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## Fractional exhaled nitric oxide in the assessment of exercise-induced bronchoconstriction: a multicentre retrospective analysis of UK-based athletes

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### Abstract

**Background:** Exercise-induced bronchoconstriction (EIB) is a condition characterised by temporary lower airway narrowing that occurs in association with physical activity. FeNO is an indirect biomarker of type 2 airway inflammation that has an established role in the assessment of asthma.

**Aims:** To evaluate the value of FeNO in the assessment of EIB.

**Method:** Multicentre retrospective analysis. Four hundred and eighty-eight athletes (male: 76%) performed baseline FeNO and spirometry pre-and-post eucapnic voluntary hyperpnoea (EVH). Sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) were calculated for established FeNO thresholds: intermediate ( $\geq 25$ ppb) and high ( $\geq 40$  ppb and  $\geq 50$ ppb) and evaluated against objective evidence of EIB ( $\geq 10\%$  fall in FEV<sub>1</sub>). The diagnostic accuracy of FeNO was calculated using receiver operating characteristics area under the curve (ROC-AUC).

**Results:** All athletes had normal resting lung function ( $>80\%$  FEV<sub>1</sub> pred). Despite this, 41% had a post-EVH fall in FEV<sub>1</sub> consistent with EIB. FeNO values  $\geq 25$ ppb,  $\geq 40$ ppb and  $\geq 50$ ppb were observed in 42%, 23% and 17% of the cohort, respectively. ROC-AUC for FeNO was 65%. Sensitivity, specificity, PPV and NPV are presented in Table 1.

**Conclusions:** FeNO  $\geq 40$  ppb provides good specificity, i.e., ability to rule-in a diagnosis of EIB. However, due to the poor sensitivity and predictive values, FeNO should not be employed as a replacement for EVH.

Table 1. FeNO sensitivity, specificity, PPV and NPV for the detection of EIB.

	FeNO >25ppb	FeNO >40ppb	FeNO >50ppb
Sensitivity	55%	37%	27%
Specificity	66%	85%	88%
PPV	51%	63%	62%
NPV	70%	68%	66%

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