Assessment of Wheezing Frequency and Viral Etiology on Childhood and Adolescent Asthma Risk

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Abstract

Background

• We previously reported that rhinovirus (RV) wheezing illnesses are the most significant predictors of the subsequent development of asthma at age 6 years.
• A similar high-risk cohort has reported that the number of lower respiratory episodes in the first years of life, as opposed to the particular infectious trigger, are associated with asthma development.

Research Question

What is the role of RV wheezing illnesses versus other wheezing illnesses caused by viruses in asthma risk from ages 6 to 13 years?

Hypothesis

The number of RV wheezing illnesses will be a more robust predictor of asthma development and persistence.

Methods

• Children at high risk for the development of asthma were studied prospectively from birth in the Childhood Origins of Asthma (COAST) study; 259 were followed to age 6 and 217 to age 13.
• The etiology and timing of specific viral wheezing respiratory illnesses during early childhood was assessed using nasopharyngeal swabs, culture, and multiplex reverse transcriptase PCR.
• The relationships of these virus-specific wheezing illnesses and frequency of wheezing illnesses to the development of asthma were analyzed using a generalized additive logistic regression model (GAM).

Results

• The number of RV wheezing episodes in early childhood was significantly associated with asthma risk from ages 6 to 13 years.
• A generalized additive logistic regression model (GAM) of asthma was fit for asthma risk from ages 6 to 13 years.

Conclusion:

RV wheezing illnesses remain an important predictor of asthma development in high-risk children and continued research efforts should focus on defining host and viral factors that promote wheezing RV illnesses in early childhood.

Conclusions

• The number of RV wheezing episodes in early childhood was significantly associated with asthma risk between ages 6 & 13 years while number of non-RV wheezing episodes was not significantly associated with asthma risk.
• Our study demonstrated higher rates of viral detection (90%) compared with a similar high-risk cohort (65%) with detection of RV (48% vs. 23%) accounting for the majority of the discrepancy.
• We hypothesize that the molecular techniques utilized in our study more robustly identify RV C, which may account for the discrepancy in RV detection rates.

Implications

• RV wheezing illnesses remain an important predictor of asthma development in high-risk children.
• Ongoing research efforts should focus on defining host and viral factors that promote RV wheezing illnesses in early life.

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References
