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Title: Physiological and inflammatory phenotypic comparisons between non-smoking and smoking COPD

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Body: There is paucity of information on how lung physiology and cellular inflammation differs between non-smoking-COPD (NS-COPD) and smoking-COPD (S-COPD). Aim: To evaluate and compare physiological and induced sputum cellular inflammatory profiles of NS-COPD and S-COPD. Methods: 47 NS-COPD and 39 S-COPD subjects underwent spirometry, Impulse-oscillometry (IOS), body plethysmography and lung-diffusion (single breath), and sputum-induction to measure the cellular-inflammatory profile. Normally distributed and non-normally distributed data were compared using means (SD) and medians (IQR), using parametric and non-parametric tests respectively. Results: There were no differences in % predicted values for FEV1, FVC, FEF25-75/FVC, SRaw, SGaw, RV, TLC, RV/TLC, ITGV, FRC, R5Hz, R20Hz, and DLCO SB and DLCO/VA between NS-COPD and S-COPD (all p values>0.05). The only physiological difference observed was in median % predicted X5Hz values on IOS; S-COPD had higher X5 compared to NS-COPD [1908.3Hz (1308.3, 2987.5), vs 983.3Hz (461.1, 2091.7), p=0.002]. S-COPD had greater median total inflammatory cells/gm sputum and absolute neutrophils/gm sputum compared to NS-COPD [7.2(3.6, 10.3)x10⁶/gm vs 4.1(2.3, 6.9)x10⁶/gm, p=0.01] and [5.5(2.8, 8.7)x10⁶/gm vs 2.8(1.6, 6.0)x10⁶/gm, p=0.01] respectively. No differences were observed between numbers of lymphocytes, eosinophils and macrophages in S-COPD and NS-COPD (all p values>0.05). Conclusion: S-COPD and NS-COPD show similar lung function derangements as measured by lung volumes, airway resistance and lung-diffusion, apart from an increased airway reactance and greater total and neutrophil cell counts in the induced sputum in S-COPD compared to NS-COPD.