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Title: Interaction between airway calibre and exhaled NO: Impact on asthma control assessment

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Body: Background : Exhaled nitric oxide (FENO) was shown to reflect asthma control change over time (Michils et al. ERJ 2008). However, FENO accuracy varies considerably between patients. Aim: to assess what features may affect FENO ability to reflect asthma control focusing on airway calibre which interferes with FENO. Methods: Post hoc analysis including 116 asthma patients seen at least 5 times in the out patient asthma clinic. At each visit, FENO and FEV1 were measured; asthma control was assessed by the asthma control questionnaire (ACQ). The individual correlation coefficient r between FENO changes and ACQ score changes over two consecutive visits was computed. Based on r, “concordant” ($r>0.7$, $n=30$) and “discordant” ($r<0.1$, $n=30$) groups were defined. Potential determinants of concordance probability were evaluated by a logistic regression analysis. Independent variables were the individual mean values of FENO, FEV1, ACQ, inhaled corticosteroids (ICS), and a binary variable (BV) coded 1 if the intra-subject correlation coefficient between individual FENO and FEV1 changes was positive, and 0 if negative. Results: FENO, FEV1, and ACQ did not influence concordance, whereas ICS ($p=0.015$), and, more strikingly, BV (adjusted odds ratio = 4.7 [2.1-10.7], $p<0.001$) did. Discussion: It is shown that a positive relationship between FENO and FEV1 (BV=1) reduces the ability of FENO to reflect asthma control. This suggests that, in “discordant” patients, airway inflammation and reduction in airway calibre occur in the same lung compartment. Conclusion: All together, our results suggest that clinicians might have to take into account airway calibre when interpreting FENO changes in asthma patients.