

Asthma and Anaphylaxis

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Asthma Definition

- According to the 2007 National Asthma Education and Prevention Program Expert Panel Report 3, asthma is a common yet complex chronic disorder of the airways characterized by variable and recurring symptoms, airflow obstruction, bronchial hyperresponsiveness, and underlying inflammation. Characteristic symptoms of asthma include dyspnea, chest tightness, wheeze, and often cough.

Asthma=Inflammation

Prevalence of Asthma in the U.S.

- affects approximately 23 million, an almost 8% prevalence rate.
- It affects roughly 6 million children making it one of the most common chronic childhood illnesses.
- NAEPP EPR 3 2007

- In 2006 in the U.S. asthma was responsible for 11.8 million office visits, 1.7 million ED visits, 444,000 hospitalizations, and 3,563 deaths (American Lung Association, Trends in asthma morbidity and mortality, January 2009).

Still not being diagnosed

- History, exam, and a pulmonary function test (spirometry) in anyone 5 years of age or older.
- Should always be considered in anyone of any age that has any of the other atopic diseases like eczema or allergic rhinitis and has a history of persistent coughing following colds.

Most Sensitive Indicator for Ongoing Asthma in Kids

- Good athletes, but they just don't have the stamina or endurance that they should have based on how good of an athlete they are.

- So the gym teacher or the coach is in a great position to identify kids with potential asthma or to determine if their asthma is being adequately controlled.
- Should also consider the diagnosis of asthma in overweight/inactive kids.

Treatment/Medications

- Emergency bronchodilators: albuterol (ProAir, Proventil, Ventolin, Xopenex), pirbuterol (Maxair), and epinephrine.
- Long-term controller medications: antileukotrienes (Singulair) and inhaled steroids (Advair, Alvesco, Asmanex, Azmacort, Beclovent, Dulera, Flovent, Pulmicort, QVAR, Symbicort, and Vanceril).
- Oral Steroids

Other Treatment Options

- Immunotherapy (allergy shots)
- Xolair (anti-IgE) found to reduce the production and release of IgE-mediated proinflammatory cytokines by human airway smooth muscle cells. (Ann Allergy Asthma Immunology 2010;104:152-160)

Treatment/Controversy

- Long-acting bronchodilators (LABAs) which include Serevent (introduced in the U.S. in 1994) and Foradil (introduced in 2001).
- These medications open the airways for up to 12 hours versus the albuterol products which open the airways for up to 6 hours.

- The 2007 National Asthma Education and Prevention Program (NAEPP) asthma guidelines recommend using these medications as add on therapy in patients already using short acting bronchodilators and inhaled steroids to achieve long-term asthma control in patients with moderate to severe persistent asthma.

- The FDA placed a black box warning on all LABAs (Serevent and Foradil) and products that contain them in combination with inhaled steroids (Advair, Dulera, and Symbicort) as of November 18, 2005.

- This warning came primarily from the findings of the SMART study (Salmeterol Multicenter Asthma Research Trial) a study undertaken in the late 1990's in the U.S. and later published in Chest. 2006;129:15-26.

- Previous literature demonstrated that LABAs are “steroid sparing” and that asthma control was better in patients who had a LABA combined with a lower dose inhaled steroid versus doubling the dose of the inhaled steroid. (Greenstone IR, et al. Combination of inhaled long-acting beta2-agonist and inhaled steroids versus higher dose of inhaled steroids in children and adults with persistent asthma. Cochrane Database Sys Rev. 2005(4):CD005533)

- The SMART study found that 12 patients died while on Serevent versus 2 on placebo which was statistically significant.
- A meta-analysis from 19 clinical trials (including SMART) showed that the use of LABAs increased exacerbations requiring hospitalization and asthma-related deaths compared with placebo. (Salpeter SR, et al. Ann Int Med. 2006;144:904-912).

- A number of other studies, including several large meta-analyses, did not come to the same conclusion regarding safety, especially for patients taking a LABA and inhaled steroids in combination. (Lazarus SC, et al. JAMA,2001;285:2583-2593. Jaeschke R, et al. Am J Respir Crit Care Med. 2008;178:1009-1016. Rodrigo G, et al. Pulm Pharmacol Ther.2009;22:9-19. Bisgaard H. Pediatr Pulmonol.2003;36:391-398.)

- It was not until the early 90's that we realized that asthma was not just bronchospasm, but was actually airway inflammation.
- An article from the early 90's found a direct correlation with an increased death rate in asthmatics who had to take their rescue (albuterol) inhalers more frequently.

