

European Respiratory Society Annual Congress 2012

Abstract Number: 2280

Publication Number: P2247

Abstract Group: 5.2. Monitoring Airway Disease

Keyword 1: COPD - diagnosis **Keyword 2:** Monitoring **Keyword 3:** Lung function testing

Title: Difference of respiratory reactance between mild and moderate COPD by forced oscillation technique using a MostGraph-01

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Body: Background: COPD is characterized with persistent airflow limitation caused by airway inflammation and parenchymal emphysema. The Forced Oscillation Technique (FOT) can detect the lung impairment by measuring respiratory impedance during tidal breathing without special maneuver of respiration. Respiratory impedance consists of resistance and reactance (Xrs), which dynamically change during tidal breathing in COPD patients. We evaluated the difference of the Xrs in respiratory cycle between mild and moderate COPD. Methods: We recruited 26 outpatients with stable mild (n=13) and moderate (n=13) COPD at the University of Tokyo Hospital. The impedance of respiratory system was measured by FOT using MostGraph-01, which was manufactured in Japan CHEST Company. The Xrs during inspiratory and expiratory phase during tidal breathing were evaluated at 4 Hz of oscillatory frequency. Comparisons of Xrs between both groups were performed using the Student's t-test. Results: The mean Xrs at 4 Hz (X4) in respiratory cycle were similar in mild and moderate groups. There were also no significant differences between inspiratory X4 (insX4) and expiratory X4 (exX4) in both groups. However, the ratio of insX4 to exX4 in mild COPD was significantly lower than that in moderate COPD (p=0.031). Conclusion: The ratio of insX4 to exX4 during tidal breathing in mild COPD was lower than moderate COPD. During tidal breathing, the Xrs changes in inspiratory and expiratory phase and might be influenced by airway obstruction and parenchymal emphysematous change. The measurement of Xrs during tidal breathing might be useful property to distinguish the severity of COPD.