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Title: Intensity of physical activity is associated with central hemodynamic and leg muscle oxygenation capacities in COPD

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Body: Aim: In COPD, physical activity is reported to be adversely associated with the magnitude of exercise-induced dynamic hyperinflation. There is limited evidence as to whether central hemodynamic, oxygen transport and peripheral muscle oxygenation capacities also contribute to reduced physical activity. Methods: Nineteen consecutive COPD patients (FEV1: 48±14% pred.) underwent a treadmill walking test at a speed corresponding to the individual patient's mean walking intensity, captured by a triaxial accelerometer during a preceded 7-day period. Results: During the indoor treadmill test, the individual patient mean walking intensity (range: 1.5 to 2.3 m/s²) was significantly correlated with changes from baseline in cardiac output recorded by impedance cardiography (range: 1.2 to 4.2 l/min; r=0.73), systemic vascular conductance (range: 7.9 to 33.7 ml/min/mmHg; r=0.77), systemic oxygen delivery estimated from cardiac output and arterial pulse-oxymetry saturation data (range: 0.15 to 0.99 l/min; r=0.70), arterio-venous oxygen content difference calculated from oxygen uptake and cardiac output data (range: 3.7 to 11.8 mlO²/100ml; r=-0.73) and quadriceps muscle fractional oxygen saturation assessed by near infrared spectrometry (range: -6 to 23%; r=0.77). Conclusion: In COPD, walking intensity is partially associated with central hemodynamic and peripheral muscle oxygenation capacities regulating the adequacy of matching peripheral muscle oxygen availability by systemic oxygen transport. Financial support: This work was funded by Innovative Medicines Initiative Joint Undertaking (IMU-JU # 115011) and by Thorax Foundation.