

European Respiratory Society Annual Congress 2012

Abstract Number: 1243

Publication Number: P4612

Abstract Group: 7.1. Paediatric Respiratory Physiology

Keyword 1: Asthma - mechanism **Keyword 2:** Longitudinal study **Keyword 3:** Lung function testing

Title: Determinants of functional deficits assessed by spirometry and plethysmography in children with bronchial asthma

Richard 9196 Kraemer richard.kraemer@swissonline.ch MD ¹, Gisela 9197 Wirz gisela.wirz@insel.ch ¹, Philipp 9198 Latzin philipp.latzin@insel.ch MD ¹ and Oliver 9199 Fuchs oliver.fuchs@insel.ch MD ¹. ¹ Division of Paediatric Respiratory Medicine, University of Berne, Inselspital, Berne, Switzerland, CH-3010 .

Body: Follow-up in asthmatic children is usually performed by spirometry, and hence without consideration of pulmonary hyperinflation. 'Effective' specific resistance (sR_{eff}) measures resistive changes throughout the whole breath cycle concomitantly to changes of resting end-expiratory level.[1] Objectives. Defining the pattern of functional deficits and their changes over time in children with bronchial asthma. Methods. Serial lung function measurements performed in 216 asthmatic children (age: 4.0 to 17.9 y) were analyzed retrospectively representing at least 3 annual tests, and providing functional residual capacity (FRC_{pleth}), sR_{eff} , volume-time and flow-volume indices (FEV_1 , MEF_{50} , and $MMEF_{75-25}$). Data were expressed as SD-score computed by z-transformation using reference equations. Results. Within the 1270 lung function tests spirometry failed to detect abnormal lung function in 24.1% of tests (plethysmography 1.7%). Bronchial obstruction ($> 2SDS$) was depicted by sR_{tot} in 93.8%, sR_{eff} in 74.6%, MEF_{50} in 73.8 %, $MMEF_{75-25}$ in 62.1% and FEV_1 in 23.7% of tests. Moreover, pulmonary hyperinflation ($FRC_{pleth} > 2 SDS$) was present in 26.7 %, mostly combined with obstruction (23.4 %). Independent from age at entry pulmonary hyperinflation remained to a certain degree despite treatment (LABA and ICS). Conclusions. Apart from spirometry, follow-up of asthmatic children should include plethysmographic measurements, because changes in static lung volumes influence airway dynamics, mimicking normal flow-volume curves. Moreover, patients with pulmonary hyperinflation are less responsive to standard treatment. [1] Matthys H, Orth U. Respiration 1975; 32(2): 121-134.