

2018 KAAACI-EAAS-SERIN ASIA Joint Congress in conjunction with APAAACI



Oral presentation 2



- **Date:** May 11, Friday 2018
- **Chairs:** Ruby Pawankar (Japan), Young-II Koh (Chonnam Nat'l Univ.)

The effects of particulate matter on atopic dermatitis symptoms are influenced by weather type: Application of spatial synoptic classification (SSC)

Young-Min Kim, Jihyun Kim^{1,2}, Kwon Jung³, Soomi Eo³, Kangmo Ahn*

¹Environmental Health Center for Atopic Diseases, Samsung Medical Center, Seoul Korea; ²Department of Pediatrics, Samsung Medical Center, Sungkyunkwan University School of Medicine, Seoul, Korea; ³Seoul Research Institute of Public Health and Environment, Gwacheon, Korea

Introduction: The effects of weather and air pollution on atopic dermatitis (AD) flares have not been well investigated. Therefore, this study aimed to investigate how the effects of particulate matter (PM) on AD symptoms are influenced by weather type.

Methods: A total of 125 young children (76 boys and 49 girls) under six years of age with AD living in Seoul, Korea, were enrolled as a panel and followed for 17 months between August 2013 and December 2014. AD symptoms were recorded on a daily basis, including itching, sleep disturbance, erythema, dry skin, oozing, and edema. Daily weather was classified into seven categories according to spatial synoptic classification (SSC). Personal exposure to PM with an aerodynamic diameter less than 2.5 (PM_{2.5}) in each individual was estimated with time-weighted average concentrations considering outdoor and indoor levels of PM_{2.5} and time-activity of each individual. Generalized linear mixed models were used to analyze the effects of PM_{2.5} on AD symptoms, controlling for ambient temperature, humidity, age, sex, SCORAD at enrollment, fever, day of week, and topical corticosteroid use.

Results: A total of 20,415 person-days of symptom records were collected. The presence of AD symptoms was higher on dry polar (DP) days (45.4%, $P < .0001$) than on moist tropical (MT) days (37.7%, $P < .0001$). Overall, the risk of AD symptoms significantly increased with increased exposure by 10 $\mu\text{g}/\text{m}^3$ to PM_{2.5} [adjusted odds ratio (aOR) = 1.061; 95% confidence interval (CI), 1.014-1.109]. Among the seven weather types, the risks of AD symptoms caused by PM_{2.5} were significantly increased on dry moderate (DM) days (aOR = 1.127; 95% CI, 1.053-1.207). In addition, there was a significant delayed effect of PM_{2.5} and PM₁₀ on AD symptoms. Exposure to PM_{2.5} increases the risk of AD symptoms with a delayed effect, especially on DM days.

Conclusion: Weather type, air pollution, and their modifying effects should be considered for proper management of AD.

Key Words: PM_{2.5}, atopic dermatitis, weather

Is Asthma a Protective Factor against Dengue Fever? an *in vitro* experiment and nationwide population-based cohort analysis

Hong-Ren Yu¹, Yen-Hsia Wen², Jui-Hsiu Tsai³, Shih-Sheng Wu², Jiu-Yao Wang⁴, Chun-Hung Richard Lin^{5*}

¹Department of Pediatrics, Chang Gung Memorial Hospital - Kaohsiung Medical Centre, Kaohsiung, Taiwan, ²School of Pharmacy, College of Pharmacy, Kaohsiung Medical University, Kaohsiung, Taiwan, ³Calo Psychiatric Center, Pingtung, Taiwan, ⁴Center for Allergy and Clinical Immunology Research (ACIR) and College of Medicine, National Cheng Kung University, ⁵Department of Computer Science and Engineering, National Sun Yat-sen University, Kaohsiung, Taiwan

