Asthma

PATHOPHYSIOLOGY

Wheezy Rhinovirus Illnesses in Early Life Predict Asthma Development in High-Risk Children

PURPOSE OF THE STUDY. Childhood asthma is often preceded by episodes of viral wheezing. Whether specific viral infections confer more risk for future development of asthma is incompletely understood. Associations between the timing and cause of early viral infections and the subsequent risk of childhood asthma were assessed in a cohort of children at high risk.

STUDY POPULATION. A total of 259 children were monitored prospectively from birth to 6 years of age in the Childhood Origins of Asthma (COAST) study. To qualify for the COAST study, ≥1 parent was required to have respiratory allergies (defined as ≥1 positive aeroallergen skin tests) and/or a history of physician-diagnosed asthma.

METHODS. The etiology and timing of specific viral wheezing respiratory illnesses during early childhood were assessed by using nasal lavage, culture, and multiplex reverse transcriptase-polymerase chain reaction assays. The relationships of these virus-specific wheezing illnesses and other risk factors to the development of asthma were analyzed.

RESULTS. A specific viral etiology was identified in 90% of wheezing illnesses. Wheezing with respiratory syncytial virus (RSV) (odds ratio [OR]: 2.6), rhinovirus (RV) (OR: 9.8), or both RV and RSV (OR: 10) from birth to age 3 years was associated with increased asthma risk at age 6 years. In year 1, both RV wheezing (OR: 2.8) and aeroallergen sensitization (OR: 3.6) independently increased asthma risk at age 6 years. By age 3 years, wheezing with RV (OR: 25.6) was more strongly associated with asthma at age 6 years than was aeroallergen sensitization (OR: 3.4). Nearly 90% of children with wheezing with RV at age 3 subsequently developed asthma, regardless of the presence or absence of aeroallergen sensitization.

CONCLUSIONS. In children at high genetic risk, early childhood wheezing in the outpatient setting caused by RV infection is a strong risk factor for the development of asthma at age 6 years.

REVIEWER COMMENTS. We have been familiar with the previous studies focused on associations of early RSV infections and the subsequent risk for asthma. Persistent wheezing associated with early-onset RV infection seems to be a better indicator of asthma risk than RSV infection. It will be interesting to follow the COAST study results as they monitor these children throughout childhood and beyond. A still-unanswered question is: do early viral infections cause asthma or just unmask predisposed asthma?

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Evidence of a Causal Role of Winter Virus Infection During Infancy in Early Childhood Asthma

PURPOSE OF THE STUDY. In the first year of life, ~20% of children have ≥1 episode of respiratory illness with wheezing. Other studies have shown that certain respiratory viruses confer an increased risk of developing later childhood asthma. Whether these common respiratory viruses cause asthma or are a marker of individuals predisposed to developing asthma is unknown. The timing of birth in relation to the winter virus peak and whether this alters the risk of developing early childhood asthma are investigated in this study.

STUDY POPULATION. A population-based, birth cohort study of 95 310 children who were born between 1995 and 2000 and followed through 2005, who were continuously enrolled in the Tennessee Medicaid program from birth through early childhood, representing 25% of the annual births in Tennessee, was performed.

METHODS. The criteria for defining asthma variables and classification represent a minor flaw, because they were not defined a priori and were based on adult data. However, the authors used well-designed methods to make certain that the main outcome variables were defined in the best way the data allowed. Infant birth in relation to the winter virus peak was defined for each infant as the infant’s age in days from birth to the first winter virus peak. The annual winter virus peak was defined as the first day of the week with the highest number of bronchiolitis hospitalizations for that winter season.

RESULTS. During the 5 winter virus seasons, the risk of developing asthma tracked with the timing of infant birth in relation to the winter virus peak among the 95 310 children studied from birth through early childhood. Infant birth ~4 months before the winter virus peak carried the highest risk, with a 29% increase in the odds of developing asthma, compared with birth 12 months before the peak (odds ratio: 1.29). Infant age at the winter virus peak was comparable to greater than other known risk factors for asthma, such as maternal smoking or maternal asthma. Over the 5 study seasons,
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