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## 102. Asthma: risk factors and comorbidities

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**P974****Evaluation of inhaled allergen-specific IgE in wheezing infants as predictor for persistent symptoms**

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The aim of this study was to assess the IgE immune response in infants who were hospitalized for wheezing and follow-up during school age.

**Subjects and methods:** Thirty-eight children with a mean age of 8,5 months (2–22 months), who had been hospitalized with acute wheezing episodes, were included in the study. Total IgE and specific IgE for food and inhalant allergens were assessed by FEIA, Uni CAP.

The wheezing infants were divided into three clinical groups according to the number of previous wheezing episodes: first wheeze (n = 22), second wheeze (n = 9) and children with recurrent – three or more episodes of wheezing (n = 7). After five years the children were evaluated for asthma and allergy including t IgE and skin-prick test for inhalant allergens.

**Results:** Neither total IgE nor allergen-specific IgE turned out to be of discriminative value for the three groups outlined on the basis of clinical criteria on the first visit, because of considerable overlap. Elevated levels of t IgE were associated with skin-test reactivity at school age. Inhalant allergen-specific IgE was found in only 6 cases, but was a good predictive value for persistent wheezing.

**Conclusion:** These results indicate that early detection of allergen-specific IgE to inhalant allergens in wheezing infants are predictors for persistent of wheezing and determines the necessity of their examination.

**P975****Analysis of the environmental risk factors in patients with bronchial asthma, allergic to molds in second year observation**

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Mold is a common yet significant allergen. Approximately 5% of people with allergies are subjected to allergic reactions of the respiratory tract which may be caused by mold. It seems that although mold frequently occurs in the outdoor

environment, it often happens that indoor exposure must be taken into account in diagnostic procedure. To decrease the risk of mold allergy development or aggravation, indoor mold growth in patient's closest environment should be prevented. In case of mold colonization at home, school or office, humidity source, which supports its growth, should be found so as to identify it and remove as quickly as possible. From January 2009 to December 2010, 421 subjects were recruited from among outpatients visiting the Allergy Outpatients, Poland. Among them, in 166 patients positive mold allergy tests were obtained. These were patients with symptoms of bronchial asthma. All examined patients were subjected to interview concerning environmental exposure to mold allergens. For this purpose a questionnaire was used concerning demographic factors, living conditions, determination of the age of the building, presence of moisture in the place of living, and active or passive tobacco smoking environment. It seems that exposure to environmental factors such as damp flat, old housing plus tobacco smoking, especially in flats of large concentration, may all be favourable to the occurrence of environmental mold allergy and be the cause of the rise of allergy symptoms as well as invoking exacerbations.

**P976****Food allergy as a risk factor for habitual snoring**

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**Background:** It has been suggested that habitual snoring (HS) has adverse health outcomes in children and it's an important indicator of many clinical conditions such as atopy, cough and rhinitis.

**Aim of the study:** To determine the prevalence of HS in a cohort of children with food allergy (FA) and its association with atopic state, and other clinical symptoms such as cough, and rhinitis.

**Methods:** Seventy-four children (mean age 11.0±2.0 years; 36 males) with an history of FA were selected. Atopic status was determined by a SPT to a panel of principal aeroallergens and food allergens. Parents-administered questionnaires were used to collect information on children's snoring and possible symptoms associated. HS was defined as snoring three or more times per week.

**Results:** In our experience, children with FA show an higher prevalence of HS compared to Italian age-matched population (respectively 23% vs 4.9%; p <0.001) (Brunetti et al. Chest 2001, 120, 1930-1935). Furthermore among HS, children with associate food and aeroallergen allergy are 27.7% while children with food allergy are 14.8%; the difference was statistically significant (p<0.01). Snoring children show an higher prevalence of productive cough, dry cough and rhinitis compared to not snoring (respectively 47% vs 18.2 p<0.05; 47.1% vs 21.2% p<0.04 and 76.5% vs 57.6%; p=0.07).

