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Background: Eosinophilic airway inflammation contributes to persistent airflow limitation in adults with severe asthma. We aimed to evaluate the association between eosinophilic inflammation in induced sputum and pulmonary function, and persistent airflow limitation in children.  

Methods: A total of 92 asthmatic children and 72 control children were enrolled in this study. Eosinophil count (%) and eosinophil cationic protein (ECP) levels were measured in induced sputum. We performed spirometry and methacholine challenge test while measuring total eosinophil count, total serum IgE, and serum ECP in all subjects. Subjects with persistent airflow limitation were defined as the patients with postBD FEV1/FVC below the lower limit of controls, which is subtraction of 2 standard deviation from the mean ratio.  

Results: Asthmatic children had significantly higher levels of sputum eosinophils (18.1 ± 21.5 vs 0.5 ± 1.3%, P < 0.001) and sputum ECP (2.3 ± 0.7 vs 1.6 ± 0.6 log ug/L, P < 0.001) compared to controls. No differences in sputum eosinophils and ECP among 4 asthmatic groups divided by the degree of persistent airflow limitation. Sputum ECP level had statistically significant inverse correlation with postbronchodilator (postBD) FEV1 (r = –0.307, P = 0.001) and postBD FEV1/FVC (r = –0.286, P = 0.002), whereas sputum eosinophils didn’t show any correlation with postBD FEV1 and postBD FEV1/FVC.  

Conclusions: Our findings suggest that sputum eosinophilic inflammation, especially ECP, is associated with pulmonary function and persistent airflow limitation, which is manifested by low postBD FEV1 and postBD FEV1/FVC.

PEDIATRIC ASTHMA

523 Not All Who Wheeze Have Asthma—Tracheal Diverticulum with Stenosis of Trachea in 9 Years Old Boy  
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Background: A tracheal diverticulum (TD) is very rare congenital malformation. The prevalence is about 0.3% in children over 10 years of age according to fiberoptic bronchoscopy studies and it is rarely reported in clinical practice (3). Here we describe our recent experience in successfully diagnosing and treating a 9-years old boy suffering from membranous stenosis of trachea with trachea diverticulum.  

Methods: A 9-year old boy (personal history negative as to trauma of respiratory tract and intubation and atopy) was admitted to hospital with wheezing and progressive dyspnoea during the 6 months to restrict basic locomotion and reading of text. Multislice computed tomography of the chest showed surprising incidental finding of a tracheal diverticulum (6 mm x 2 mm) and 3-dimensional reconstruction CT stenosis of trachea approximately 1.5 cm below vocal corde and orificeum of tracheal diverticulum (the 2nd cartilage of trachea). Pulmonary function tests revealed reduction of spirometric values, with no post-bronchodilator change. Subsequent flexible bronchoscopy showed circular stenosis of trachea and orificium of TD. Subsequently, the vaporization by Nd:YAG laser - Sharplan 3000, with energy of 30 W was performed via flexible bronchoscopy under general anesthesia with a laryngeal mask. The dilatation by balloon (Boston Scientific) was performed to widen the diameter of trachea up to 8 mm.  

Results: After 1 week, pulmonary function test revealed normal parameters without pathological symptoms.  

Conclusions: In conclusion, we have summarized the case of an 9-year old boy with membranous stenosis of trachea and trachea diverticulum, a very rare congenital anomaly. This abnormality can be clearly diagnosed by multislice CT and 3-dimensional reconstruction CT stenosis of trachea. Using the interventional bronchoscopy of membranous circular stenosis of trachea is adequate solution in children too.

524 Recurrent Wheezing in Childhood—Is It Always Asthma?  
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Background: Clinical presentation of the bronchial obstruction in children is most often highly suggestive of bronchiolitis, recurrent wheezing or asthma.  

Methods: We present the cases of 2 patients diagnosed with recurrent bronchiolitis and asthma, non-responsive to treatment.  