Purpose: Dengue fever (DF) is the most rapidly spreading mosquito-borne viral disease worldwide. Dendritic cell (DC)-specific intercellular adhesion molecule 3-grabbing non-integrin (DC-SIGN) of macrophages and DCs can bind to the dengue virus (DV) and promote infection. After entering the host through DV-infected mosquito bites, the virus infects skin dendritic cells (DCs) via DC-SIGN. Infected DCs may then migrate to the lymph nodes to infect more cells, leading to viremia. Asthma is a common allergic airway disease, with house dust mites (HDMs) being one of the most important allergens in this context. Recent studies have shown that the HDM component can decrease DC-SIGN expression of DCs. Moreover, monocyte-derived DCs from asthma patients have significantly lower levels of DC-SIGN than those from healthy controls. Since DC-SIGN is important for DV entry, the spread of DV is probably decreased in asthma patients due to the lower expression of DC-SIGN.

Methods: In this study, we designed an *in vitro* experiment and performed a nationwide population-based cohort analysis to assess whether allergic asthma can be a protective factor against DF.

Results: Through the *in vitro* experiment, we found that HDM extracts can diminish surface expression of DC-SIGN in DCs and further decrease the cellular entry of DV. Compared to patients without asthma, the hazard ratio (HR) for DF in patients with asthma was 0.166 (95% CI: 0.118-0.233) after adjustment for age, sex, geographic region of residence in Taiwan, monthly income, and severity of the physical condition. In the age stratification, the adjusted HR for DF in young adult (18-35 years old) patients with asthma was 0.063 (95% CI: 0.023-0.168).

Conclusions: The present study suggests that patients with asthma, particularly young adults, are at a decreased risk of DF. Blocking DC-SIGN through modulation of the HDM component may be a promising strategy for DV control.

Prenatal particulate matter exposure at second trimester affects new asthma onset via airway hyperresponsiveness in schoolchildren

Song-I Yang, So-Yeon Lee¹, Hyo-Bin Kim², Ju-Hee Seo³, Hyun-Ju Cho⁴, Young-Ho Jung⁵, Eun Lee⁶, Young-Ho Kim¹, Jisun Yoon¹, Sungsu Jung¹, Ho-Jang Kwon⁷, Soo-Jong Hong*

¹Department of Pediatrics, Childhood Asthma Atopy Center, Environmental Health Center, Asan Medical Center, University of Ulsan College of Medicine, Seoul, Korea, ²Department of Pediatrics, Inje University Sanggye Paik Hospital, Inje University College of Medicine, Seoul, Korea, ³Department of Pediatrics, Dangoon University Hospital, Cheonan, Korea, ⁴Department of Pediatrics, International St. Mary's hospital, Catholic Kwandong University, Incheon, Republic of Korea, ⁵Department of Pediatrics, Bundang CHA Hospital, College of Medicine, CHA University, Seongnam, Korea, ⁶Department of Pediatrics, Chonnam National University Hospital, Gwangju, Korea, ⁷Department of Preventive Medicine, Dankook University College of Medicine, Cheonan, Korea

Background: Prenatal periods are considered to be critical times for the effects of PM on the development of respiratory systems and later respiratory outcomes. Studies that have evaluated the critical period during pregnancy in which PM exposure produces airway hyperresponsiveness (AHR) and asthma development in school-age children are scarce.

Objectives: To investigate whether PM10 exposure affects AHR and the new diagnosis of asthma in school-age children according to the exposure period during pregnancy.

Methods: From 2005 to 2006, elementary schoolchildren (n=3570) enrolled in a nationwide prospective 4-year follow-up survey in Korea. Individual annual PM10 exposure was estimated by using an ordinary kriging method from the prenatal period to 7 years of age. The prenatal period was divided into three trimesters; from week 1 through 13 (first), week 14 through 27(second) and from week 28 through week 40 (third). Information on asthma was collected by questionnaire. AHR at age 7 years was defined as methacholine PC20 \leq 8 mg/ml.

