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Title: Regional hyperinflation in COPD patients: Correlation between lobar hyperinflation and internal flow distribution

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Body: Background: Diagnosis of COPD patients is mainly based on lung function tests. Severe COPD patients often develop dynamic and static hyperinflation. However, few studies have addressed the association of hyperinflation and internal flow redistribution. This study describes the relation between regional hyperinflation and flow distribution in COPD patients. Methods: Lobar volume levels in COPD patients (n=39, <FEV1>=42.1±2.1 %pred) were determined using functional imaging based on CT data (De Backer J. et al, Radiology 2010; 257(3):854-862). Lobar flow distribution was obtained by calculating the relative difference in the TLC and FRC volumes on the lobar level. The flow distribution towards the different lobes was compared to the imaged based volumes of the corresponding lobes. Results: Statistically significant correlations (R= 0.4, p< 0.04) were observed between lobar flow distribution and lobar volume-hyperinflation with more flow going to more hyperinflated areas.

Conclusion: Internal flow is redistributed towards the hyperinflated zones which means that also inhaled medication would mainly go to the hyperinflation areas leaving other areas partially untreated and this may further enhance the observed flow redistribution.