**Conclusions:** We found an high prevalence of habitual snoring among children with food allergy; prevalence increases further in the group with aeroallergen allergy too. Moreover, the presence of the symptom "snoring" should be looked for and stressed in children with allergic respiratory diseases because it is often associated and underreported, but significantly worses the quality of life.

**P977****Atopy is a risk factor for adult asthma in two rural communities in south western Nigeria**

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**Rationale:** Factors affecting asthma course are not clearly elucidated in rural communities in developing countries. Furthermore, the interaction between factors such as atopy, environmental exposure, and urbanization and helminthic infections in modulating asthma have not been well investigated.

**Objectives:** To determine factors which affect asthma in adults being evaluated at 2 rural health centers in Southwest, Nigeria.

**Methods:** A random sample of 31 (10M, 21F) consecutive patients with stable physician diagnosed asthma, and 29 (13M, 16F) age matched control subjects without asthma seen at the outpatient clinics in Eruwa and Igbo-Ora were enrolled into the study. All subjects completed an asthma questionnaire, underwent evaluation, which included blood tests for eosinophil, serum IgE, allergy skin test to 8 common environmental allergens, stool for ova and parasites and spirometry. Wilcoxon sign-rank tests were used to compare eosinophil counts, percentage eosinophil and allergy skin test between the groups.

**Results:** Asthmatics had significantly more positive skin reaction to house dust mite, cockroach, mould, and mouse epithelium than controls (P<0.05).

Total serum IgE was also significantly higher in asthmatics than in controls (mean 380 vs.194 IU/ml; P<0.001). Stool parasitism was similar in both groups. There was correlation between serum IgE and skin test reactivity but not between stool parasitism and skin test reactivity.

**Conclusion:** Atopy is an important factor in the expression of adult asthma in 2 rural communities of a developing country such as Nigeria where atopy is expected to be uncommon. Additional studies to evaluate rural urban dichotomy in the expression of asthma are needed.

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**P978****Peripheral airway obstruction is a predictive sign of early asthma**

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**Introduction:** Diagnosis of early asthma is important to introduce early intervention. However, despite of many reports, it has not been established yet.

**Objective:** We performed spirometry and Impulse Oscillometry System (IOS) on early asthmatics and compared the data with those of patients with chronic cough symptom (CC) and acute bronchitis (AB).

**Methods:** Patients who complained of chronic cough, wheeze and dyspnea, and had never been diagnosed as bronchial asthma (BA) before were recruited to the present study. After having their informed consent, we performed spirometry and IOS, and measured bronchial hyperresponsiveness (BHR). After several months, these patients were diagnosed as bronchial asthma, chronic cough including cough variant asthma and acute bronchitis by development of symptoms, hematological analysis and other findings.

**Results:** BHR of BA (D<sub>min</sub>: 1.1±1.4; mean±SEM, n=89) was significantly increased compared to CC (5.2±3.4, n= 32) and AB (6.8±7.6, n=23). FEV1 of BA was not significantly decreased compared to CC. However, both %V50 and %V25 of BA were significantly decreased compared to those of CC (%V50: BA vs CC; 49.7±25.9 vs 70.2±16.4, p<0.05, %V25: BA vs CC; 38.1±25.0 vs 54.1±12.3, p<0.05). %R (5-25) measured by IOS was significantly higher in BA than in CC/AB (BA vs CC/AB; 151±76 vs 52±26).

**Conclusion:** Decreases of %V50 and %V25 and increase of %R (5-25) in IOS which indicated peripheral airway obstruction were detected in early asthmatics not in CC. These results suggested that peripheral airway obstruction may be a useful predictive sign of early asthma, which can be detected by spirometry.

**P979****Does presence of bronchoprovocation test positivity effect the development of allergic respiratory disease: 7 year follow-up study**

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In this study, we aimed to investigate the relation between bronchoprovocation test positivity an development of allergic respiratory disease.