Results: A higher PM10 exposure at the first trimester was significantly associated with AHR at the first survey (aOR 1.335, 95% CI 1.048-1.701). The first and second trimester were associated with a new diagnosis of asthma (aOR 1.859, 95% CI 1.161-2.978 and aOR 1.690, 95% CI 1.047-2.730, respectively). A higher PM10 exposure at the second trimester interacted with an AHR at 7 years of age for a new diagnosis of asthma (aOR 4.136, 95% CI 1.657-10.326, p for interaction 0.001), but not at the first (p for interaction 0.390) and third trimester (p for interaction 0.210).

Conclusions: Prenatal PM10 exposure in the second trimester is associated with an increased risk of new diagnosis of asthma in school-age children with AHR at 7 years of age. Prenatal PM10 exposure in the second trimester may critically affect the development of new asthma. The incidence of asthma in children could be reduced by limiting prenatal exposure to PM10.

Key Words: Particulate matter, prenatal, asthma

Clinical aspect of gastroesophageal reflux disease in patients with subacute/chronic cough

Ryota Kurokawa, Norihisa Takeda, Hiroya Ichikawa, Masaya Takemura, Hisatoshi Hijikata, Kensuke Fukumitsu, Takamitsu Asano, Satoshi Fukuda, Hirotsugu Ohkubo, Ken Maeno, Yutaka Ito, Tetsuya Oguri, Atsushi Nakamura, and Akio Niimi, Yoshihiro Kanemitsu*

Department of Respiratory Medicine, Allergy and Clinical Immunology, Nagoya City University School of Medical Sciences, Aichi, Japan

Rationale: The prevalence of GERD on subacute/chronic cough has been increasing in worldwide. However, its clinical impact still remains little known. We investigated to determine the prevalence and impact of GERD in patients with subacute/chronic cough.

Methods: From April 2012 and to May 2016, 210 patients with cough persisting for \geq 3 weeks [141 females; mean cough duration 28.9 (SD53.2) months] underwent diagnostic tests. GERD symptoms and cough-specific quality of life were evaluated by using the Frequency Scale for the Symptoms of Gastroesophageal reflux (FSSG) questionnaire and the Japanese version of Leicester Cough Questionnaire (J-LCQ). GERD patients were stratified either predominant acid-reflex or dysmotility symptoms according to the FSSG domains.

Results: The average scores of J-LCQ was 12.1 (SD3.6) and 189 patients checked at least one or more symptoms of GERD. One hundred and fifty-seven (74.8%) were considered as treatment responders by self-reported cough symptom from patients after the therapeutic intervention. Among 210 patients, 128 were isolated cause (67 with cough-variant asthma, 29 with GERD, and 18 with sinobronchial syndrome), 80 were multiple causes (76 with having GERD), and 2 were unexplained cough on the basis of therapeutic trials. Patients with GERD showed longer cough duration, required more time until cough alleviation, and scored lower J-LCQ than those without GERD irrespective of comorbid diseases (p = 0.019, 0.008, and 0.004, respectively). When GERD patients were stratified according to symptoms, patients with predominant acid-reflux showed poor response to specific treatments. Meanwhile, patients with predominant dysmotility symptoms significantly responded to prokinetic agents with or without proton pump inhibitors.

Conclusions: GERD-related cough is one of frequent causes of subacute/chronic cough, which is often comorbid with other causes. The evaluation of GERD symptoms may be helpful for predicting response to treatments against GERD in such patients.

The increase in ambient CO₂ concentration elevate concentration of oak pollen allergen

Young-Jin Choi, Kyu Rang Kim², Baek-Jo Kim², Su-Young Woo³, Yun Am Seo², Wi Young Lee⁴, Jae-Won Oh*

²Department of Pediatrics, Hanyang University College, Applied Meteorology Research Division, National Institute of Meteorological Sciences, ³Department of Environmental Horticulture, University of Seoul, ⁴Dept. of Forest Genetic Resources, National Institute of Forest Sciences, Suwon, Korea

Background: Oak pollen is a major respiratory allergen in Korea, and the distribution of oak trees is expected to increase by ecological succession and climate change. One of the drivers of climate change is increasing CO₂, which is also known to amplify the exposure risk of weed pollen. However, the impact of CO₂ concentration on tree pollen is not clearly understood due to the experimental difficulties in carrying out extended CO₂ treatment.

