

DOES THE MEASUREMENT OF FRACTIONAL EXHALED NITRIC OXIDE HAVE A ROLE IN THE DETECTION OF EXERCISE-INDUCED BRONCHOCONSTRICTION IN ATHLETES?

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Aim: Fractional exhaled nitric oxide (FeNO) is an indirect marker of airway inflammation, recommended for the assessment and management of asthma (1). The role of FeNO in detecting exercise-induced bronchoconstriction (EIB) and monitoring respiratory health in athletes has however yet to be established. The aim of this pilot study was therefore to evaluate the value of FeNO in detecting EIB in a screened cohort of athletes.

Method: Fifty-three endurance trained athletes (male: $n = 36$) (age: 34 ± 10 years) performed baseline FeNO and spirometry pre-and-post a eucapnic voluntary hyperpnoea challenge (EVH) (2). Sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) were calculated for established FeNO thresholds: (intermediate [>25 ppb] and high [>50 ppb]) (1) and evaluated against objective evidence of EIB: (EVH diagnostic cut-off [$-10\% \Delta FEV_1$ at two consecutive time-points] (3) and [$-15\% \Delta FEV_1$ at one time-point]) (2). 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 ($>80\% FEV_1$ pred). The prevalence of EIB was 19% ($-10\% \Delta FEV_1$) and 15% ($-15\% \Delta FEV_1$) (mean $\Delta FEV_1 = -8.2\% \pm 9.2$). FeNO values >25 ppb and >50 ppb were observed in 45% and 17% of the cohort, respectively. ROC-AUC for FeNO was 75% ($-10\% \Delta FEV_1$) and 83% ($-15\% \Delta FEV_1$). Sensitivity, specificity, PPV and NPV are presented in Table 1.

Conclusion: FeNO is a simple tool that has an established role in the assessment of airway inflammation in athletes. FeNO >50 had good specificity (93%) for a positive EVH test; however given the poor predictive values, our findings indicate that FeNO should not be employed as a substitute for indirect bronchoprovocation for diagnostic purposes. Future research is required to establish normative values and determine the role of FeNO in modifying the treatment of EIB in athletes.

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

Population: $n = 53$						
Prevalence (-10% Δ FEV ₁): 19%						
Prevalence (-15% Δ FEV ₁): 15%						
EVH						
		-10% ΔFEV₁			-15% ΔFEV₁	
		+	-	+	-	
FeNO (25ppb)	+	6	18	+	6	18
	-	4	25	-	2	27
FeNO (50ppb)	+	6	3	+	6	3
	-	4	40	-	2	42
FeNO						
		-10% ΔFEV₁		-15% ΔFEV₁		
		25ppb	50ppb	25ppb	50ppb	
Sensitivity (%)		60	60	75	75	
Specificity (%)		58	93	60	93	
PPV (%)		25	67	25	67	
NPV (%)		86	91	93	95	

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