Dynamic lung compliance in non-smokers with asthma and fixed, non-reversible airflow obstruction

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To the Editor:

We read with interest the article "Dynamic compliance and reactance in older non-smokers with asthma and fixed airflow obstruction" by DURACK *et al.* [1] in the *European Respiratory Journal*. Oscillometry provides analysis of intrabreath mechanics and airway distensibility measured as the slope of the conductance–lung volume relationship was found to be more sensitive in assessing bronchodilator responsiveness in relation to reactance *versus* lung volume [2].

Ventilation distribution being heterogenous is determined by the variation of time constants, the product of resistance and static compliance of individual lung units. The authors found that lung compliance measured under dynamic conditions (C_{dyn}) was found to be related to respiratory system reactance at 5 Hz (X_5) and, more importantly, its contribution to heterogeneity is greater than static lung compliance (C_{stat}) in asthma patients, but they did not assess the contribution of the first determinant of the product, *i.e.* resistance in airway heterogeneity.

We have previously assessed airway distensibility and its first moment derivative (because of the known effect of flow on resistance), in asthma patients after bronchodilation or anti-inflammatory treatment [3]. We found that after bronchodilatation, changes in distensibility measured as linear regression slope of conductance (reciprocal of resistance) at 5 Hz (G(rs5)) *versus* lung volume (ΔG(rs5)/ΔV(L)) were far greater (34%) than the sensitive traditional oscillometric indices, but its first moment derivative linear regression slope of respiratory system conductance *versus* lung flow (ΔG(rs5)/Δflow), was not (2.8%).

After 12 weeks' inhaled steroid treatment, ΔG(rs5)/Δflow changes were significantly increased, by 46%, indicating that the first moment of distensibility probably better reflects changes in airway wall oedema rather than airway tone in asthma, providing information on peripheral mechanical tissue properties alterations, which are also related to heterogeneity of time constants such as C_{dyn} and X_5.

We, therefore, suggest that airway distensibility measurement indices might be useful, providing additional information along with C_{dyn} and X_5 in detecting airway wall pathology in asthma. This observation warrants further exploration in prospective trials.

Shareable abstract (@ERSpublications)
Airway distensibility measurement indices might be useful for providing additional information in detecting airway wall pathology in asthma https://bit.ly/3ntNLya

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