

## PD 14-16

2009-534

**Involvement of Pollutants/Allergens Mediated Oxidative Stress on Bronchial Asthma**Kensese Mossanda<sup>1</sup>, ED Dabula<sup>1</sup>, HF Joubert<sup>1</sup>, I. Hassan<sup>2</sup>, O. Mzileni<sup>2</sup><sup>1</sup>Chemical Pathology Department, University of Limpopo-Medunsa Campus, South Africa, <sup>2</sup>Internal Medicine-Pulmonology, University of Limpopo-Medunsa Campus, South Africa

**Background/Purpose:** Simultaneous exposure to pollutants, inhalants and food allergens can activate neutrophils and macrophages to produce reactive oxygen species (ROS) and reactive nitrogen species (RNOS) which may increase the risk of developing exacerbated conditions of asthma through the promotion of T cell response.

**Methods:** In South Africa, grass pollens level peaking from October to January; constitute a problem to allergic patients. During winter period, the use of paraffin, coal, charcoal and wood for heating, may make people to be more susceptible to asthma. The purpose of this study is to investigate the implication of allergens and the involvement of oxidative stress in the exacerbation of asthmatic conditions in polysensitized subjects suffering from allergic rhinitis. Lung function test was evaluated using spirometric measurements in 73 asthmatic children (6–14 years old): 11 with allergy rhinitis sensitized both to pollen and perennial allergens were compared to 42 allergy asthmatic patients without this particular sensitization and 20 non allergy asthmatic patients. Total equivalent antioxidant capacity (TEAC), Superoxide dismutase (SOD) and Glutathione peroxidase (GPx) were evaluated using kits commercially available from Randox-Company. Malondialdehyde (MDA) was estimated by thiobarbituric acid reaction.

**Results:** A general lung obstruction profile was detected in these patients (from mild to severe) corresponding to the clinical score ranging from 3 to 8 and confirmed by FEV<sub>1</sub> (Forced Expiratory Volume) % ranging from 43 to 75% and by the measured ratio FEV<sub>1</sub>/FVC (Forced Expiratory Volume/Forced Volume Calculated). Hematologic results displayed a high level of eosinophils (2.8 to 20%) for the majority of patients in exacerbated conditions of asthma corresponding to the IgE values exceeding 500 KU/L. Positive Phadiatop has been observed in these patients who also displayed low values of TEAC and GPx (<1.42 mmol/L and <700 U/mL respectively) and high values of 8 isoprostane (>7.5 pg/ml) and MDA (>3.5 mmol/L).

**Conclusions:** Exacerbated conditions of asthma observed clinically in allergy rhinitis patients (clinical score: 6–8) with reduced FEV<sub>1</sub>/FVC ratio, decreased activity of GPx and increased lipid peroxidation are a consequence of hyperproduction of eosinophils and IgE by oxidative stress generated by pollutants, inhalants and food allergens acting as adjuvants in the immune system of those patients sensitized to the observed allergens.

## PD 14-17

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**Phospholipase A2 and Phospholipase C Activity in Plasma Membrane of Erythrocytes in Asthma**

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**Background/Purpose:** Phospholipase A2 (PLA2), and phospholipase C (PLC) are lipolytic and ubiquitous enzymes in biologic systems. These enzymes play an important central role in the basal phospholipid metabolism of all cells, host defence and signal transduction. While PLA2 catalyzes the hydrolysis of membrane phospholipids at the sn-2 acyl bond position to liberate arachidonic acid (AA) and lysophospholipids, PLC cleaves phosphatidylinositol 4,5-bisphosphate into diacylglycerol (DAG) and inositol 1,4,5-triphosphate (IP3), all of which act as second messengers. These second messengers activate signal transduction pathway leading to the activation of inflammatory cells, and arachidonic acid serves as precursor of inflammatory mediators. In asthma biochemical and morphological changes in erythrocyte membranes have been reported. Moreover for studying changes in membranes, human erythrocytes are considered to be the best model. Therefore in the present study, we evaluated the total phosphatidyl choline (PC) content, PLA2 and PLC activity in the erythrocyte membrane of asthmatic patients.

