Eur Respir J 2003; 21: 195–198
DOI: 10.1183/09031936.03.00067103

European Respiratory Journal
ISSN 0903-1936

CORRESPONDENCE

Exhaled breath temperature in asthma

To the Editor:

We read with interest the manuscript of PIACENTINI *et al.* [1]. This paper shows that exhaled breath temperature plateau and exhaled nitric oxide (NO) are correlated in children with asthma.

This finding is interesting considering that NO is a marker of inflammation and that exhaled breath temperature may also be used to assess inflammation in the airways in a noninvasive way. We previously showed a similar correlation between exhaled NO and breath temperature in adults [2]. However, we measured the rate of exhaled breath temperature increase (Δe°T) rather than the peak expiratory temperature (PET) and the plateau temperature (PLET) measured in this study. The use of Δe°T as a parameter to characterise the exhaled breath temperature curve allowed us to show that asthmatic patients have higher Δe°T values compared to those in normal subjects, possibly reflecting airway inflammation and bronchial blood flow. Contrary to what was shown in the study by PIACENTINI *et al.* [1], we were not able to show any correlation between PLET and exhaled NO, and PLET was not significantly different in asthmatic compared to normal subjects, confirming that Δe°T is a better parameter to characterise the curve.

In addition, we are surprised to see that the PIACENTINI *et al.* [1]. managed to separate the PET from the PLET, as they coincide in our tracings (fig. 1).

Furthermore, the authors failed to recognise that Δe°T and plateau are dependent on the exhalation flow rate [2]. The children were asked to perform a "slow expiratory act" but the exhalation flow rate was not standardised, making the results unreliable. Moreover, the mouth pressure generated during exhalation should be determined to confirm that the soft palate was effectively closed avoiding contamination of the exhaled breath with nasal air.

In addition, the intersession and intrasession reproducibility of the method was not investigated.

The lack of standardisation of the method may explain some of the unexpected findings in this paper, such as the failure of steroids to decrease exhaled breath temperature despite their efficacy in reducing bronchial blood flow [3]. Furthermore, exhaled NO levels were similar in steroid-treated and untreated children, whereas it is well established that steroids effectively reduce the levels of exhaled NO [4, 5].

We feel that the methodological inexactitudes and the unexpected findings deserve a comment by the authors, which was not provided in the paper as published.

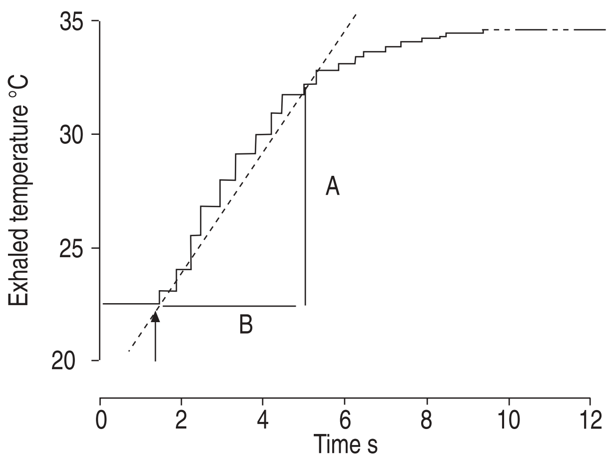

Fig. 1. – On-line recording of exhaled breath temperature of a normal subject. Arrow: start exhalation; –··–: plateau. "A" represents the increase of temperature from baseline to 63% (two time constants) of the maximum increase and "B" is the time required to reach it. A/B is the slope of the curve and represents the rate of temperature increase from baseline to 63% of the total temperature increase (Δe°T=3.0°C·s^{-1}).

P. Paredi, S.A. Kharitonov, P.J. Barnes
Dept of Thoracic Medicine, National Heart and Lung Institute, Imperial College School of Science, Technology and Medicine, London, UK.

References

1. Piacentini GL, Bodini A, Zerman L, *et al.* Relationship between exhaled air temperature and exhaled nitric oxide in childhood asthma. *Eur Respir J* 2002; 20: 108–111.
2. Paredi P, Kharitonov SA, Barnes PJ. Faster rise of exhaled breath temperature in asthma: a novel marker of airway inflammation? *Am J Respir Crit Care Med* 2001; 165: 181–184.
3. Brieva JL, Danta I, Wanner A. Effect of an inhaled glucocorticosteroid on airway mucosal blood flow in mild asthma. *Am J Respir Crit Care Med* 2000; 161: 293–296.
4. Zanconato S, Scollo M, Zaramella C, Landi L, Zacchello F, Baraldi E. Exhaled carbon monoxide levels after a course of oral prednisone in children with asthma exacerbation. *J Allergy Clin Immunol* 2002; 109: 440–445.
5. Payne DN, Adcock IM, Wilson NM, Oates T, Scallan M, Bush A. Relationship between exhaled nitric oxide and mucosal eosinophilic inflammation in children with difficult asthma, after treatment with oral prednisolone. *Am J Respir Crit Care Med* 2001; 164: 1376–1381.