- All experts treating asthma agree that the LABAs should not be used as monotherapy.
- Most experts are not concerned with using LABA and ICS in combination (Advair, Dulera, and Symbicort) as long-term asthma controller therapy.
- After gaining control the goal is then to minimize the amount of meds.

- All experts agree that objective pulmonary function testing should be done at least yearly to objectively assess a person's degree of airway obstruction and asthma control.
- Most experts agree that a person's history or exam findings rarely correlate with his/hers pulmonary function test findings.

- My personal favorite way to gage asthma control in any patient is by the “rule of twos rule”
- Anyone having any asthma symptoms more than twice a week during the day or twice a month at night or requiring their rescue inhaler more than twice a week is not in control of their asthma.

Asthma Myths

- Exam is an excellent way of determining the degree of airway inflammation/obstruction. No
- Asthma is outgrown. No
- Bronchitis is common in asthmatics. No
- Peak flow meters correlate well with spirometries. No

- Albuterol should be used on a daily basis to control asthma. No
- For an acute flare of asthma one should never exceed more than 2 puffs of albuterol every 4 hours. No
- Only kids should use aerochambers. No
- Inhaled steroids can stunt growth. No

- A chest x-ray can aid in differentiating between asthma and bronchitis, bronchiolitis, croup, pneumonia, pneumonitis, or walking pneumonia. No
- It has been estimated that between 40 to 75% of individuals with asthma have reflux as one of their underlying diseases. Yes
- Migraine is one of the most common causes for headaches in kids (more common in atopic individuals). Yes

Anaphylaxis

- Defined as a systemic IgE-mediated allergic reaction.
- Term first coined by Portier and Richet in 1902 when they were trying to immunize dogs to venom from a sea anemone.

Causes

- The more common causes for anaphylaxis include foods, drugs, insect stings, and more rarely exercise.

Foods

- It has been estimated that there are about 29,000 anaphylactic episodes due to foods per year, resulting in about 150 deaths (5% mortality rate). S. Allan Bock MD, et al. Fatalities due to anaphylactic reactions to foods. J Allergy Clin Immunol. Jan 2001;Vol 107:No 1;191-193.

- The most common foods associated with allergic reactions include milk, eggs, soy, wheat, and peanuts in kids.
- In adults peanuts, tree nuts, fish, and shellfish.

- A study by Dr. Allan Bock, et al. in 2001 reviewed the cases of 32 individuals who died from anaphylaxis and found that 94% were due to peanuts or nuts, 96% had asthma, and only 10% had epinephrine available at the time.

Symptoms

- The more common symptoms associated with anaphylaxis include urticaria/angioedema, laryngeal edema, dyspnea, wheezing, flushing, dizziness, syncope, hypotension, nausea, vomiting, diarrhea, abdominal cramps, rhinitis (hayfever symptoms), and headache.

- The GI symptoms (nausea, vomiting, abdominal cramps) are often overlooked as a true sign of an anaphylactic reaction.

- A study by Hugh Sampson, et al. in 1992 identified 13 kids (2-17 yrs old) who experienced fatal (6) or near fatal (7) anaphylaxis; all had asthma. (NEJM;Vol 327;No 6)
- The majority of the kids who died presented initially with just GI symptoms, so were not recognized as having a true allergic reaction.

Treatment in the School Setting

- Antihistamines if mild--just hives (1-2mg/kg); Benadryl (up to 50mg) or Zyrtec (up to 10mg).
- Epinephrine if more severe; use an Epi-pen Jr. or Twinject 0.15mg in kids less than 40 pounds and a regular Epi-pen or Twinject 0.3mg over 40 pounds. Call 911.
- Albuterol in asthmatics.

- Epinephrine works by preventing or reversing blood vessel dilation, reversing bronchospasm (opens the airways), and improving cardiac output (increases heart rate and force of contraction).
- Roughly 20 to 30% will need a second dose within 10-15 minutes.

Food Allergy Research

- Immunotherapy initially tried, but resulted in a death; so allergy shots were no longer pursued as a potential treatment.
- Now trials are underway using oral desensitization; primarily with peanuts, but also reported with eggs and milk.
- Initial results are promising; individuals are still allergic, but can tolerate accidental exposures.

Myths

- Every time an individual is exposed to the food that causes an allergic reaction it will be more severe. No (same for bee stings)
- A severe reaction can occur by just being in the same room as someone eating the food. No
- Allergy testing results can be used to predict the severity of a reaction. No

- After using an Epi-pen always call 911. Yes
- A food allergy or a bee allergy can run in families. No
- You shouldn't use an Epi-pen in someone having an anaphylactic reaction with a heart condition. No (ABC)
- If Benadryl is given quickly it can prevent a more severe allergic reaction. No

Anapen

- What?