

# *Respirations*

Fall 2006

Greetings and welcome to the first issue of *Respirations*, an anticipated quarterly offering from the Division of Pediatric Pulmonary & Sleep Medicine at St. John's Mercy Medical Center. Over the past five years, I have thoroughly enjoyed seeing your patients. Taking care of them has taught me a tremendous amount. Whether it was knowledge gained from reading, attending conferences, continuing education programs or just from listening to the families, its importance demands its communication. I try to utilize the discussion session in my consultant notes to relay interesting tidbits and I am always willing to speak on a topic in more details at Grand Rounds. However there remained a void which I hope we can now begin to fill. This project was an idea of mine that unfortunately had to sit on the back burner until I was afforded some "free" time. The arrival of Dr. John Spivey, a native St. Louisian, who completed his fellowship at St. Louis Children's Hospital, has not only granted me that time, but also given me an infusion of fresh enthusiasm and excitement! John, as many of you are finding out for yourselves, is an extremely well trained, thoughtful and conscientious physician and I am delighted to have him as a partner!

So, what will you find in *Respirations*? It is our goal to provide a variety of clinically relevant pieces of information. Hopefully the format will be neither cumbersome nor boring. John and I will take turns writing the different sections covering topics from papers and cases we find interesting. We promise to be as objective as possible realizing that some of our practice styles may be reflected in our discussions. Still, we certainly hope you will enjoy reading what we offer and look forward to your feedback. I anticipate that *Respirations* will undergo some evolution, so give us a call or send me an email ([choolr@stlo.mercy.net](mailto:choolr@stlo.mercy.net)) and let me know what you liked/did not like and if there are any topics you would like us to tackle in the future. Regards, Lee R. Choo-Kang, M.D.

## **Asthma: What we know and how we can best help our patients**

The annual perceived spike of wheezing school-aged children flooding your office in September and October is not an aberration. Emergency room visits and hospital admissions across the country from Virginia to Arizona peak during these months for children older than 3 years of age. What causes this predictable pattern one might ask?

Several factors have been proposed and studied but rhinovirus infection and atopy seem to be the most significant. In a twelve month case-control study<sup>1</sup> of infants and children admitted to the University of Virginia Children's Medical Center, monthly admissions for wheezing in children  $\geq$  age 3 years peaked in October. Using a combination of detection techniques including viral culture, antigen tests for RSV and

influenza, PCR for adenovirus and RT-PCR for other viruses, the researchers identified viral pathogens in more than two thirds of wheezing children (3-18 years). Whether isolated alone or in combination with another virus, human rhinovirus was the casual agent in nearly 50% of cases. Similar findings were reported in an earlier British study<sup>2</sup> of asthmatic children between 9 and 11 years of age.

The Virginia study also confirmed that respiratory syncytial virus (RSV) was the main viral pathogen behind hospital-requiring episodes of wheezing and respiratory distress amongst children < 3 years of age. Their peak hospitalization months were January through March.

The next question to be addressed is why some children appear more susceptible to wheezing with rhinovirus. Lemanske et al.<sup>3</sup> demonstrated that rhinovirus infection prior to allergen challenge enhanced airway hyper-responsiveness and the late phase eosinophil response. Clinically amongst young adults with asthma and documented inhalant allergies, the largest decreases in forced expiratory volume in 1 second (FEV1) following viral nasal inoculation were seen in patients with higher serum IgE levels. Serum IgE levels correlated with other markers of airway inflammation including nasal wash eosinophilic cationic protein (ECP), blood eosinophilia and exhaled nitric oxide level. Allergen-specific IgE measurement (I-Cap) demonstrated sensitivity to at least one common inhalant allergen in 85-87% of children hospitalized in the Virginia study.

Besides from seasonal allergens during this time of year such as weeds and mold, there are also seasonal increases in perennial allergens that occur. Platts-Mill et al.<sup>4</sup> showed an increase in dust allergen levels found in carpet, bedding and sofa during the colder months of September through January.