**Methods:** The study included 40 subjects (20 asthmatics and 20 healthy volunteers) of either sex (age range; 18–60 years). Erythrocyte membranes were prepared from peripheral blood in which PC content and activity of enzymes viz. PLA2 and PLC were determined. The values were expressed as mean ± S.E.M. P < 0.05 was considered significant.

**Results:** In asthma, there was a significant decrease in total PC content (90.47 ± 9.54 vs. 127.1 ± 9.74 µg/109 R.B.Cs in controls, P = 0.0030), and an increase in PLA2 activity (64.20 ± 2.49 units/ 109 cells vs. 6.72 ± 0.196 units/ 109 cells, P < 0.001) and PLC activity (29.39 ± 1.45 units/ 109 cells vs. 6.64 ± 0.289 units/ 109 cells P < 0.0001).

**Conclusions:** Increase in PLA2 and PLC activity and decrease in total PC content in the membrane show an increased metabolism of PC and other phospholipids in the asthma resulting into accumulation of second messengers such as arachidonic acid, LPC, DAG, IP3 etc. in the membrane which are involved in the pathogenesis of the disease. Regulation of PC, PLA2 and PLC by suitable agonists/antagonists may regulate the status of asthma.

## PD 14-18

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**The Prevalence of Reflux Oesophagitis in Adult Asthmatics**Channa Ranasinha<sup>1</sup>, Lakmali Amarasiri<sup>2</sup>, Janaka De Silva<sup>3</sup><sup>1</sup>Dept of Pharmacology, Faculty of Medicine, University of Kelaniya, Sri Lanka, <sup>2</sup>Dept of Physiology, University of Kelaniya, Sri Lanka, <sup>3</sup>Dept of Medicine, University of Kelaniya, Sri Lanka

**Background/Purpose:** Asthma and gastro-oesophageal reflux disease are known to be associated. The severity of asthma is related to the degree of reflux. This relationship has been little studied in South Asia.

**Methods:** Thirty asthmatics underwent a reflux symptom assessment using a validated questionnaire assessing 7 upper gastro-intestinal (UGI) symptoms graded on a 5-point Likert scale (Amarasiri LD 2009). They further underwent UGI endoscopy.

**Results:** All asthmatics had mild stable asthma. 20 of the 30 asthmatics had a positive GORD symptom score. 27 asthmatics consented to UGI endoscopy. The grade of oesophagitis was classified using Savary Miller criteria. 10 of the 27 asthmatics had evidence of mucosal damage (see Table 1). There was no correlation between the grade of oesophagitis and the GORD score (r = 0.025; P = 0.896, Spearman Rank correlation).

**Conclusions:** The prevalence of reflux oesophagitis in asthmatics was 37%. There was no association of severity of oesophagitis with symptoms. Both these findings are consistent with the global data, but have not previously been described in a South Asian population.

Table 1

	Asthmatics with (-) GORD symptom scores (n=10)	Asthmatics with (+) GORD symptom scores (n=20)	All asthmatics (n=30)
Age, yrs mean (SD)	35.4 (9.6)	34.5 (8.0)	34.8 (8.4)
Gender, (M:F)	2:8	9:11	12:18
BMI, (kg/m <sup>2</sup> ), mean (SD)	20.3 (2.4)	21.9 (5.1)	21.3 (4.4)
GORD symptom score, mean (SD)*	10.0 (1.6)	43.1 (17.0)	32.0 (21.1)
Severity of asthma, no of subjects (%)			
Mild intermittent	10 (100)	16 (80)	26 (87)
Mild persistent	-	4 (20)	4 (13)
Upper GI endoscopy status, no of subjects			
Normal	5	12	17
Oesophagitis, grade 1	2	7	9
Oesophagitis, grade 2	-	-	-
Oesophagitis, grade 3	-	1	1

\* P&lt;0.001; Student t test

All other parameters did not significantly differ between the two groups

[Fig 1]