ASTHMA-What is it and How to Live with It

Asthma is by definition reversible airway disease (RAD) that recurs over time. Reversibility can be demonstrated through administration of medications or can resolve on its own given enough time. It is a common diagnosis among children and results in much time lost from school, work, and sports participation when not treated properly. In fact, improper or inadequate treatment can be life altering.

There are two physiologic mechanisms that cause wheezing: 1) .*Inflammation* which leads to fluid accumulation in the bronchial wall and production of mucous by the airways which is what they are designed to do in response to irritation by substances like smoke, particles in the air including allergens, irritating chemicals, and infections; 2) *Bronchospasm.* The airways are encircled with smooth muscle and when inflammation occurs the muscles are triggered to contract, quickly narrowing the airway, a "spasm" causing a cough or wheeze.

Ideal treatment for asthma addresses each of these mechanisms. The first addresses *bronchospasm* – this is the first obvious sign of a flare up and the medications commonly used to treat it are albuterol and Xopenex. The medical term for these medications is B2-agonists. They are the Rescue or Quick Relief medications and are the ones that should be used in a flare up situation. The second addresses the *inflammatory response* which is typically slower to develop and last to resolve. This important group of medications is called the Controller medications. They consist of drug types including inhaled steroids, leukotriene receptor agonists, and, rarely, theophylline. These are medications that your doctor will prescribe based on certain established guidelines. They typically are given to those with a history of recurrent asthma episodes. Both types of meds are required for asthma management.

Not all asthma is wheezing. **One of the most common presenting symptoms of asthma is cough**. Other signs of asthma can include "tight" chest, shortness of breath, chest pain, night time cough, exercise intolerance, extra mucous production, and increased heart rate. On the other hand, not all wheezing is asthma. Other common causes of wheezing include: viral bronchiolitis, pulmonary infections such as pneumonia or bronchitis, allergic reaction, gastroesophogeal reflux (GER), congenital heart failure and several other less common causes which can be diagnosed by a doctor.

Many children under the age of 3 years will wheeze with common respiratory viral illnesses that in most of us cause only cold symptoms. This is because of their relatively smaller airway. As bronchial walls swell due to inflammation from viruses the size and caliber of the airway tube narrows, as though biting down on a straw and blowing air through it….a whistling sound will be produced. A wheeze is the sound heard when a child tries to push air out of narrowed airway tube (expiration). If the swelling is severe, sounds might also be heard when breathing in (inspiration). Young infants and children can quickly become quite sick if this happens because they don't have much reserve to adapt to the changes as air exchange diminishes. Signs that a child in this situation needs immediate medical attention include:

- Respiratory rate more than:
  - 60 per minute if age birth to 3 months
  - 50 per minute if 3months to 1 year
  - 40 per minute if 1-3 years
  - 35 per minute if 3-6 years
  - 30 per minute if 6-12 years
  - 20 per minute if 12-12 years
- Cough
- Wheeze
- Shortness of breath
- Hard to talk
- Breathing hard and fast
- "Tight" feeling in chest
- Night waking
- Retractions which are visible, pulling movements between the ribs and of neck muscles
- Nasal opening
- Change in color
- Irritability or extreme fatigue

These children should be given care in an emergency room or other acute care setting. Usually they are treated with supportive measures such as oxygen and medications and once doing better can be treated at home. Most of these children will return to baseline within a week or two. A small percentage will go on to develop chronic asthma. Predictive risk factors that this young child might be at risk for future asthma include four or more episodes of wheezing the previous year and:

1) One of the following: parental history of asthma, physician diagnosis of eczema, or evidence of allergic response to environmental elements like dog, cat, dust, pollens, weeds.
2) Two of the following: evidence of sensitization to foods, eosinophils in the blood, or wheezing without cold symptoms. [1]

Children showing a pattern of recurrent wheezing and these risk factors should be evaluated by their physician for possible asthma maintenance therapy to try and prevent chronic airway inflammation which studies have shown may lead to chronic, irreversible changes in the lung over time.

It is important that these children be identified as they may have underling airway inflammation even when not overtly wheezing. These are the children that require "maintenance" medications to control the condition and prevent flare ups. *Flare up equals time lost from school and play and, for parents, missing work.* **"**Treatment with medications is based on clinical evidence and best practices as stated in the revised guidelines from 2007 by the National Heart, Lung, and Blood Institute (NHLBI). The goal is to promote management at home and reduce risk of hospitalization and, though not proven, to prevent progressive loss of lung function and

[1] Hummell, Donna S., Allergy Disorders, *Contemporary Pediatrics*, August 2008: volume 25, No. 8, p.45.

growth."[2] Your child's doctor can evaluate your child's pattern of illness with asthma and then formulate a plan to help control the symptoms. **The goal of an asthma action plan is to allow a child with asthma to live a normal life in spite of it.** By following the plan the child can prevent flare ups and stay active. This includes being able to attend school on a regular basis, participate in sports, and sleep through the night without wakening due to cough or wheeze or shortness of breath. The plan should encompass:

- Avoidance of triggers such as allergens like pollen dust, and pets; cold air, smoke, strong odors like perfume and powder
- Taking appropriate medications <u>regularly</u>
- Monitoring for sign of changes in breathing and flare up
- When to seek emergency help
- Planning for regular visits to the doctor (at least annually to review plan and response)
- Preventive vaccines for respiratory illnesses such as influenza

Proper treatment allows kids living with asthma to lead a full and normal life. Regular medical care is integral to achieving this goal.

[2] Hummell, Donna S., Allergy Disorders, *Contemporary Pediatrics*, August 2008: volume 25, No. 8, p.46.