The inclusion criteria to study were disease duration more than 1 year, no chronic urticaria exacerbation in two months, no history of long acting antihistaminic and corticosteroid usage in a month. The patients with asthma and pulmonary symptoms, disease causing positive methacholine provocation test (MPT), contraindication to the MPT, and abnormal pulmonary function test were excluded. 156 patients with chronic urticaria were included to the study. There was 108 (69,2%) female and the mean age was 42,54±13,19 years. The duration of disease was 6,05±4,33 (1-25) years.

After physical examination, pulmonary function test and MPT were performed to the all patients with chronic urticaria. At the beginning, MPT positivity was detected in 41 (26,3%) patients. There was no significant difference between patients with MPT(+) and MPT(-) according to demographic findings. Mean dose of MPT and total IgE level were 2,64±3,36 mg/dl and 123,3±124,3 respectively. In MPT(+) patients, rate of doctor diagnosed asthma and allergic rhinitis were 46,3% and 60,9% respectively and they were 18,2% and 25,2% respectively in MPT(-) patients (p<0.05). Presence of allergic disease in family members did not influence the development of these allergic respiratory diseases. Also total IgE level at the beginning did not related with development of these disease.

As a result, bronchoprovocation test can be (+) in chronic urticaria patients without pulmonary symptoms and this positivity can be first sign of respiratory allergic disease that will develop in future.

**P980****Allergic rhinitis in asthmatic children**

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**Objective:** Examine the prevalence and clinical expression off allergic rhinitis in children with bronchial asthma.

**Material and methods:** 120 children were evaluated in the period (2006-2009), 69 (57,5%) male mean age 8,3 years. The following parameters were substancial for determining the diagnosis: history, clinic condition. Routine and specific examinations.

**Results:** Allergic rhinitis was displayed in 68,7% of the children. Intermittent asthma was presented in 30,9%; mild persistent asthma in 44,8%, while 5,2% of patient had severe persistent asthma. Intermittent rhinitis was demonstrated in 14 children and 12 from them have had moderate-severe degree. Persistent allergic rhinitis had 65 children and in 41,5% of them have had moderate-severe rhinitis. Nasal symptoms preceded asthma in 65,8% of patients. The others were both diseases appeared in the same time. Positive skin tests to Dermatophagoides

pteronyssinus had 2/3 of children. Over 80% of them were with persistent allergic rhinitis and asthma. Pollen sensitivity was confirmed in 20,9% of the children, but almost all of them were with Dermatophagoides sensitivity. Sneezing and rhinorrhea were presented in 22,8% of the children (almost in all of the children with pollen sensitivity.) Concomitant sinusitis was presented in 67% of the children with asthma and rhinitis, but in over 90% of the children with Dermatophagoides sensitivity. Associated conjunctivitis had 20,3% of the patients, but almost all of the children that were with pollen sensitivity.

**Conclusion:** Epidemiological studies consistently shown that asthma and rhinitis often coexist in the same patients, and our study confirmed also strong association between allergic rhinitis and asthma in childhood.

**P981****Bronchial asthma and allergic rhinitis: Clinical, immunological and morphological features**

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**Aim:** Our study was the comparative clinical and morphologic characteristics of adolescents and adult patients with bronchial asthma (BA) in before and after the course allergen-specific immunotherapy (ASIT).

**Materials and methods:** The study involved 52 adolescents aged 14-18 and 24 adult aged 20-54 with a diagnosis of BA. Allergological examination, level serum hormones, cytokine levels, the provocation nasal and inhalation tests and electron microscopy study were conducted.

