

## Non-invasive assessment of intrinsic positive end-expiratory pressure

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Abstract (max 1500 characters, space included)

Assessment of intrinsic positive end-expiratory pressure (PEEPi) in spontaneously breathing subjects requires an esophageal balloon (ES) to estimate the end-expiratory sudden drop of alveolar pressure ( $P_{alv}$ ) corresponding to PEEPi. With the advent of electronic compensation,  $P_{alv}$  can be estimated also plethysmographically, opening the possibility to assess PEEPi non-invasively. The aim of this study is to develop a procedure to identify PEEPi on plethysmographic  $P_{alv}$  tracings and to compare the result of its application with ES-derived data (PEEPi<sub>es</sub>) from the literature.

60 COPD patients underwent plethysmography before and after bronchodilation (BD). 35 patients exhibited tidal expiratory flow-limitation (FL), a condition likely to induce PEEPi. Plethysmographic PEEPi (PEEPi<sub>pl</sub>) was identified as the sudden drop of  $P_{alv}$  immediately before end-expiration by an automated algorithm.

Before BD, 34 COPD patients with FL and 11 without FL presented PEEPi<sub>pl</sub>. In patients with PEEPi<sub>pl</sub>, PEEPi<sub>pl</sub> was greater in the presence than in the absence of FL (3.8 (1.8) versus 2.0 (1.4) cmH<sub>2</sub>O,  $P=0.007$ ). On average, after BD PEEPi<sub>pl</sub> decreased by ~30%. PEEPi<sub>pl</sub> was inversely correlated with IC%p and FEV<sub>1</sub>%p, and positively correlated with dyspnea at rest ( $p<0.001$ ). PEEPi<sub>pl</sub> values were similar to PEEPi<sub>es</sub> previously measured (Haluszka 1990; Dal Vecchio 1990).

In conclusion, although a direct PEEPi<sub>pl</sub>-PEEPi<sub>es</sub> comparison is needed to validate the technique, non invasive assessment of PEEPi seems feasible.