Results: The first patient, a 9-year-old boy presented wheezing, non-productive cough, dyspnea, aquous rhinorrhea, sneezing and nasal itching interpreted as allergic asthma associated to allergic rhinitis as he was sensitized to house-dust mites and dog. A treatment with inhaled corticosteroids and antihistamine was prescribed with little improvement of asthma symptoms. Six months later the patient presented for vomiting and productive cough. Thoracic ultrasound suggested achalasia, diagnosis confirmed through esophageal manometry and barium swallow. Surgical treatment led to resolution of asthma-like symptoms with persistence of a mild intermittent rhinitis. In the second case, a female patient presented 2 episodes of uncomplicated bronchiolitis during the 6th and the 7th month of life and a 3rd episode of bronchiolitis complicated with pneumonia during the 8th month of life. When admitted for the 3rd episode, she presented an oxygen saturation of 91% in ambient air. Thoracic ultrasounds oriented the diagnosis towards a diaphragmatic hernia, confirmed through barium swallow and barium enema. The surgical treatment of the hernia determined the resolution of respiratory symptoms. Unfavourable clinical course, despite correct treatment in both cases required additional investigations which finally led to the correct diagnosis and treatment.  

Conclusions: For the differential diagnosis of non-responsive bronchial obstruction in children, one must think to digestive diseases. Ultrasound was the elective non-invasive method in diagnosing our cases.

525 Bronchial Hyperresponsiveness in Children with Suggestive Asthma Symptoms  
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Background: To describe the accuracy of bronchial challenge tests (methacholine and manitol) to measure bronchial hyperresponsiveness in a group of pediatric patients with suggestive symptoms of asthma.  

Methods: We selected 27 patients who attended consecutively to our outpatient clinic complaining of 1 or 2 symptoms of asthma. They showed a normal baseline spirometry and a negative bronchodilator test. All of them underwent unspecific bronchial provocation challenges. Methacholine was performed using the tidal volume technique and a PC20 ≤ 8 mg/mL was considered positive. Dry-powder manitol (Osmohale TM) was administered according to the manufacturer’s recommendations and the challenge was considered positive if a PD15 ≤ 635 mg resulted. We performed both tests with an interval of at least 1 week. Asthma drugs were avoided during the 2 weeks previous to every challenge. Skin prick tests (SPT) to the most common aeroallergens were also performed.
Results: Mean age was 9 (ranged 7–15) years, 18 (66.6%) children were male. Symptoms referred were: 14 (51.8%) cough, 10 (37%) seasonal cough or shortness of breath, 5 (18.51%) cough or shortness of breath due to physical exercise and 1 (3.7%) cough or wheezing related to respiratory infections. SPT were positive in 59.2% of the children. Eighteen (66.6%) out of 27 patients had bronchial hyperresponsiveness, and 10 (37.03%) were non atopic. All patients with a positive response to manitol showed also positivity to methacholine. Mean methacholine PC20 among responders was 0.64 ± 4.08 mg/mL. Manitol was performed in 16 children, and resulted positive in 8 cases (50%) with a mean PD15 of 146.8 ± 246.49 mg. In 2 (25%) out of 8 patients with negative manitol resulted a positive methacholine.

Conclusions: Methacholine and manitol challenge tests detected bronchial hyperresponsiveness in more than a half of the studied children with suggestive asthma symptoms. Methacholine was more sensitive than manitol.

526 Relationship between Fractional Exhaled Nitric Oxide (FeNO) and Forced Expiratory Volume in One Second (FEV1) and Forced Vital Capacity (FVC) Children with Asthma

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Background: Measurement of fraction of exhaled nitric oxide (FeNO) is a relatively simple, noninvasive, and reproducible test for detection of endogenous inflammatory signals in childhood. The aim of this study was to evaluate the correlation between FeNO levels and forced vital capacity (FVC) and forced expiratory volume in the first second (FEV1) in a group of steroid-naive childhood asthma.

Methods: The study was conducted in a group of 60 steroid-naive asthmatic children (50 atopic and 20 nonatopic; mean age 7 years) who presented to Kyung Hee University Hospital and 20 healthy children. All patients underwent measurement of FeNO, skin prick tests with common inhaled allergens, and blood eosinophil, and flow-volume spirometry. FeNO levels were measured by chemiluminescence during exhalation into the NO analyzer. Measurements of FeNO in parts per billion (ppb) and spirometry, including FEV1 and FVC, were performed.