**Results:** Retrospective analysis were prevailed the atopic form of BA (88,2%) in adolescents. The debut of BA was appeared in age before 15 years old (71,6%); the middle degree - 40,3%, light degree - 32,8%, heavy degree - 26,9%. Accompanying diseases the illness of digestion system - 43,9%, the endocrine system - 35,1%; the heavy family allergic anamnesis - 78%, the pernicious habits (the smoking - 42,2%, alcohol - 10,6%). Hyperreactivity of the mucous membranes is higher in adolescents than adults. In all groups identified cytokine imbalance, characterized by a significant decrease in the level INF- $\gamma$  and IL2 and increased the content of IL4, IL5 (p<0,05). In the study of hormonal status revealed an endocrine imbalance. In mucosa of airways identified priorities change of epithelial cells with subsequent activation of immune cells, in the stroma. After the ASIT adolescents indicated more intensive decrease in the reactivity of the mucous membranes of the nose and bronchi in comparison with adults.

**Conclusion:** Timely and adequate prescriptions of basic therapy and possible prior ASIT contribute to the best clinical effect, avoid possible complications, and also increase the restoration of the damaged nasal mucosa.

**P982****Lower airway inflammation and hyperresponsiveness in allergic and non-allergic rhinitis**

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**Background:** Remarkable relationship exists between upper and lower airways, but lack of large-sample study on total airway inflammation and hyperresponsiveness in allergic and non-allergic rhinitis.

**Objectives:** To investigate lower airway inflammation and hyperresponsiveness in allergic and non-allergic rhinitis without asthma.

**Methods:** We enrolled 166 subjects with allergic rhinitis (AR), 122 with non-allergic rhinitis (NAR) and 143 healthy volunteers (control). Nasal-lavage, induced sputum, lower airway fractional exhaled nitric oxide (FeNO), methacholine bronchial provocation tests and allergen skin prick test were performed.

**Results:** AR group showed high nasal-lavage eosinophils count [6.90 (22.40)×200]. Sputum eosinophil was 1.50% (5.38%) in AR, higher than NAR [0.25% (1.00%)] and control [0% (0.50%), P<0.001]. FeNO in AR (23.40±17.50ppb) was higher than in NAR (17.26±11.38ppb, P=0.001) and control (13.85±6.61ppb, P<0.001). Subject count with mild and borderline BHR in AR, NAR and control was 20 (12.05%), 3 (2.46%) and 2 (1.40%), respectively (P<0.001). In AR group, 59 cases with high sputum eosinophils (>3%) showed statistical difference (P<0.05) in nasal eosinophils [15.65 (41.60)×200 vs. 2.05 (14.45)×200], FeNO [31.61±21.52ppb vs. 19.96±14.34ppb], mild and borderline BHR count [13 (22.03%) vs. 7 (6.54%)] when compared with 107 cases without sputum eosinophils increased.

**Conclusions:** Allergic rhinitis presents obvious upper/lower airway inflammation and BHR when compared with non-allergic rhinitis. High sputum eosinophil level in allergic rhinitis is closely correlated with nasal eosinophils, FeNO and BHR.

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**P983****Nasal airway resistance and correlation with lower airway involvement in allergic rhinitis**

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**Background:** Allergic rhinitis often precedes onset of asthma. Nasal airflow obstruction is measured by rhinomanometry.

**Aims and objectives:** Determining nasal airflow obstruction by active anterior rhinomanometry

Correlating nasal resistance with clinical severity of rhinitis and incidence of latent lower airway involvement.

**Materials and methods:** 32 patients with allergic rhinitis underwent active anterior rhinomanometry followed by spirometry. If spirometry was normal; histamine challenge test was performed.

**Results:** 56% of patients with mild rhinitis and 94% with moderate-severe rhinitis had significantly raised nasal airway resistance values. ( $> 0.3 \text{ Pa/cc/sec}$ )<sup>1</sup> ( $p < 0.05$ )

71.9% of patients with allergic rhinitis had lower airway involvement though they had no clinical evidence of asthma.

87.5% of patients with raised nasal resistance compared to 25% with lower values had airway involvement. ( $p = 0.001$ )

94% of patients with moderate-severe rhinitis and 83% of patients with persistent rhinitis compared to 50% patients with mild and 44% with intermittent symptoms had lower airway involvement. ( $p < 0.05$ )

**Conclusions:** Clinical severity of allergic rhinitis correlated with nasal airway resistance values measured by active anterior rhinomanometry.

