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Title: The CT emphysema index is a predictor for exertional desaturation in COPD patients without resting hypoxemia

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Body: Background: Although numerous studies have attempted to correlate various clinical tests with exertional desaturation in patients with COPD, no test has shown significant positive predictive value. The aim of this study was to identify clinical predictors of exertional desaturation focusing on the CT indices, and to determine whether an association exists between exertional desaturation and a particular COPD phenotype. Methods: A total of 224 subjects were selected from the Korean Obstructive Lung Disease cohort. Exertional desaturation was defined as a post-exercise oxygen saturation (SpO_2) of <90% or a ≥4% decrease. The cohort was divided into desaturator (n=47) and non-desaturator (n=177) groups Results: Significant differences were observed between the groups in terms of age, BODE index, forced expiratory volume in 1 second (FEV_1), diffusing capacity, and resting SpO_2. The CT emphysema index was significantly higher in the desaturator group. Multivariate analysis showed that the CT emphysema index (RR, 1.028; 95% CI, 1.001 to 1.056; p=0.046) and resting SpO_2 (RR, 0.790; 95% CI, 0.648 to 0.965; p=0.021) were significant independent predictors. In the desaturator group, the rate of decline in FEV_1 was more rapid and health-related quality of life worsened faster than in the non-desaturator group over a 3-year period of follow-up.Conclusions: In patients with COPD, exertional desaturation possibly occurs in parallel with an increase in the CT emphysema index. Exertional desaturation may be a manifestation of emphysema phenotype, and COPD patients with exertional desaturation are associated with a more rapid decline in lung function and poorer health-related quality of life.