Method: To study the response of pollen production of sawtooth oak trees (*Quercus acutissima*) to elevated levels of ambient CO₂, three open-top chambers at the National Institute of Forest Science in Suwon, Korea, were utilized with daytime (8 am -6 pm) CO₂ concentrations of ambient (×1.0, ~400 ppm), ×1.4 (~550 ppm), and ×1.8 (~700 ppm) treatments. Each chamber had three sawtooth oak trees planted in September 2009. One or two trees per chamber matured to bloom in 2016. Five to six catkins were selected per tree and polyethylene bags were attached to collect pollen grains. The total number of catkins per tree was counted and the number and weight of pollen grains per catkin were measured. Oak allergen—Que a 1 (Allergon Co., Uppsala, Sweden)—was extracted and purified to make an ELISA kit by which the antigen levels in the pollen samples were quantified.

Results: Total pollen counts (weight) per tree of ×1.4 and ×1.8 treatments showed significant increase of 4.5 (7.6) and 14.0 (19.5) times, respectively, as much as those of ×1.0 treatment. Concentration of Que a 1 showed significant increase to 1.26 (median 287.9 μg/mL p<0.05) and 1.54 (median 353.8 μg/mL p<0.05) times more, respectively from ×1.0 treatment (median 229.1 μg/mL).

Conclusion: Oak trees under elevated CO₂ concentration of 40% or higher would produce at least 4.5 times more pollen grains with 9% higher allergen level.

Key Words: Aeroallergen, Oak pollen, CO₂

Effects of Vitamin D Supplementation on Symptom Control and Lung Function in 57 Patients of Uncontrolled Bronchial Asthma with Low Serum Vitamin D Level

Nikhil Sarangdhar, Agam Vora, K C Mohanty

Consultant Chest & Allergy specialist, Mumbai and Joint Secretary, Academy of Respiratory medicine, Mumbai, India

Introduction and Scope of the study: Vitamin D is known to play an role in boosting innate and adaptive immunity, apart from modulating the inflammatory response. The association of Vitamin D deficiency with allergic respiratory diseases like asthma and allergic rhinitis is well documented, though its exact role still remains to be determined.

Aims and Objectives: 1. To assess baseline characteristics of patients of Uncontrolled Bronchial Asthma with low serum Vitamin D levels (< 30 ng/mL) w.r.t. Symptom control and Lung function. 2. To document improvement in Asthma control and Lung Function after intermittent Vitamin D supplementation in patients of Vitamin D deficiency (25(OH) Vitamin D <20 ng/mL) versus insufficiency (< 20-30 ng/mL).

Methodology: Fifty-seven (thirty-four female, twenty-three male) non-smoker patients of difficult to control bronchial asthma between 18-55 years of age with low Serum 25(OH) Vitamin D levels (<30 ng/mL) who were uncontrolled even after courses of oral glucocorticosteroids and other maximally optimised medical treatment for asthma alongwith treatment of other co-morbidities like gastro-oesophageal reflux and allergic rhinitis were subjected to evaluation by spirometry and peak flow measurement alongwith asthma control test (ACT) scoring. Study population was dichotomized into 2 groups according to the baseline serum 25(OH) Vitamin D level, namely Vitamin D Deficiency and Vitamin D Insufficiency, with Fishers exact test (two-tailed) used to analyze any significant differences between these two groups. Twenty patients had Vitamin D Insufficiency and thirty-seven had Vitamin D Deficiency. The average serum Vitamin D level was 17.3 ng/mL. The ACT score was significantly [$p=0.031$ (<0.05)] better in patients with Vitamin D insufficiency. Following supplementation with Vitamin D (Oral Cholecalciferol 60000 units once every 15 days) for 3 months, these patients were re-evaluated by serum 25(OH) Vitamin D levels, spirometry, peak flow rate and ACT score.