71.9% patients with allergic rhinitis had lower airway involvement despite being asymptomatic for asthma, incidence being greater in patients with severe and persistent disease.

Proportion of patients with lower airway involvement is greater among those with significantly raised nasal airway resistance by rhinomanometry.

Ref:

1. Suzina AH et al: Objective assessment of nasal resistance in patients with nasal disease. *J of laryngology and otology*, 2003,117

**P984****Patients with asthma and comorbid allergic rhinitis: Is optimal quality of life achievable in real life?**

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**Background:** Asthma trials suggest that patients reaching total disease control have an optimal Health Related Quality of Life (HRQoL). Rhinitis is present in almost 80% of asthmatics and impacts asthma control and patient QoL.

**Aims and objectives:** We explored whether optimal HRQoL was reachable in a real-life setting, and evaluated the disease and patient related patterns associated to optimal HRQoL achievement.

**Methods:** Asthma and rhinitis HRQoL, illness perception, mood profiles, rhinitis symptoms and asthma control were assessed by means of validated tools in patients classified according to GINA and ARIA guidelines.

**Results:** Optimal HRQoL, identified by Rhinasthma Global Summary (GS) score  $\leq 20$ , was reached by 78/209 (37.32%). No association between clinical and demographic characteristics, with the exception of age, and optimal HRQoL achievement was found. Patients reaching an optimal HRQoL differed in disease perception and mood. Asthma control was significantly associated with optimal HRQoL ( $\chi^2 = 49.599$ ;  $p < 0.001$ ) and well-controlled and totally controlled patients significantly differed in achieving optimal HRQoL ( $\chi^2 = 7.617$ ;  $p < 0.006$ ).

**Conclusion:** While the majority of asthma patients did not reach optimal HRQoL, it is achievable, in real life, independently from disease severity. Failure to achieve optimal HRQoL was related to unsatisfactory disease control. Patients reaching optimal HRQoL differ from others in disease illness perception and mood. Therefore, therapeutic plans should be directed toward achieving the best possible clinical control of asthma and comorbid rhinitis, but also incorporate individualized elements according to patient-related characteristics.

**P985****P986****Chronic rhino-sinusitis in severe asthma improves at high altitude**

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**Background:** Severe asthma and chronic rhino-sinusitis often coexist (Meltzer, JACI 2004). Patients with severe asthma have shown to benefit from high altitude treatment (Rijssenbeek AJRCCM 2010). It is unknown whether chronic rhino-sinusitis also improves at high altitude.

**Aim:** To investigate the effect of high altitude treatment on symptoms of upper and lower airways disease in patients with severe asthma and rhino-sinusitis.

**Methods:** 137 patients with severe asthma treated at the Dutch Asthma Center Davos were included. In 65 patients, using nasal steroids, sino-nasal symptoms (SNOT scores), asthma control (ACQ), exhaled Nitric Oxide (FeNO), use of oral and nasal steroids were analysed, as well as the relationship between parameters of upper and lower airways. Parametric and non-parametric tests were used where appropriate.

## Results

	admittance	12 wks
SNOT-20 score <sup>‡</sup>	2.4 (0.74)	1.6 (1.0)*
SNOT-rhin. score <sup>‡</sup>	2.2 (1.1)	1.7 (1.1)*
ACQ score <sup>‡</sup>	3.1 (1.1)	1.7 (1.1)*
FeNO (ppb) <sup>‡</sup>	22 (5-224)	16 (3-70)*
Oral steroid dose (mg/day) <sup>‡</sup>	5 (0-110)	0 (0-30)*
Nasal steroid dose ( $\mu\text{g/day}$ ) <sup>‡</sup>	200 (75-1200)	200 (0-1200)

<sup>†</sup>Mean (SD); <sup>‡</sup>Median (range). \* $p < 0.05$

The improvement in SNOT-20 correlated significantly with the improvement in ACQ ( $R = 0.527$ ,  $p < 0.05$ ), the improvement in SNOT-rhinologic domain correlated significantly with improvement in ACQ ( $R = 0.489$ ,  $p < 0.05$ ), and decrease in FeNO ( $R = 0.26$ ,  $p < 0.05$ ).

