European Respiratory Society
Annual Congress 2013

Abstract Number: 1271

Publication Number: P2029

Abstract Group: 1.1. Clinical Problems

Keyword 1: Asthma - mechanism **Keyword 2:** Lung mechanics **Keyword 3:** No keyword

Title: Mechanical determinants of dyspnoea in asthma

Dr. Alessandro 12923 Gobbi alessandro.gobbi@polimi.it [1], Mr. Andrea 12924 Antonelli antonelli.a@ospedale.cuneo.it MD [2], Prof. Emanuele 12925 Crimi crimi@dism.unige.it MD [3], Dr. Michele 12926 Baroffio michele.baroffio@unige.it [3], Mr. Carlo 12927 Gulotta cgulotta@libero.it MD [4], Mr. Roberto 12930 Torchio r.torchio@inrete.it MD [4], Prof. Dr Raffaele 12938 Dellaca raffaele.dellaca@polimi.it [1], Mr. Giorgio 12939 Scano giordan1969@alice.it MD [2], Prof. Vito 12941 Brusasco vito.brusasco@unige.it MD [3] and Prof. Riccardo 12942 Pellegrino pellegrino.r@ospedale.cuneo.it MD [2]. [1] Electronics, Informatics and Biomedical Engineering, Politecnico Di Milano, Milano, Italy, 20133 ; [2] Allergologia e Fisiopatologia Respiratoria, ASO S. Croce e Carle, Cuneo, Italy ; [3] Fisiopatologia Respiratoria, Dipartimento Di Medicina Interna, Universita' Di Genova, Genova, Italy and [4] Pneumologia-Fisiopatologia Respiratoria, AOU S. Luigi, Orbassano, Italy .

Body: Background. Bronchial asthma is characterized by episodes of airway narrowing with dyspnoea. This is described as chest tightness, inspiratory effort, unrewarded inspiration or expiratory difficulty. Aims. To examine if dyspnoea or its descriptors reflect different mechanical changes during bronchoconstriction. Methods. Eighty-four mild asthmatics were challenged with methacholine. Symptoms were scored as Borg units. Lung function measurements included: 1) compression-free partial flow at 40% of vital capacity, residual volume, functional residual capacity, inspiratory resistance (R_5) and reactance (X_5) at 5 Hz; 2) changes in R_5 and X_5 with deep breath and velocity of recovery; 3) difference in resistance between 5 and 19 Hz (R_{5-19}); 4) interquartile range (IQR) of R_5, R_{5-19}, and X_5; 5) difference between inspiratory and expiratory X_5 (ΔX_5), as an index of expiratory flow limitation. Relationships between variables were assessed by ordinal logistic regression analysis and expressed as Odds Ratio (OR). Results. At 25% FEV_1 fall, dyspnoea was related to increased X_5-IQR (OR: 8.55), inspiratory effort to ΔX_5 (OR: 2.27), unrewarded inspiration to deep-breath inability to attenuate X_5 fall (OR: 4.58) and expiratory difficulty to a blunted increase in R_{5-19}-IQR (OR: 0.017). No relationships were observed between functional data and chest tightness. Conclusions. The increments in dyspnoea, inspiratory effort and unrewarded inspiration reflect the ease with which the airways close over time, occurrence of expiratory flow limitation, and reduced recruitment of closed airways with deep breaths. The increase in expiratory difficulty appears to reflect the inability of the open peripheral airways to take different configurations with breathing.