Results: After 3 months of Vitamin D supplementation, all fifty-seven (100%) patients with low serum Vitamin D levels showed improvement in terms of serum 25(OH) Vitamin D levels, the average rise being in which was 22.6 ng/mL, apart from improvement in asthma symptoms and control, with improvement in Lung function being significantly more [$p<0.05$] in patients with Vitamin D deficiency (100%) as compared to those with Vitamin D insufficiency w.r.t. the parameters of FEV₁ (70%) [$p=0.001$], PEF (75%) [$p=0.0037$] & PEF variability (75%) [$p=0.0037$].

Conclusion: This study reveals a strong correlation between Vitamin D deficiency and difficult to control asthma, with subsequent improvement in symptoms, asthma control and lung function after Vitamin D supplementation.

Nerve sensory receptor role in capsaicin induced cough model

Byeong-Gon Kim, Pureun-Haneul Lee, Sun-Hye Lee, Jisu Hong, An-Soo Jang*

Division of Allergy and Respiratory Medicine, Department of Internal Medicine, Soonchunhyang University Bucheon Hospital

Background: Capsaicin is an 8-methyl-N-vanillyl-6-nonenamide that is a respiratory irritant that can be generated during cooking and commonly every day. Capsaicin induced cough increased the reactivity of sensory C-fibres in mucosa. Capsaicin is a common and important neuro receptor signaling. Change or dysfunction of nervous system is induced affect change of airway system.

Objective: The aim of study was to identify the capsaicin irritation on pulmonary mechanism such as transient receptor potential channel and purinergic receptor in a mice model.

Methods: Mice were treated with saline (Sham), capsaicin administration intraperitoneal group, or capsaicin inhalation group. Bronchoalveolar lavage (BAL), histology were performed. Enhanced pause (Penh) was measured as an indicator of airway resistance on day 6 and samples were collected on day 7. The effect of capsaicin on TRPV1, -4, P2X4 and -7 was estimated using immunoblotting, and immunohistochemical stain. The level of Neuropeptides, calcium and IL-5 was measured by ELISA.

Results: Mice exposed to capsaicin irritation exhibited increased airway inflammatory cell infiltration and bronchial hyper-responsiveness compared to control mice groups. Airway inflammation and hyperresponsiveness are more increased in capsaicin inhalation group than in capsaicin intraperitoneal group. TRPV1, TRPV4, P2X4 and P2X7 protein increased in capsaicin inhalation mice lung tissue. Also Substance P, ATP, CGRP, and calcium increased. Th2 cytokine IL-5 level more increased in capsaicin inhalation group than in capsaicin intraperitoneal group.

Conclusion: Our data demonstrate that capsaicin administration of inhalation methods can induce airway inflammation, or indicate neurogenic receptor induced airway pathogenesis through neurogenic mechanism.

Key Words: Capsaicin, transient receptor potential channel, purinergic receptor, neuropeptide, neuro inflammati

Repeated Measurement of Fractional Exhaled Nitric Oxide Is Not Essential for Asthma Screening

HJ Park^{1*}, SY Yang¹, YH Kim², MK Byun¹, HJ Kim¹, CM Ahn¹, SH Kim¹, HS Lee³

¹Department of Internal Medicine, Gangnam Severance Hospital, Seoul, Korea, ²Department of Pediatrics, Gangnam Severance Hospital, Seoul, Korea, ³Biostatistics Collaboration Unit, Seoul, Korea Yonsei University College of Medicine, Seoul, Korea

Background: Older guidelines recommend that fractional exhaled nitric oxide (FeNO) should be checked more than twice during the same session to confirm an asthma diagnosis. Recent studies show the excellent reproducibility of FeNO measurements.

Objective: We aimed to determine whether repeated FeNO measurements during the same session are necessary for asthma screening.

