

European Respiratory Society Annual Congress 2013

Abstract Number: 72

Publication Number: P2142

Abstract Group: 1.1. Clinical Problems

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

Title: Determinants of severity of dyspnea in COPD

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Body: Severity of dyspnea in COPD patients with comparable FEV1 is highly variable. Aim: To compare clinical and functional parameters in COPD patients with varying dyspnea degree. Methods: 88 COPD outpatients (GOLD II) aged 42-80 years were studied. COPD symptoms, spirometry and body plethysmography parameters, bronchial hyperresponsiveness (BHR) to methacholine challenge and concentration of serum biomarkers were analyzed. Depending on a dyspnea level all patients were divided two groups: 1-group (MRC 0-2) - 48 patients, 2-group (MRC 3) - 40 patients. Determinants of differences of degree of dyspnea were identified by means discriminant analysis. Results: FEV1 values were similar in both groups ($p = 0,58$). Among clinical characteristics were defined a contribution to the difference of level dyspnea: COPD duration ($F=22,8$; $p<0,001$), exacerbations frequency ($F=13,1$; $p<0,001$) and age of patients ($F=5,2$; $p=0,023$). More severe dyspnea was associated also with residual volume – RV ($F=8,0$; $p=0,006$) and BHR ($F=11,7$; $p<0,001$). The use of these variables resulted in correct classification rates of 92% in general. Patients of the 2-nd group (MRC 3) were older ($p = 0,042$) and their COPD duration was 2,2 times longer ($p<0,001$) compared with patients of the 1-st group. COPD exacerbations were more frequent in patients with severe dyspnea: 2,1 vs 1,2 per year ($p<0,001$). The post bronchodilator RV in the 2-nd group on average was on 14% higher than in the 1-st group ($p<0,001$). In severe dyspnea BHR was present in 95% of patients compared with 52% of cases in the 1-st group ($p<0,001$). Conclusion: Significant dyspnea-related differences in COPD II patients is based mainly on COPD duration, exacerbations frequency, BHR, RV and age of patients.