an appreciation of how much pressure is needed to activate the device until a "click" is heard.

Management of Children with Life Threatening Allergies

GENERAL RECOMMENDATIONS

- 1) These recommendations apply to all personnel having responsibility for the care of children (i.e. schools, nurseries, camps, school bus drivers).**
- 2) Information and identification sheets (photographs, allergen to avoid, management plan) for children with life threatening allergies should be readily available. These sheets are available in the Parent Package available from the Anaphylaxis Project of the Allergy Asthma Information Association.
- 3) The parents should sign a waiver allowing the school to use epinephrine when they consider it necessary.
- 4) Parents should be advised never to sign a waiver absolving the school of responsibility if epinephrine was not injected.
- 5) Every child who has been prescribed an epinephrine auto-injector should have one labeled with his or her name and kept in a readily available location.

6) Children who are old enough to use an EpiPen should, in addition carry their own epinephrine auto-injector.

7) Because of the potential severity of the allergic reaction, no child should be expected to be completely responsible for the administration of epinephrine. Assistance must be provided by a teacher or other caregiver.

8) All teachers and other caregivers should be aware of children who have an allergy which may predispose to anaphylaxis. These children should be properly identified and their allergy clearly stated (i.e. Medic-Alert bracelet).

9) Staff and students should be educated to understand and treat anaphylaxis.

10) The school should have readily available first aid kits which must contain epinephrine auto-injectors. First aid kits should be available in designated areas (lunch rooms, gymnasiums, school yards).

11) Health classes should include information regarding the recognition and treatment of life threatening allergic reactions.

Management of Specific Allergens

Insect sting and peanut allergy are the most common causes of anaphylaxis at school.

Allergy to Stinging Insects or Peanut

I) Avoidance:

In the case of stinging insect allergy;

1) Schools should regularly look for and remove nests or hives of stinging insects.

2) Garbage should be stored in well covered containers.

In the case of peanut allergy;

1) In the nursery, day care setting and earlier public school grades where there are peanut allergic children no peanuts, peanut butter or peanut containing foods should be allowed, since it is extremely difficult to avoid accidental ingestion. It should be recognized that this will reduce but not eliminate the risk of accidental exposure.

2) In the higher public school grades and high school settings avoidance policies while desirable may be impractical. If there are common eating areas, no peanut foods should be allowed if there are peanut allergic children. Allergy free classrooms may need to be

instituted when appropriate. Public education of the dangers of peanut allergy and requests for cooperation restricting peanut use at school are important.

3) Education of all teachers, staff and students regarding food allergies and in particular peanuts and nuts should be incorporated into first aid courses.

4) Foods served by the school / nursery / day care for snacks, special programs, etc., should omit peanuts and other nuts if peanut allergic individuals are present.

II) Suspected or Actual Contact with a Known Allergen

The child should be under close and constant supervision for 4 hours after the suspected / actual sting or ingestion. Administer the epinephrine auto-injector as soon as the child develops any one of the following symptoms and take him or her immediately to hospital. If no serious reaction occurs within 4 hours it is unlikely to occur.

Additional epinephrine must be available during transport and may be administered every 15 to 20 minutes (7). This should only be given in situations where the allergic response is not under adequate control: i.e. the patient's breathing becomes more labored or the patient has a decreasing level of consciousness. The need for multiple injections indicates the need for other emergency drugs, therefore it is important when planning trips or camping outdoors that a hospital be within an hour travel time or there is easy access to police, fire or ambulance emergency services.

NOTE:

1) We have not recommended the use of antihistamines in these circumstances. These will be subsequently used with other necessary medications to treat anaphylaxis under the supervision of a medical professional.

2) In the event of a child having had a life threatening reaction, his or her physician may elect to have the epinephrine administered immediately after the suspected / actual sting / ingestion and before any reaction occurs.

Other Life Threatening Allergies

In addition to stinging insect and peanut allergy, some children in the school setting may have life threatening allergy to a number of other allergens. In all cases the diagnosis must have been made by a physician specialized in the diagnosis and management of allergic diseases.

The approach to these children is similar to that outlined for peanut and stinging insect allergy. Care of these children should be individualized based on discussions between the parent, the allergy specialist and the school.

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