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Hot Topics Department

Life-threatening Allergic Reactions Increasing Among Children☆·☆☆

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Anaphylaxis, a sudden and potentially life-threatening allergic reaction, is increasing among children according to a new report by Blue Cross Blue Shield (2018). The new report looked at U.S. emergency room visits for anaphylaxis from 2010 to 2016 among their subscribers, including 9.6 million children 18 years of age and younger. The report showed that emergency room visits for children for anaphylaxis more than doubled, from 1.4 visits per 10,000 children in 2010 to 3.5 visits in 2016. Children diagnosed as "at risk" for an anaphylaxis episode increased 104% in the seven years of the study, from 23 per 10,000 children in 2010 to 47 per 10,000 in 2016. While anaphylaxis is relatively rare, children are especially vulnerable to serious allergic reactions since an allergy is not necessarily known until a reaction occurs. According to the authors of the study, the steep increase in emergency room visits among children calls for an increased awareness around the dangers of severe allergic reactions.

Nearly 1.7 million, or 18% of the children in the study, suffer one or more allergy and roughly 25% of children under that age of 3 were diagnosed with one or more allergies, excluding asthma, in 2016. Specific food allergies were responsible for 47% of the emergency room visits for anaphylaxis. The most common foods that trigger allergic reactions were peanuts (22%), tree nuts and seeds (15%), and milk and eggs (6%). Fish and shellfish (3%) and fruits and vegetables (2%) caused smaller number of reactions. The other 53% of the visits were attributed to unknown foods or other unspecified causes, such as insect bites, possibly because the information was collected from insurance claims and some billing claims charge for "anaphylactic shock, unspecified."

An earlier study using administrative claims for 56,212 emergency room visits for anaphylaxis found that the rate of anaphylaxis emergency room visits increased by 101% from 2005 to 2014 with the largest increase in children 5 to 17 years (196% increase) (Motosue, Bellolio, Van Houten, Shah, & Campbell, 2017). Similarly the largest increase in food-related anaphylaxis was in children aged 5 to 17 years (285% increase) and the highest rates of increase in medication anaphylaxis was seen among young children aged 0 to 4 years (479%).

The large unanswered question is why there is an increase in allergies among children. Genetics and the environment are both important factors and may be responsible for the increase. There are several theories. One theory is the hygiene hypothesis, which states that our improved ability to be clean and avoid germs has thrown our immune systems off balance. This theory speculates that because the immune system has less to do, the system that fights allergens overcompensates. This theory is supported by a study that found that rates of allergies and asthma are lower for those living on farms, possibly due to exposure to a specific molecule found in cow manure (Schuijs et al., 2015). Ultimately, our environment determines whether or not we will be exposed to a particular allergen, a requirement for developing an allergy, but it is not clear whether exposure is beneficial.

Another theory credits the rise in childhood allergies to American parents waiting to introduce allergen-producing foods, like peanuts. This theory is based on the observation that cultures where peanuts are introduced into the diet at an earlier age have a lower incidence of peanut allergies. A large study called Learning Early About Peanut Allergy (LEAP) was conducted in England to determine if there is any benefit to early exposure to peanuts (Du Toit et al., 2015). It found that exposing children to peanuts early lowered the chances of a child developing a lifelong allergy.

Another theory hypothesizes that the way food is prepared contributes to allergies. This is based on the observation that roasting peanuts seems to increase their allergic value relative to boiling them (Verma, Kumar, Das, & Dwivedi, 2012). There may also be a link between the prevalence of allergies and climate change. Both the higher global temperatures and the related increase in carbon dioxide in the air allow plants to grow and propagate faster. More plants leads to more pollen, which could be linked to higher allergy rates (Katelaris & Beggs, 2018).

Finally, some experts believe that the number of people reporting an allergy has increased, but the actual number of children affected has remained the same. Parents may be more aware of the warning signs and may be seeking care more often than before. In addition, the ability to identify allergies has improved, so healthcare providers may be reporting more allergies, which could account for part of the increase in childhood allergies in the new study (Blue Cross Blue Shield, 2018).

As the rate of allergies rises, there is an increased need for awareness and education for parents and caregivers to help them recognize and treat anaphylaxis. Because parents are generally able to make their homes free of risky substances, most severe reactions occur outside of the home. This means that parents need to be sure that there is an awareness of the allergy and how to treat it in all areas that a child spends time, including at school and after school programs such as child care and sports programs. It is also important that a child has a good understanding of their allergy and that they feel empowered to speak up and ask about the presence of allergens in their food.

