European Respiratory Society
Annual Congress 2012

Abstract Number: 1680

Publication Number: P865

Abstract Group: 4.1. Clinical physiology and Exercise

Keyword 1: Lung function testing **Keyword 2:** Asthma - diagnosis **Keyword 3:** Lung mechanics

Title: Effects of thoracic gas compression on airway responsiveness in asthma

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Body: Background: The response to a bronchial challenge is usually assessed from the changes in the forced expiratory in 1 s (FEV_1). Yet this measurement is negatively affected by the thoracic gas compression. Aim: To examine the effects of thoracic gas compression on the dose-response curve to methacholine (MCh) in asthma. Methods: 28 male and 25 female asthmatic patients participated in the study. Methacholine challenge was performed in a flow-type body plethysmograph to compute simultaneously FEV_1 and compression-free FEV_1 (FEV_1PLETH). The doses of MCh that caused a decrease in FEV_1 and FEV_1PLETH by 20% of control were calculated by linear interpolation of the dose-response curve and transformed into natural logarithm. Results: On average, lnPD20FEV_1 was significantly less that lnPD20FEV_1PLETH (5.49±0.94 vs. 5.74±1.00, $p<0.001$). The difference between lnPD20FEV_1 and lnPD20FEV_1PLETH was positively correlated with absolute TLC ($r2=0.40$) and height in cm ($r2=0.27$), and it was larger in males than in females (0.34 vs. 0.14, $p<0.001$). Conclusions: Thoracic gas compression has a significant effect on airway responsiveness, which depends on absolute lung volume and, thus, anthropometric characteristics.