**Conclusions:** A simultaneous improvement in upper and lower airway symptoms and oral steroid use occurs at high altitude in patients with severe asthma and chronic rhino-sinusitis.

**Implications:** These beneficial effects on upper airways disease underscore the anti-inflammatory and steroid-sparing effect of high altitude treatment in patients with severe asthma.

**P987****The relationship of gastroesophageal reflux with asthma quality of life and asthma control test in asthmatic patients**

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**Aim:** In this study we aimed to investigate the relationship of gastroesophageal reflux with Asthma Quality of Life (AQLQ) and Asthma Control Test (ACT) in asthmatic patients.

**Method:** Between September- October 2010, total 50 patients followed with a diagnosis of asthma at outpatient clinic of Cerrahpaşa Medical School Chest Diseases department were enrolled in this study. Patients' reflux symptoms in last one month were irrigated by using "Reflux Symptom Index" that consisting of 9 questions and graded from 0 to 5 (0: none; 1: very little, 2: low, 3: moderate, 4: severe, 5: very severe). ACT and AQLQ questionnaires were filled. Statistical analysis was done by using SPSS 15.0 software.

**Results:** 34 patients (68%) were female and 16 (32%) were male, mean age was  $42 \pm 14$ . The number of patients suffering from reflux was 23 (46%). The statistically very significant negative correlation was found between gastroesophageal reflux and AQLQ ( $r = -0.551$ ;  $p < 0.005$ ). Between the presence of gastroesophageal reflux and ACT, the statistically significant negative correlation was found ( $r = -0.314$ ;  $p < 0.05$ ) (Table 1).



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Table 1. The relationship of gastroesophageal reflux with ACT and AQLQ

	Reflux	ACT	FEV% <sup>2</sup>
AQLQ	r: -0.551; p: 0.000***	r: 0.667; p: 0.000***	r: 0.127; p: 0.380
Symptoms	r: -0.542; p: 0.000***	r: 0.686; p: 0.000***	r: 0.155; p: 0.283
Activity restriction	r: -0.431; p: 0.002**	r: 0.527; p: 0.000***	r: 0.160; p: 0.267
Emotional function	r: -0.471; p: 0.001***	r: 0.672; p: 0.000***	r: -0.028; p: 0.845
Environmental factors	r: -0.361; p: 0.010**	r: 0.238; p: 0.096	r: 0.063; p: 0.664
ACT	r: -0.314; p: 0.026*		

\*\*\*p&lt;0.001, \*\*p&lt;0.005, \*p&lt;0.05.

**Conclusion:** In our study, the presence of gastroesophageal reflux was found to decrease the quality of life and Asthma Control Test score in asthmatic patients.

### P988

#### The increased comorbidities in obese asthmatics

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**Aim:** Many studies have demonstrated an association between obesity and asthma, also the affects of obesity with airway inflammation were investigated. The aim of this study was to investigate the difference of age, sex, atopy, comorbid diseases and pulmonary function test parameters between obese and non obese asthmatics. **Method:** The data files of 210 asthmatic patients who admitted to our outpatient clinic in 2010 were evaluated. 169 patients without attack, with asthma control test over 20 and accessed BMI (body mass index) value enrolled in this study. The patients were divided in to two groups; BMI>30 kg/m<sup>2</sup> (obese) and BMI≤30 kg/m<sup>2</sup> (normal). The two groups were compared to age, gender, smoking history, comorbidities (gastroezafageal reflux, hypertension, diabetes mellitus, glaucoma, psychiatric disease, hipertirodi), allergy skin test positivity and pulmonary function test parameters by using statistical program SPSS 15.0 software.

