Title:

Levels of total IgE vs. specific IgE during childhood for defining and predicting T2-high asthma

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ABSTRACT (250 words)

Background:

T2-high asthma is characterized by elevated blood eosinophils (b-eos), and/or fractional exhaled nitric oxide (FeNO), and/or being "allergy-driven", which is not well-defined.

Objective:

To investigate the role of total and specific immunoglobulin E (tIgE/sIgE) for defining and predicting T2-high asthma in childhood as biomarkers of "allergy-driven".

Methods:

We utilized data from the COPSAC2000 (n=411) and COPSAC2010 (n=700) mother-child cohorts with repeated measurements of tIgE, sIgE, b-eos and FeNO through childhood. We defined T2-high asthma by elevated b-eos ($\geq 0.3x10^9$/L) and/or FeNO ($\geq$20 ppb) and analyzed association with elevated tIgE (age-specific cut-offs) and sIgE ($\geq$0.35 kU/L) using logistic regression at ages 7/10/13/18 years. Further, we analyzed the association between elevated tIgE and sIgE at age 0-4 years and later risk of T2-high asthma using logistic regression and ROC models.

Results:

Elevated tIgE was associated with risk of T2-high asthma at all time points, whereas elevated sIgE showed similar results at ages 10/13/18 years. There was no overall model fit preference for a combination of tIgE and sIgE instead of tIgE or sIgE alone using Vuong's Likelihood-Ratio-Test, Akaike or Bayesian Information Criterion. Further, elevated tIgE at age 0-4 years was associated with later risk of T2-high asthma at all time points (AUC=0.63-0.70), whereas elevated sIgE at 0-4 years was only associated with T2-high asthma at 18 years (AUC=0.66). There were no significant differences in AUC values between tIgE and sIgE (DeLong's test).

Conclusion:

Elevated tIgE and sIgE are equally useful stand-alone biomarkers for defining and predicting risk of T2-high asthma in childhood.