Methods: We retrospectively reviewed the electronic medical records of adult outpatients who visited the respiratory medicine department for diagnosis of asthma and assessed FeNO measurements obtained from June 2016 to July 2017.

Results: Of the 132 patients enrolled, 79 (59.8%) were diagnosed with asthma. Repeated FeNO measurements taken during the same session showed high reproducibility (intraclass correlation coefficient >0.9; P<.001) and a strong correlation (Pearson coefficient >0.9; P<.001), although reproducibility and correlation were slightly weaker in patients with low FeNO values. The value of repeated measurement was not significant; however, the second FeNO measurement was significantly higher than the first measurement in patients with the worst and best lung function. The predictive power of the first measurement of FeNO (sensitivity, 80.5%; specificity, 85.1%) was not inferior to the second (sensitivity, 76.6%; specificity 85.1%). The same was true of the geometric mean of the two.

Conclusion: Repeated FeNO measurement during the same session is not essential for asthma screening in cases where the first acceptable FeNO measurement is performed using the proper method.

Key Words: Asthma, Fractional exhaled nitric oxide, Repeated measurements

Different factors associated with acute exacerbation between elderly and non-elderly asthmatics

Jihyun Oh¹, Kyoung-Hee Sohn⁵, Seung-Woo Shin⁴, Tae-Bum Kim², Sang-Heon Cho¹, Choon-Sik Park^{3,4}, Heung-Woo Park^{1*}

¹Division of Allergy and Clinical Immunology, Department of Internal Medicine, Seoul National University College of Medicine, Seoul, Korea, ²Division of Allergy and Clinical Immunology, Department of Internal Medicine, Asthma Center in Asan Medical Center, University of Ulsan College of Medicine, Seoul, Korea, ³Division of Allergy and Respiratory Disease, Department of Internal Medicine, Soonchunhyang University Bucheon Hospital, Bucheon, Korea, ⁴Genome Research Center for Allergy and Respiratory Diseases, Soonchunhyang University Bucheon Hospital, Bucheon, Korea, ⁵Division of Allergy and Respiratory Disease, Department of internal medicine, Kyung Hee University Medical Center, Seoul, Korea

Background: Elderly asthma (EA ≥ 65 years of age) is thought to be different from non-elderly asthma (NEA < 40 years of age). The purpose of this study was to identify EA- or NEA-specific clinical factors associated with acute exacerbation (AE) of asthma.

Material and methods: A total of 503 subject with EA and 564 subjects with NAE were enrolled and their AE during 1 year before enrollment was assessed. AE was defined when one of the following criteria was satisfied: use of systemic corticosteroids or an increase from a stable maintenance dose for at least three days, asthma-specific unscheduled visits and emergency department visits or hospitalization. We performed logistic regression and Bayesian network analysis to find baseline clinical factors significantly associated with AE of asthma in two groups.

Result: A total of 156 subjects with EA experienced AE (31%) whereas 187 subjects with NEA (33.2%). Multivariate logistic regression analysis showed fixed airway obstruction (defined by predicted value of post-bronchodilator FEV1 ≤ 80 after 3-month of treatment) and male gender were significantly associated with AE in subjects with EA ($P = 0.002$ and $P = 0.015$ respectively). Meanwhile, in subjects with NEA, age, FEV1 and FVC predicted values, FEV1/FVC ratio and blood eosinophil count were significant ($P=0.002$, $P < 10E^{-16}$, $P < 10E^{-16}$, $P < 10E^{-16}$ and $P = 3.67E^{-7}$ respectively). Bayesian network analysis revealed that FEV1/FVC ratio and age in subjects with EA and FEV1 predicted value and blood eosinophil count in subjects with NEA were directly connected to AE.

Conclusion: Clinical factors significantly associated with AE were different between subjects with EA and with NEA. This finding suggests a necessity of EA-specific management in clinical practice.

Funding: This research was supported by a fund (HD16A1150) by Research of Korea Centers for Disease Control and Prevention.

