Abstracts' Service

Bronchodilator Responsiveness in Wheezy Infants Predicts Continued Early Childhood Respiratory Morbidity

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Objective. Spirometry including bronchodilator responsiveness is considered routine in the workup of asthma in older children. However, in wheezy infants the existence of bronchodilator responsiveness and its prognostic significance remain unclear.

Methods. Infants (< 2 years) with chronic or recurrent wheezing or coughing were evaluated by infant pulmonary function testing (PFT). Maximal expiratory flow at the point of functional residual capacity ($V_{max}FRC$) was measured before and 20 minutes after salbutamol administration. Only infants with an obstructive profile ($V_{max}FRC < 80\%$ predicted) were included. The infants were divided into two groups with regard to whether or not a response to salbutamol was observed on PFT. A response was defined as a mean $V_{max}FRC$ after salbutamol administration exceeding the upper confidence interval limit of individual prebronchodilator V_{max} FRC measurements. Follow-up data was gathered after a mean of 2 years.

Measurements and Main Results. Sixty infants were included in the study of which 32 (53%) demonstrated responsiveness to bronchodilators. The infants in the responsive group had a significantly higher frequency of physician visits for wheezing than the non-responders (3.0 mean visits/yr vs. 1.5 respectively, P = 0.03), and had a higher likelihood of having received asthma medication in the last year of the follow-up period (84% vs. 50% respectively, RR: 1.68[1.10-2.56]). At the end of the follow-up period, more parents in the responsive group reported continued respiratory disease (71% *versus* 22%, RR:3.21[1.30-7.95]).

Conclusions. Bronchodilator responsiveness can be demonstrated by infant PFT in infants with recurrent wheezing and can predict increased respiratory morbidity until 3 years of age.

Short-Term Variation of Lung Function and Airway Inflammation in Children and Adolescents with Bronchiolitis Obliterans

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Purpose. Bronchiolitis obliterans (BO) is an inadequately researched disease in terms of lung function as well as inflammatory profile. The short-term variation of these parameters has not been investigated. Therefore, the objective of this study was the investigation of lung function, sputum cells and cytokine profiles in BO at two visits within of four to six weeks.

Methods. Twenty patients with BO (median age = 14.6, range 8.3-24.3) performed lung function tests, airway reversibility testing and induction of sputum within four to six weeks. The cell composition in the sputum was analysed and cytokine levels of IL-1ß, IL-6 and IL-8 were determined by cytometric bead array analysis. The short-term variation was then statistically quantified and compared to that of twenty-two healthy controls. Furthermore, we compared data on short-term variation of lung

function and airway inflammation with a previous investigation in these patients 10-15 months earlier. **Results.** Patients with BO showed minimal variation of lung function (VCmax, FVC, FEV1, FEV1/VC, MEF25 and RV/TLC) and the inflammatory cell profile. The lung function data were significantly lower for FVC, FEV1, the Tiffeneau index and MEF25 compared to the control group, whereas RV/TLC was significantly increased. Analysis of the BO sputum cells showed a consistent neutrophil inflammation. The levels of inflammatory cytokines IL-1ß, IL-6 and IL-8 had a great variability.

Conclusions. The short-term variability of sputum neutrophilia and lung function is low in BO patients. This finding should be considered to identify successful treatment in the individual patient and could be used as endpoints for future BO-related studies.

Progression from Asthma to Chronic Obstructive Pulmonary Disease. Is Air Pollution a Risk Factor?

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Rationale. Individuals with asthma-chronic obstructive pulmonary disease (COPD) overlap syndrome (ACOS), have more rapid decline in lung function, more frequent exacerbations, and poorer quality of life than those with asthma or COPD alone. Air pollution exposure is a known risk factor for asthma and COPD; however, its role in ACOS is not as well understood.

Objectives. To determine if individuals with asthma exposed to higher levels of air pollution have an increased risk of ACOS.

Methods. Individuals who resided in Ontario, Canada, aged 18 years or older in 1996 with incident asthma between 1996 and 2009 who participated in the Canadian Community Health Survey were identified and followed until 2014 to determine the development of ACOS. Data on exposures to fine particulate matter ($PM_{2,5}$) and ozone (O_2) were obtained from fixed monitoring sites. Associations between air pollutants and ACOS were evaluated using Cox regression models.