**Results:** The mean age of the 169 patients was 39.5±15%. 32% were male and 68% were women. The obese group included 31 patients. The two groups were compared. In the group with normal weight FEV1 and FVC values were significantly higher (p<0.05). In the obese group the proportion of women and men, presence of gastroesophageal reflux and the hypertension, the average age of patients were statistically significantly higher than in normal group (p<0.05). There was no statistically significant difference between the two groups in terms of smoking history, diabetes mellitus, glaucoma, psychiatric disease, hipertirodi, allergy skin test positivity FVC%, FEV1%, FEV1/FVC% parameters (p>0.05).

**Conclusion:** The gastroesophageal reflux and hypertension comorbidities were more commonly seen in obese asthmatic than non obese asthmatics.

### P989

#### Asthma severity and body mass index relationship

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Obesity is considered as a risk factor for asthma; however the relationship between obesity and asthma control is being discussed. In this study we aimed to evaluate the relationship between obesity and disease severity in asthma patients.

Asthma patients diagnosed in our clinic (543 patients) were enrolled to study. BMI (kg/m<sup>2</sup>) of the cases were analyzed. BMI was classified as low (BMI, <18.5 kg/m<sup>2</sup>), normal (18.5-24.9 kg/m<sup>2</sup>), overweight (25-29.9 kg/m<sup>2</sup>), obesity (BMI, >= 30 kg/m<sup>2</sup>), or morbid obesity (BMI, >34.9 kg/m<sup>2</sup>). The patients were also grouped according to disease severity.

In this study, the mean age of asthmatic patients (417 female, 126 male) was 48.4±13.7. Of the patients 172 (31.7%) had mild intermittent asthma, 190 (35%) had mild persistent, 138 (25.4%) had moderate persistent and 43 (7.9%) had severe persistent asthma. Obese and morbid obese patients consisted of 52% of the asthma patients and only 1.8% of the patients were low weight and 17.7% of them were normal weight cases. Frequencies of obesity and morbid obesity in female asthmatics were higher than in male asthmatics (in females %33.8 and 23.7%, in males %19.8 and 14.3%). There was no difference between males and females with respect to asthma severity. Also no significant difference was found when we analyzed the relationship between asthma severity and obesity.

In conclusion, in our study we found that most of the asthma patients were obese or morbid obese; so obesity is a risk factor for asthma, however there is no significant relationship between obesity and asthma severity.

### P990

#### The effect of obesity or overweight on airway hyperresponsiveness and clinical features in patients with asthma

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**Background:** Obesity is a risk factor of asthma in general population but the effect of obesity on airway hyperresponsiveness (AHR) or airway inflammation in asthma is not clear. This study attempted to evaluate the effects of obesity on asthma in the aspects of symptoms, AHR and severity.

**Methods:** The 852 asthmatics who were diagnosed based on clinical symptoms and AHR confirmed by methacholine bronchial provocation test were enrolled from COREA adult asthma cohort. The intensity of AHR was assessed by provocative concentration of methacholine causing a 20% fall in FEV1 (PC20). BMI was classified into 4 categories, underweight (<18.5 kg/m<sup>2</sup>), normal weight (18.5-24.9 kg/m<sup>2</sup>), overweight (25.0-29.9 kg/m<sup>2</sup>), and obesity (≥30 kg/m<sup>2</sup>).

**Results:** BMI was negatively correlated with FEV1 (L), FVC (L), and FEV1/FVC (%) in lung function test. The prevalence of wheezing was increased with the increase of BMI after adjustment for age, sex, smoking, medication history, and PC20 (P<0.0001). AHR was higher in normal weight group than overweight group (P=0.001). The risk of moderate or severe AHR (PC20≤4 mg/ml) was decreased when BMI increased after adjustment for age, sex, smoking, and medication history (P=0.035).