Results: Compared to the healthy volunteers, FeNO was elevated in both groups of asthmatics. The mean FeNO level in the asthmatic children was 18.6 ppb. FeNO in the atopic asthma group was higher than in the group of nonatopic asthmatics. There was statistically significant correlation between FeNO levels and FEV1 (r = -0.36, P < 0.016) and FVC (r = -0.40, P < 0.01).

Conclusions: FeNO levels were related with pulmonary functions in childhood asthma. Thus measurement of FeNO is a promising clinical tool for assessing asthma.

527 Evaluation of the September Epidemic of Asthma Exacerbation in Children in Our Practice

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Background: Know that the rate of asthma exacerbations are increased in September after summer vacation with the beginning of school year. Investigators have been studied this problem and it was supposed that the main cause could be the stress associated with school return what can worsen asthma symptoms. Beside this children returning to school after summer vacation are reexposed to respiratory viral infections, sensitizing allergens in the school environment, and can be connected with poor compliance in the medication in the summer period.

Methods: We stared to investigate that what could be the causative factors in children who suffered dyspnea and other signs of asthmatic exacerbation from September 2008, could we present the increasing number of these patients in hospitalization rate, and could we confirm the changing compliance of the regular medication during the summer period? A short questionnaire was constructed and was given the patients who were admitted to hospital (162) with asthma exacerbation symptoms. Then 45 patients were selected for a longer follow up to investigate their compliance in medication. We investigate from the database of our Hospital the asthmatic patient’s admission rate from 2006.

Results: We could present from 2006 the increasing number of patients admitted because of asthma exacerbation in September in every year. We could present the increased number of schoolage patient among all of the admitted patients in the fall season. We compared the genders which were similar. We found that the symptom of asthma was worse in the fall season. We confirmed the higher number of patients suffering from viral infections. But the changing rate among patient who stopped the medication during summer was low as 13%.

Conclusions: We could confirm the September epidemic of asthma exacerbation among our patients as well. Compare the international investigations the main cause of the September epidemic of asthma connecting with the beginning of the school year and the increasing number of viral infections at this period of the year. Fortunately our patient compliance was good but we have to continue our patients’ education from time to time.

528 Elevated Asthma Prevalence in Mexican-American Children in El Paso, Texas

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Background: In the United States, among Hispanics, Mexican American have the lowest rate of asthma1,2 This study was designed to determine the prevalence of asthma among 5 to 17 year-old children, in El Paso Texas, a community area with a 65.8% of Hispanic of origin Mexican families.

Methods: Of March 2006 to May 2010, a cross-sectional screening survey was administered to 1108 children of 751 families selected at random from 50 strata of the El Paso County. We used self-reported history of physician-diagnosed asthma. Data were analyzed to determine the prevalence of lifetime and current asthma. Associations between asthma outcomes and variable trigger were evaluated. Chi-square tests were used for statistical comparison. A P value less than 0.05 was considered to be significant. Multivariate logistic regression (GENMOD) adjusting for repeated measures for the family was used to determine the risk of childhood asthma.

Results: Self-reported physician-diagnosed asthma was reported for 25.8 % of children, and current asthma identified in 20.5% respectively. The prevalence was statistically higher in boys than tin girls (P < 0.05). 243 (90%) Children asthmatics are atopic and 437 (51.8%) children non-asthmatics are atopic. Smoking occurred inside 23.8% of households.26.3% of children had an indoor dog or cat and 21.2% of caregivers reported cockroaches inside the home.

Conclusions: Prevalence of physician-diagnosed asthma in Hispanic of Mexican origin, ever asthma and current asthma, were higher than those reported from the Centers for Disease Control and Prevention, the prevalence of asthma in 2007. Although most children with asthma are atopic (90%) a significant proportion (51.8 %) of atopic children do not have asthma. Children with a parent with asthma were almost twice as likely (OR = 2.40) to have asthma compared those without a parent with asthma. Children with a parent and grandparent with asthma were over 4 times likely to have asthma compared to those without a parent and grandparent with asthma.