So, how could we use this knowledge to better the respiratory health of our patients? We could globally advise parents to limit their child's contact with sick individuals, remove any potential allergens from their environment and keep them on multiple medications. But realistically this is a difficult treatment regime for any family to follow especially without objective data and feedback. Therefore in our practice we utilize available objective data including specific allergy testing, spirometry to measure FEV1 and fractional exhaled nitric oxide levels to determine an individual's triggers, lung function and risk of having an acute exacerbation. This information is incorporated into establishing the treatment plan with attention to environmental modifications and medications. LCK

## References:

1. J Allergy Clin Immunol. 2004;114(2):239-47

2. BMJ 1995; 310:1225-1228
3. J Clin Invest 1989;83:1-10
4. J Allergy Clin Immunol. 1987; 79:781-91

### Illustrative Case

LK is a 6 year old female who was admitted to the PICU for wheezing and respiratory distress. She was hospitalized one year ago for a similar but milder episode. A formal diagnosis of asthma had not been made and she was receiving only Albuterol at home on a PRN basis. Upon review, she had frequent coughing, wheezing, and complaints of chest tightness that occurred during both the day and night. Nocturnal symptoms occurred several times a week. Her main respiratory precipitants included changes in weather and presumptive respiratory infections. Environmental exposures included second-hand tobacco smoke exposure (both parents) and 4 cats in the home. Normal growth and development was noted.

In the PICU, LK required continuous bronchodilator aerosols, intravenous steroids and supplemental oxygen. A pulmonary consultation was obtained. A normal sweat chloride test ruled out cystic fibrosis. *In vitro* measurement of allergen specific IgE revealed significant sensitivity towards cats, dogs, dust mite, mold, ragweed, several trees, and grass pollen. She responded quite well and her therapies and support were gradually weaned. Appropriate instruction including asthma education, environmental modifications and smoking cessation were provided along with prescriptions for daily anti-inflammatory treatment. She was discharged from the hospital on day #5 with a plan to follow-up for objective lung function assessment in 3-4 weeks.

**Discussion:** Living in St. Louis—one quickly realizes the importance of atopy and allergic disease in our children with asthma. But how many of our asthma patients have had formal allergy testing? The expert guidelines for asthma management produced by the NHLBI states the importance of *in vitro* or skin testing for the identification of asthma triggers. Allergen can be divided into seasonal or perennial allergens, indoor or outdoor allergens. Seasonal allergens classically include trees, grasses, weeds and molds. Tree pollens typically shower around late winter to spring with an intense, shorter period of time. Grass pollens rank #2 behind ragweed and show a great amount of cross-allergenicity among species. Grass pollen allergy causes symptoms during late spring and summer. Weed allergies occur in the late summer to early fall. Molds can occur all year round in temperate climates. In Missouri, fungi or mold allergies typically rise in spring and summer time but peak in the early fall. Perennial allergies (e.g. cat, dog, dust mites, cockroach, and mouse) can cause symptoms all year around.

Identification of specific triggers whether allergic or non-allergic is an important aspect of formulating an asthma treatment plan. Information gained from definitive testing can be used to guide necessary environmental modifications, predict problematic times for an individual patient, determine risk for persistent problems into and through adolescence, and guide prescription of medications. Physicians and parents alike can check pollen counts specific to the Missouri region on AAAAI website: [www.aaaai.org](http://www.aaaai.org). JFS

### Diagnostic Tool Talk

Exercise-related symptoms such as shortness of breath and chest pain are common complaints amongst school-age athletes. Sorting through the different causes can be difficult as most will have a normal physical examination at rest. Formal cardiopulmonary exercise testing offers the opportunity to objectively assess children while they are symptomatic. Currently two different protocols are available for the evaluation of children with exercise-induced symptoms. The “Asthma Exercise Test” is a relatively brief but vigorous treadmill challenge designed to optimally elicit exercise-induced bronchospasm when clinically suspected. Patients should ideally be off their asthma controller medications if the test is being conducted for diagnostic purposes. However if there is a question as to the etiology of persistent symptoms despite asthma medications, it may be more appropriate to test the child on his or her routine controller therapy.

A more comprehensive but extremely helpful “Cardiopulmonary Exercise Test” is also available. This test is aptly named since it is not possible to stress the cardiac or pulmonary systems in isolation of each other during exercise. It is indicated in evaluation of exercise-induced symptoms when a child’s presentation is less suggestive of asthma and answers the important questions of: (1) Is there an abnormal limitation to exercise? (2) Is it primarily cardiac or pulmonary in origin? (3) For the more discerning of athletes, what is the level of fitness? This test is also indicated in the assessment of lung disease impairment (e.g. cystic fibrosis, interstitial lung disease), preoperative assessment (e.g. pectus excavatum, scoliosis), rehabilitation screening and disability assessment. LCK

### Nurse Joan’s Corner

Receiving a flu shot, Synagis® and even routine immunizations can be traumatic to a little one. Did you know there is something we can do to help ease their pain? Studies have shown that a sucrose solution can help soothe an infant after a painful injection and even reduce duration of crying. The solution or syrup can be easily placed on the child’s pacifier. This intervention might prove to make it easier on everyone.

Have a safe and healthy season!

Nurse Joan

Related article: BMJ (no 6993, 10 June 1995)

