frequent respiratory symptoms with no asthma diagnosis, and normal. Multivariate regression was used to determine if demographic or potential risk factors varied between phenotypes and whether measures of severity varied by phenotype.

RESULTS. A total of 4.8% of children had atopic asthma, 1.9% had nonatopic asthma, 3.4% had resolved asthma, and 4.3% had frequent respiratory symptoms. Mean BMI was higher among children with nonatopic asthma, whereas prenatal maternal smoking was a risk factor for resolved asthma. Atopic and nonatopic asthma were similar for most measures of asthma severity (eg, medication use and lung function), and relatively few children in either group were receiving inhaled corticosteroids (5%–10%). Patients with resolved asthma had fewer symptoms but lung-function impairment similar to that seen with current asthma, whereas children with frequent respiratory symptoms but no asthma diagnosis had normal lung function.

CONCLUSIONS. The authors conclude that asthma risk factors and measures of severity vary between children with different asthma phenotypes.

REVIEWER COMMENTS. Studies of children and adults have identified several unique phenotypes of asthma that share the feature of chronic and/or recurrent airflow obstruction. Accurate categorization is crucial in efforts to define genetic and environmental risk factors for asthma, and this work uses a very large national database to help establish environmental correlates to asthma subgroups in children. Notably, resolved asthma was linked to prenatal exposure to tobacco smoke and also to persistent impairment in lung function. Because environmental and lifestyle factors are almost certainly behind the rise in asthma prevalence, this line of research is clearly valuable from a public health perspective.

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Clinical Use of Noninvasive Measurements of Airway Inflammation in Steroid Reduction in Children

PURPOSE OF THE STUDY. To examine the clinical utility of noninvasive measures of airway inflammation as predictors for successful inhaled corticosteroid (ICS) dose reduction in children with asthma.

STUDY POPULATION. Forty children (aged 6–17 years) with stable asthma on a constant ICS dose and eligible for steroid dose reduction.
METHODS. Children were followed prospectively every 8 weeks with noninvasive measures of airway inflammation including exhaled nitric oxide (eNO), sputum induction with bronchial hyperreactivity testing, and exhaled breath condensate. Physicians who were unaware of the results of inflammatory measures made reductions in the steroid dose on the basis of clinical assessment and spirometry. Multiple logistic-regression models were used to determine the usefulness of noninvasive inflammatory markers in predicting successful steroid reduction.

RESULTS. Seventy-five percent of patients tolerated a reduction in steroid dose for at least 2 months; however, 15 (38%) of the 40 patients’ conditions subsequently failed ICS dose reduction and experienced an asthma exacerbation. All children with absence of sputum eosinophils successfully tolerated dose reduction. Increased eNO ≥22 ppb (odds ratio: 6.3; 95% confidence interval: 3.75–10.58) and increased sputum eosinophils ≥3% (odds ratio: 1.38; 95% confidence interval: 1.06–1.81) were significant predictors of failed ICS dose reduction.

CONCLUSIONS. Noninvasive measures of airway inflammation may be useful tools in optimizing treatment of children with asthma.

REVIEWER COMMENTS. These findings suggest that noninvasive measures of airway inflammation are potential adjunctive tools that can be used in pediatric patients who appear clinically stable. However, their clinical usefulness may be limited by several factors. Sputum induction was not successfully performed in 25% of the children, and some measures including bronchial hyperreactivity and breath condensate did not prove to be useful predictors in this study. In addition, criteria for predicting failure were met in 6 (21%) of 28 and 19 (39%) of 49 occasions for sputum eosinophil and eNO cutoffs, respectively, when the child was successfully weaned on the basis of clinical judgment. Conversely, use of noninvasive markers would have prevented an attempt to wean steroids on >70% of occasions when patients subsequently experienced an exacerbation. Inflammatory markers as sole predictors of success or failure will likely result in both significant undertreatment and overtreatment with ICSs. Treatment algorithms that include noninvasive airway inflammatory markers in conjunction with clinical markers are likely the best approach to optimize therapy in children who appear clinically stable.
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