



Improved prediction of asthma exacerbations by measuring distal airway inflammation

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Partitioning exhaled nitric oxide allows improved prediction of risk of an asthma attack in the subsequent 4 months. $C_{alvNO} > 7$ ppb was highly specific for a subsequent exacerbation, while $C_{alvNO} < 4$ ppb excluded risk of an attack with high specificity. <https://bit.ly/3zWZWYp>

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Abstract

Introduction Partitioning parameters measured from exhaled nitric oxide, such as the alveolar concentration of nitric oxide (C_{alvNO}), may provide better predictors of future asthma exacerbation than exhaled nitric oxide fraction at an expiratory flow rate of $50 \text{ mL} \cdot \text{s}^{-1}$ ($F_{ENO_{50}}$). We aimed to determine whether any partitioned nitric oxide parameters were more closely associated than $F_{ENO_{50}}$ with subsequent asthma exacerbations.

Methods 68 asthmatic children (mean \pm SD age 9.0 ± 2.4 years) were followed prospectively (134 visits) and exacerbations were recorded. Childhood Asthma Control Test (cACT), spirometry, $F_{ENO_{50}}$, C_{alvNO} , bronchial flux of nitric oxide (J_{awNO}), transfer factor of nitric oxide (D_{awNO}) and airway wall concentration of nitric oxide (C_{awNO}) were measured.

Results No exacerbation was recorded in 99 visits (Group 1) and an exacerbation was recorded in 35 visits (Group 2). The median (range) $F_{ENO_{50}}$, J_{awNO} , C_{alvNO} , D_{awNO} and C_{awNO} of Group 1 versus Group 2: 12.7 (4–209) versus 13.5 (3.8–149.9) ppb, 715 (10–12 799) versus 438 (40–7457) $\text{pL} \cdot \text{s}^{-1}$, 3.4 (0.2–10.8) versus 5.2 (1.7–23.6) ppb, 38.3 (0.2–113.3) versus 38 (1.3–144.5) $\text{pL} \cdot \text{s}^{-1} \cdot \text{ppb}^{-1}$ and 26.8 (4.1–2163) versus 29.9 (5.5–3054) ppb, respectively. Other than for C_{alvNO} ($p < 0.001$), there was no difference between the two groups. $C_{alvNO} > 7$ ppb predicted asthma exacerbation with specificity 90.9% and positive likelihood ratio (LR) 3.1. Conversely, $C_{alvNO} < 4$ ppb excluded an exacerbation with sensitivity 71.4% and negative LR 0.48. An increase of C_{alvNO} by 0.5 ppb between visits could also predict an exacerbation with sensitivity 92%, specificity 92%, positive LR 11.8 and negative LR 0.08.

Conclusions Assessment of C_{alvNO} improved prediction of subsequent exacerbation, highlighting the importance of distal inflammation in asthma outcomes in children.