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Caregivers need to be aware of the signs and symptoms of an anaphylactic reaction, including lip swelling, hives with nausea or coughing or throat discomfort, tongue swelling, throat tightening, trouble breathing, dizziness or lightheadedness. The American Academy of Pediatrics (AAP) has a parent information sheet for parents of children who have had an anaphylactic event and for parents of children who have had a mild allergic event who should be knowledgeable about anaphylaxis because these children are at a higher risk of having another, more severe attack. In 2017 the AAP released an emergency plan for allergy and anaphylaxis that can be individualized (http://pediatrics.aappublications.org/content/early/2017/02/09/peds.2016-4005). Although there are several anaphylaxis action plans that are available, the AAP version recognizes that allergic reactions can be unpredictable and it outlines multiple pathways to cover mild to severe reactions. The plan emphasizes that epinephrine should be used promptly if there is any uncertainty about the severity of the reaction. Having a written action plan is only one part of a comprehensive management of allergy and anaphylaxis. General community education and planning for prevention, recognition and management of anaphylaxis is also needed.

For children who do have an allergy, parents and teachers need to be vigilant about the signs of anaphylaxis and to begin treatment quickly. According to the AAP, it is better to over-treat than to under-treat anaphylaxis. In the Blue Cross Blue Shield report many of the children who came to the emergency room for anaphylaxis did not have a previous diagnosis of anaphylaxis (Blue Cross Blue Shield, 2018). This means that it is a diagnosis that everyone caring for children should be prepared to recognize and treat, whether there is a history of an allergic reaction or not. The Centers for Disease Control and Prevention (CDC) has a tool kit for managing food allergies in schools as part of their Healthy Schools campaign (https://www.cdc.gov/healthyschools/foodallergies/index.htm). In addition, a School Nurses Tool Kit is available from the National Association of School Nurses (NASN) to provide guidance for food allergy and anaphylaxis management in the school setting (https://www.nasn.org/nasn-resources/practice-topics/food-allergies). There has been a substantial increase in the most severe anaphylactic allergic reactions in children, largely triggered by foods. This increase coincides with a steep rise in emergency room visits. The National Institute of Allergy and Infectious Diseases guidelines for peanut allergies, the most common cause of fatal anaphylaxis from a food, include introducing peanut-containing foods earlier than previously recommended (Greenhawt, 2017). Children with severe eczema or egg allergy need to be evaluated for peanut allergy, and depending on results, peanut-containing foods (although not peanuts) may be introduced at 4 to 6 months of age (Togias et al., 2017).

Until we can figure out the causes, parents should know the warning signs and talk to their healthcare providers about what to do if an allergic reaction occurs. Previous studies have found that more than half of the individuals who had anaphylaxis were not equipped with life-saving epinephrine (Greenberger, Wallace, Lieberman, & Gregory, 2017). In addition, only half of those who had an auto-injector of epinephrine used it prior to arrival in the emergency department (Hochstadter et al., 2016). Anaphylaxis can occur within seconds or minutes of exposure to an allergen. It is important for caregivers and healthcare providers to work together to ensure the timely use of epinephrine auto-injectors in the case of anaphylactic reactions.

Successful management of anaphylaxis in the emergency department also plays a crucial part in the care of children with allergies. Fear of biphasic anaphylaxis, the recurrence of symptoms after a period of resolution without re-exposure to the allergen, has prompted minimum observation periods ranging from 3 h to 24 h. This range of observation periods led to a variation in clinical decision-making, more hospitalizations or prolonged emergency department stays, increased costs, and inconsistent discharge care and caregiver confusion. Recent research has shown that biphasic anaphylaxis is uncommon and that decreasing the recommended length of observation from 8 to 4 h can result in a 60% reduction hospital admissions (Lee et al., 2018). In 2011 consensus guidelines were created by the National Institute for Allergy and Infectious Diseases that recommended an observation period of 4 to 6 h for most anaphylaxis patients and that patients with oral food challenge could be discharged 2.5 h after epinephrine administration, provided that symptoms had resolved (Burks et al., 2011).

The Blue Cross Blue Shield (2018) study notes that the chances of a positive outcome are increased if necessary medications are on hand during a life-threatening situation. The availability of medication is a particularly important topic given the recent controversy about the high cost of the epinephrine auto-injectors, commonly prescribed for children at risk, so that they have emergency treatment available at home and school. Epinephrine auto-injector medications alleviate severe allergy symptoms and are available as both name brand and generic drugs. According to the authors of the study, the steep increase in price of the most commonly prescribed Mylan EpiPen© over the past several years (from $129 in 2010, to $645 in 2016 for a pack of two auto-injectors) motivated parents and health care workers to work to ensure that these medications continue to be available in case of an emergency. Several generic versions of the medication are now available, including the Adrenaclinck© auto-injector, which now costs $234. Work has been done to make epinephrine in schools, parks and other places, but more work needs to be done to ensure that this medication is available in emergency situations. Parents are more likely to use an auto-injector if cost is not an issue. The authors of the Blue Cross Blue Shield study noted that the increase in emergency room visits may be good, because it indicates that parents are more aware of possible anaphylaxis and are using their epinephrine auto-injectors more often and subsequently taking their children to emergency rooms afterwards.

Continued focus on proper identification and diagnosis of childhood allergies remains an important step to help keep children safe. The availability and access to epinephrine auto-injectors should remain a matter of concern for health care workers. As more children suffer from allergies and potentially life-threatening anaphylactic reactions, access to these medications and to emergency room care is essential to safeguarding the health of children.

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