Key Words: Aged, Asthma, Acute exacerbation

Validation of The Filipino Version of The Written Asthma Action Plan for Patients 5-18 Years Old

Katrina Faith A. San Gabriel, Roxanne Casis Hao, Mary Anne R. Castor, Marysia Stella T. Recto, Madeleine W. Sumpaico

Section of Allergy and Immunology, Department of Pediatrics, U.P. - Philippine General Hospital

Background: Asthma is a complex disorder characterized by variable and recurring symptoms, airflow obstruction, bronchial hyperresponsiveness, and an underlying inflammation. Asthma is one of the most common chronic diseases in the world and its burden of disease is exceedingly high. According to current guidelines, the asthma action plan is a cornerstone in the management and control of asthma exacerbations. Written action plans are now recommended for all children with asthma as part of initial home management of acute wheezing episodes and exacerbations. Translating the written asthma action plan to Filipino and testing it for cultural content validity and reliability will make it useful on a wider scale in our country, help reduce morbidity and improve asthma control in the Filipino pediatric population.

Objectives: To perform content and cultural validation and reliability testing of the Filipino Written Asthma Action Plan (FWAAP).

Methods: The Written Asthma Action Plan was translated to Filipino following conventional translational steps: 1) forward translation, 2) back translation, 3) final translated version. A total of 31 participants were included in a cross-sectional study done at a tertiary care hospital. Content validity and reliability were evaluated.

Results: The study population found the Filipino asthma action plan relevant to their disease, understandable, concise and useful in the management of their asthma. The Filipino RCAT was easy to understand, relevant, and concise. The Cronbach's alpha coefficient was 0.9235 showing that the tool was highly consistent. Seigel and Castellan's Kappa (Inter-rater or Inter-observer consistency) showed inter-rater agreement of 0.9615 (kappa of 0.7787) and 0.923 (kappa of 0.8846) respectively showing adequate inter-rater agreement.

Conclusion: The Filipino asthma action plan is a reliable and valid tool for managing asthma in the home setting.

Exercise induced bronchoconstriction during follow-up and management of asthma in children treated with inhaled corticosteroids

Jun-Hong Park, Kenji Izuhara, Heysung Baek*

Department of pediatrics, Hallym University Kangdong Sacred Heart Hospital, Saga Medical School, Saga, Japan

Background: Serum periostin values, eosinophil counts, and fractional exhaled nitric oxide (FeNO) levels all reflect a TH2-driven inflammatory response. The aim of this prospective study was to explore the relationship between these biomarkers and exercise-induced bronchoconstriction (EIB) during follow-up and management of asthma in children treated with inhaled corticosteroids (ICS).

Methods: Thirty asthmatic children aged 6 to 18 years previously treated (or not) with ICS were included. Following the guidelines of the Global Initiative for Asthma (GINA), all patients underwent standard ICS treatment for 12 months, based on disease severity. Serum periostin levels, eosinophil counts and FeNO levels were measured at baseline and post-intervention, and spirometry and the Asthma Control Test (ACT) were performed. A standardized treadmill exercise challenge was performed at baseline and post-intervention.

Results: Significant improvements in the maximum decrease in FEV1 after exercise compared with baseline values were observed during follow-up ($P=0.001$). The maximum decreases in FEV1 after exercise were accompanied by significant reductions in ACT data (decrease of 0.427% for each doubling of ACT change from baseline, $P = 0.003$) and FeNO levels (a 0.322% decrease; $P = 0.032$). Serum periostin levels increased in 27 of 30 asthmatic subjects at 1-year follow-up. Changes in serum periostin levels eosinophil counts did not significantly correlate with changes in the maximum decrease in FEV1 after exercise during follow-up.

Conclusions: Instead of serial measurements of periostin levels and eosinophil counts, FeNO and ACT could reflect good EIB management in asthmatic children.

Key Words: Exercise-induced bronchoconstriction, asthma, children