



MEETING ABSTRACT

Open Access

Are known biomarkers for asthma present in early infancy?

M Ayanna Boyce^{1*}, Sanja Stanojevic², Krzysztof Kowalik³, Susan Balkovec², Felix Ratjen², Malcolm R Sears⁴, Padmaja Subbarao²

From Canadian Society of Allergy and Clinical Immunology Annual Scientific Meeting 2013
Toronto, Canada. 3-6 October 2013

Background

Exhaled nitric oxide (FE_{NO}) is a biomarker for eosinophilic airway inflammation [1]. Elevated FE_{NO} has been proposed as a marker for diagnosing asthma and predicting asthma exacerbations [2]. We wished to examine the association between known asthma risk factors and FE_{NO}. A sub cohort of children (n=222) participating in the Canadian Healthy Infant Longitudinal Development (CHILD) study underwent infant pulmonary function tests (IPFTs) during the first year of life.

Methods

Risk factors were obtained from a subset of available CHILD questionnaires administered prenatally and 3 times during the first year of life. FE_{NO} was collected using a multiple-breath sampling technique during quiet tidal breathing at the 3 month visit, 1 year visit, or both visits. Prenatal smoke exposure was defined as any maternal smoking, including mothers who stopped or cut down on smoking during pregnancy. Postnatal smoke exposure was defined as any exposure in or away from the home up to 1 year of age. Parental asthma was defined as self-reported or doctor diagnosed asthma. Parental atopic status was confirmed by allergy skin tests. T-tests with Bonferroni correction for multiple comparisons were used to compare FE_{NO} in the exposed and unexposed groups ($\alpha=0.004$).

Results

At the 3 month visit, 134 infants attended the IPFT lab, and 84 of 117 attempted eNO tests were successfully analyzed; mean FE_{NO} was 16.8±8.1ppb. At the 1 year visit, 181 infants attended the IPFT lab and 138 of 158 attempted eNO tests were successfully analyzed; mean FE_{NO} was 15.3±9.7ppb. Prenatal smoking rates were low (3% and 6%) and showed no association with FE_{NO} (Table 1). Postnatal smoke exposure was also not associated with FE_{NO}. FE_{NO} was not statistically different in infants whose mothers or fathers had a history of asthma or atopic status, compared to those without. Having siblings was not significantly associated with FE_{NO} after applying the Bonferroni correction.

Conclusions

Smoke exposure was not related to FE_{NO}, however no nicotine biomarker was assessed and smoking rates were low. Maternal and paternal histories were not associated with FE_{NO} levels in healthy children up to 1 year of age. None of the risk factors were statistically significantly associated with FE_{NO}, however infants with siblings were observed to have a lower FE_{NO} than infants without siblings at the 1 year visit. A larger sample size is required to increase the power of these tests. Further factors must be studied to explain the variation in FE_{NO} measures seen.

* Correspondence: mabooyce@uwaterloo.ca

¹Faculty of Applied Health Sciences, University of Waterloo, Waterloo, Canada

Full list of author information is available at the end of the article

Table 1

Variable	Testing Time Point		Sample Size	Mean \pm SD (ppb)	P value
Prenatal Smoke Exposure	3 months	Yes	2	13.12 \pm 0.8	0.072
		No	57	15.40 \pm 7.7	
	1 Year	Yes	6	21.12 \pm 14.6	0.405
		No	100	15.63 \pm 9.5	
Postnatal Smoke Exposure	3 months	Yes	14	15.13 \pm 7.5	0.471
		No	64	16.76 \pm 7.6	
	1 Year	Yes	38	13.72 \pm 8.2	0.233
		No	99	15.73 \pm 10.1	
Maternal Atopic Status	3 months	Yes	47	16.72 \pm 7.5	0.458
		No	19	15.19 \pm 7.5	
	1 Year	Yes	87	15.11 \pm 10.0	0.638
		No	40	15.94 \pm 8.9	
Maternal Asthma	3 months	Yes	16	17.23 \pm 8.2	0.495
		No	49	15.62 \pm 7.5	
	1 Year	Yes	29	14.50 \pm 7.9	0.460
		No	88	15.86 \pm 10.3	
Paternal Atopic Status	3 months	Yes	55	16.32 \pm 7.4	0.925
		No	12	16.07 \pm 8.4	
	1 Year	Yes	87	15.13 \pm 9.4	0.085
		No	21	19.24 \pm 9.5	
Paternal Asthma	3 months	Yes	10	15.45 \pm 10.0	0.962
		No	48	15.28 \pm 7.2	
	1 Year	Yes	20	19.42 \pm 10.1	0.081
		No	80	14.89 \pm 9.5	
Sibling	3 months	Yes	30	13.54 \pm 8.2	0.065
		No	29	17.17 \pm 6.5	
	1 Year	Yes	46	13.27 \pm 10.0	0.015
		No	60	17.98 \pm 9.4	

Authors' details

¹Faculty of Applied Health Sciences, University of Waterloo, Waterloo, Canada. ²Respiratory Medicine, Hospital for Sick Children, Toronto, Canada. ³Department of Physiology, McGill University, Montreal, Canada. ⁴Department of Medicine, McMaster University, Hamilton, Canada.

Published: 3 March 2014

References

1. Gabriele C, Jaddoe VW, van Mastrigt E, Arends LR, Hofman A, Moll HA, de Jongste JC: **Exhaled nitric oxide and the risk of wheezing in infancy: the Generation R Study.** *Eur Respir J* 2012, **39**:567-572.
2. American Thoracic Society: **ATS/ERS Recommendations for Standardized Procedures for the Online and Offline Measurement of Exhaled Lower Respiratory Nitric Oxide and Nasal Nitric Oxide, 2005.** *Am J Respir Crit Care Med* 2005, **171**:912-930.

doi:10.1186/1710-1492-10-S1-A48

Cite this article as: Boyce *et al.*: Are known biomarkers for asthma present in early infancy? *Allergy, Asthma & Clinical Immunology* 2014 **10**(Suppl 1):A48.

Submit your next manuscript to BioMed Central and take full advantage of:

- Convenient online submission
- Thorough peer review
- No space constraints or color figure charges
- Immediate publication on acceptance
- Inclusion in PubMed, CAS, Scopus and Google Scholar
- Research which is freely available for redistribution

Submit your manuscript at
www.biomedcentral.com/submit