**Conclusion:** Obesity is a risk factor of asthma in general population but obesity in patients with asthma is negatively correlated with the intensity of AHR and not related with asthma severity. However obesity increases the prevalence of wheezing in asthmatics although obesity does not increase AHR.

### P991

#### Prevalence of obstructive sleep apnea in patients with difficult-to-treat asthma

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**Background:** Obstructive sleep apnea (OSA) is seen commonly in asthmatics and complicate the management of asthma.

**Objective:** To evaluate the prevalence of OSA in a difficult-to-treat asthma (DTA) population.

**Methods:** Asthma can not be controlled with high-dose inhaled corticosteroids with a combination of long-acting β2 agonist or another controller medications was defined as DTA. All participants underwent full-night polysomnography. Patients were categorized according to apnea-hypopnea index (AHI). Patients were considered as mild OSA with an AHI=5-15 and as moderate-severe OSA with an AHI≥15. Demographics and characteristics of asthma such as age at the diagnosis, duration of asthma, smoking and atopy status, pulmonary function tests, number of controller medications used, hospitalization and emergency room visit due to asthma, and analgesic hypersensitivity was compared according to presence of OSA.

**Results:** We analyzed 47 (M:9/F:38) DTA patients with the mean age of 48.74±9.45 years. The mean duration of asthma was 9.17±6.5 years. 51.1% patients were atopic, 27.7% had analgesic hypersensitivity, 29.8% were former smoker. 35 patients (74%) had OSA. Sleep quality was impaired in all patients, particularly in patients with OSA. Eleven patients had mild, 24 patients had moderate-severe OSA. Presence of OSA was not statistically correlated with any characteristics of asthma, despite patients with OSA had longer duration of asthma.

**Conclusion:** The study showed that there is remarkable high prevalence of OSA in DTA. Thus all DTA patients should be evaluated for OSA.

### P992

#### The role of inflammatory cells, adhesion molecules, intermediate filaments and chemokine receptors in the pathogenesis of nasal polypos

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Pathogenesis of nasal polyposis is incompletely understood. This study investigates the role of inflammatory cells, adhesion molecules, intermediate filaments and chemokine receptors in development of nasal polyposis. Totally, 35 patients were enrolled (Group 1, 10 patients with Samter syndrome; Group 2, 10 patients with diffuse polyposis without signs of Samter syndrome; Group 3, 5 patients with solitary nasal polyps; Group 4, 10 controls). Expression of CD105, CD106, CD62E, CD4, CD8, CXCR4, CD147, CD90, CD104, BF45, vimentin, pancytok-eratin and MSA were determined. Expression of CD4, CD8 and CD106 were similar between groups. Ratio of patients expressing CD4 in Group 1, Group 2 and Group 3 were higher than controls. Ratio of patients expressing CD8 antigen were significantly higher in all 3 groups than control group. Expression of CD147 in Group 3 and Group 4 was significantly higher than in Group 1 and Group 2. CD98 expression was higher in Group 1, Group 2 and Group 3 than in Group 4. Ratio of patients expressing vimentin in Group 1, Group 2 and Group 3 were significantly

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higher than in Group 4. Immunostaining for pancytokeratin was positive in all patients.

Results of the immunohistochemical analysis of 35 patients enrolled in the study

Antigen	Group 1 (n=10)	Group 2 (n=10)	Group 3 (n=5)	Group 4 (n=10)
CD105	10	8	2	2
CD62E	2	4	3	0
CD106	10	4	5	0
CD4	8	8	5	1
CD8	7	7	5	2
CXCR4	3	3	4	0
CD147	4	3	5	10
CD98	2	4	2	10
CD90	10	10	1	3
CD104	0	3	4	5
Vimentin	7	7	4	0
Pancytokeratin	10	10	5	10
BF45	10	10	5	10
MSA	10	10	5	10

In conclusion, inflammatory cells, adhesion molecules, intermediate filaments and chemokine receptors may play a role in pathogenesis of nasal polyps.