European Respiratory Society
Annual Congress 2013

Abstract Number: 1779

Publication Number: P798

Abstract Group: 5.2. Monitoring Airway Disease

Keyword 1: COPD - management **Keyword 2:** Lung function testing **Keyword 3:** COPD - mechanism

Title: Prediction of exercise capacity using impulse oscillation system in patients with COPD

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Body: Background Exercise intolerance is frequently observed in patients with chronic obstructive pulmonary disease (COPD), and the reduced exercise capacity primarily contributes to result in the disability in activities of daily living in these patients. The six-minute walk test (6MWT) is generally used to assess exercise capacity in COPD patients. Recently, impulse oscillometry system (IOS) is used to measure lung resistance and reactance separately. This study was designed to determine whether IOS is useful to predict exercise capacity in COPD patients. Methods Fifty-one COPD patients (46 men and 5 women; mean age 72.8±8.6 years; GOLD stageIn=8; stageIIn=21; stageIIIn=20; stageIVn=2) were included in this study. 6MWT and IOS were performed in all subjects. Results We could not find the significant correlation between six-minute walk distance and any parameters in IOS. Though R20 (Resistance at 20Hz) was not also significantly correlated with any parameters in IOS, R5 (Resistance at 5Hz) was significantly correlated with the maximal decrease in SpO2 (ΔSpO2) with exercise alone. However, X5 (Reactance at 5Hz), Fres (Resonant Frequency) and AX (Reactance area 5Hz-Fres), which are parameters in IOS indicating lung reactance, were closely correlated with both ΔSpO2 and maximal increase in Borg scale with exercise. Conclusions Parameters of lung reactance in IOS are significantly correlated with oxygen desaturation and dyspnea sensation with exercise. These results suggest that IOS may be useful for predicting reduced exercise capacity in COPD patients.