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**Title:** Exercise related desaturation in patients with COPD – Another step towards phenotyping the disease

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**Body:** Desaturation during 6MWT is considered as an important predictor of mortality in COPD patients. Aim: To investigate relationship among exercise related desaturation (6MWT), symptoms, spirometric indices and number of exacerbations within last year (risk assessment). Patients and methods: Fifty patients (age  $64.5 \pm 9.2$ ; BMI  $24.6 \pm 4.5$ ; smoking pack/years.  $39.0 \pm 23.3$ ) had lung function assessment and exercise test (6MWT). Desaturation was considered when SpO<sub>2</sub> dropped  $\geq 4\%$  for at least 3 min. Results: All patients had marked airway obstruction (FEV<sub>1</sub>% =  $40.8 \pm 13.8$ ; KCO% =  $76.0 \pm 27.9$ ; PO<sub>2</sub> =  $64.4 \pm 9.7$  mm Hg), moderately decreased functional capacity (6MWT  $492 \pm 91$  m.) and high symptom scores (MRC =  $2.3 \pm 1.0$  ; CAT =  $21.4 \pm 7.5$ ). They were divided in two groups according to their exercise SpO<sub>2</sub> – without desaturation (A; n=24) and with desaturation (B; n=26). The two groups differed significantly with regard to FEV<sub>1</sub>%  $47.9 \pm 12.4$  vs  $34.2 \pm 11.8$ ; p = 0.001; KCO%  $90.8 \pm 22.4$  vs  $63.4 \pm 26.1$  p<0.001; PCO<sub>2</sub>  $39.4 \pm 4.5$  mm Hg vs  $44.3 \pm 7.0$  mm Hg p=0.006, but there was not a significant difference in symptoms (MRC and CAT scores), number of exacerbations within the last year and multidimensional indices (DoReMi box and BODE). The decrease in saturation correlated with basic spirometric and blood gas indices but not with MRC and CAT scores and number of exacerbations during last year. Conclusion: Desaturation in patients with COPD is associated with deterioration in lung function but not with symptom severity and number of exacerbations in the last year. Presumably, the patients with exercise (6MWT) related desaturation represent separate phenotype of COPD.