Measurements and Main Results. Of the 6,040 adults with incident asthma who completed the Canadian Community Health Survey, 630 were identified as ACOS cases. Compared with those without ACOS, the ACOS population had later onset of asthma, higher proportion of mortality, and more frequent emergency department visits before COPD diagnosis. The adjusted hazard ratios of ACOS and cumulative exposures to $PM_{2.5}$ (per 10 µg/m³) and O₃ (per 10 ppb) were 2.78 (95% confidence interval, 1.62–4.78) and 1.31 (95% confidence interval, 0.71–2.39), respectively. **Conclusions.** Individuals exposed to higher levels of air pollution had nearly threefold greater odds of developing ACOS. Minimizing exposure to high levels of air pollution may decrease the risk of ACOS.

Gender and Asthma-Chronic Obstructive Pulmonary Disease Overlap Syndrome

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Objective. To assess relationships between obstructive lung diseases, respiratory symptoms, and comorbidities by gender.

Methods. Data from 12594 adult respondents to the 2012 South Carolina Behavioral Risk Factor Surveillance System telephone survey were used. Five categories of chronic obstructive airway disease (OAD) were defined: former asthma only, current asthma only, chronic obstructive pulmonary disease (COPD) only, asthma-COPD overlap syndrome (ACOS), and none. Associations of these categories with respiratory symptoms (frequent productive cough, shortness of breath, and impaired physical activities due to breathing problems), overall health, and comorbidities were assessed using multivariable logistic regression for men and women.

Results. Overall, 16.2% of men and 18.7% of women reported a physician diagnosis of COPD and/or

asthma. Former asthma only was higher among men than women (4.9% *versus* 3.2%, t-test p = 0.008). Current asthma only was more prevalent among women than men (7.2% *versus* 4.7%, p < 0.001), as was ACOS (4.0% *versus* 2.2%, p < 0.001). Having COPD only did not differ between women (4.3%) and men (4.4%). Adults with ACOS were most likely to report the 3 respiratory symptoms. COPD only and ACOS were associated with higher likelihoods of poor health and most comorbidities for men and women. Current asthma only was also associated with these outcomes among women, but not among men.

Conclusions. In this large population-based sample, women were more likely than men to report ACOS and current asthma, but not COPD alone. Gender differences were evident between the OAD groups in sociodemographic characteristics, respiratory symptoms, and comorbidities, as well as overall health.

Asthma in Asia: Physician Perspectives on Control, Inhaler use and Patient Communications

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Objective. We examined the physician perspectives on asthma management in Asia.

Methods. An online/face-to-face, questionnaire-based survey of respiratory specialists and primary care physicians from eight Asian countries/region was carried out. The survey explored asthma control, inhaler selection, technique and use; physician-patient communications and asthma education. Inclusion criteria were >50% of practice time spent on direct patient care; and treated >30 patients with asthma per month, of which >60% were aged >12 years.

Results. REALISE Asia (Phase 2) involved 375 physicians with average 15.9 (±6.8) years of clinical experience. 89.1% of physicians reporting use of guidelines estimated that 53.2% of their patients have well-controlled (GINA-defined) asthma. Top consideration for inhaler choice was asthma severity (82.4%) and lowest, socio-economic status (32.5%). Then 54.7% of physicians checked their patients' inhaler techniques during consultations but 28.2 (±19.1)% of

patients were using their inhalers incorrectly; 21.1-57.9% of physicians could spot improper inhaler techniques in video demonstrations. And 79.6% of physicians believed combination inhalers could increase adherence because of convenience (53.7%), efficacy (52.7%) and usability (18.9%). Initial and follow-up consultations took 16.8(±8.4) and 9.2(±5.3) minutes, respectively. Most (85.1%) physicians used verbal conversations and least (24.5%) video demonstrations of inhaler use; 56.8% agreed that patient attitudes influenced their treatment approach. Conclusion. Physicians and patients have different views of 'well-controlled' asthma. Although physicians informed patients about asthma and inhaler usage, they overestimated actual usage and patients' knowledge was sub-optimal. Physicianpatient interactions can be augmented with understanding of patient attitudes, visual aids and ancillary support to perform physical demonstrations to improve treatment outcomes.

