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Title: Correlation of spirometry with impulse oscillometry, body plethysmography and DLCO

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Body: Background: Spirometry, Impulse Oscillometry (IOS), Body Plethysmography (BP) and DLCO are tools that measure different aspects of lung function. However, there is inadequate knowledge about the correlation between the parameters measured by these tests. Aim: To study the correlation of spirometry indices with values measured by IOS, BP and DLCO. Methods: In this ongoing study 4 healthy, 9 asthma and 10 COPD patients underwent IOS, BP, spirometry and DLCO according to the international guidelines. Correlations between values obtained by IOS (R5, R20, R5-20), BP (sGawtot, sGaweff, RV, TLC), spirometry (FEV1, FVC, FEF25-75%) and DLCO were analyzed using Pearsons's correlation. Results: R5, R5-20 and DLCO correlated with FEV1 ($r=-0.55$, -0.61 and 0.87 , all $p<0.05$) suggesting that small airway resistance increased and DLCO decreased linearly with reduction in FEV1. The correlation of FEV1 was highest with sGawtot and sGaweff ($r=0.96$, $p<0.01$ for both). FVC correlated with all the measured parameters suggesting that FVC is reflective of overall lung function (all $p<0.05$). Small airway parameter FEF25-75% correlated best with sGawtot and sGaweff ($r=0.911$ and 0.914 , both $p<0.01$) and also correlated with R5 and R5-20 ($r=-0.5$ and $p<0.05$ for both). Neither FEV1 nor FEF25-75 correlated with R20 ($p>0.05$). sGawtot and sGaweff correlated best with FEF25% ($r=0.95$, $p<0.01$ for both). Conclusion: sGaw reflects more distal airways than R5 and R5-20. FEV1 majorly reflects small airway obstruction and FVC is a measure of overall lung function. DLCO decreases linearly as FEV1 decreases.