Asthma

PATHOPHYSIOLOGY

INCREASED INCIDENCE OF ASTHMA-LIKE SYMPTOMS IN GIRLS WHO BECOME OVERWEIGHT OR OBESE DURING THE SCHOOL YEARS


Purpose of the Study. Recent cross-sectional studies have shown an association between obesity and an increased risk of asthma, especially in females. These authors used data from the Tucson Children’s Respiratory Study to search for an increase in asthma in children who became overweight between 6 and 11 years of age.

Study Population. The participating children are a birth cohort enrolled between 1980 and 1984 and followed longitudinally. All are resident in the Tucson, Arizona, area.

Methods. Symptom questionnaires were completed by parents when the children were 6, 8, 11, and 13 years of age. Weight and height were measured at age 6 and 11. Home peak flow readings were gathered at age 11. Only those children providing peak flow measurements twice daily on at least 4 days over 1 week were included in the analysis. Spirometry including bronchodilator response was also obtained at age 11.

Results. By age 6 and 11 years, 55% and 48%, respectively, of the original cohort remained in the study. Several factors were associated with a body mass index (BMI) in the overweight (BMI >85 percentile to <95 percentile) or obese (BMI >95 percentile) range. Females who were overweight or obese at the age 11 visit were more likely to have a concurrent history of wheezing than the nonoverweight. This effect was not present in girls at age 6 nor in boys at either age. Females who became overweight or obese between age 6 and 11 were roughly 7 times more likely to have developed new-onset asthma at age of 11 or 13. This history of wheezing was accompanied by an increase in peak flow variability and bronchodilator responsiveness. This association of obesity with new-onset asthma between 6 and 13 years was seen in the boys.

Conclusions. The authors conclude that development of an elevated BMI between age 6 and 11 is associated with an increased risk of asthma in girls. They speculate that there are 2 likely explanations for the observation. First, obesity may influence circulating female sex hormones; these hormones are thought to alter beta2-adrenergic responsiveness and may have other proasthmatic activity. A second possibility is the presence of a subgroup of girls with genetic alterations in the responsiveness of female hormone receptor(s). Such a change could lead to a predisposition to obesity and to asthma symptoms. The authors note a third possibility, a relationship of lack of exercise and increased risk of asthma and obesity, that cannot be addressed by the data available.

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BODY MASS INDEX AND ASTHMA IN THE MILITARY POPULATION OF THE NORTHWESTERN UNITED STATES


Purpose of the Study. To examine the association between asthma and obesity among adults.

Study Population. Enrollees in a military managed care program, ages 17 to 96 years.

Methods. The investigators obtained data from 45 743 enrollment questionnaires that were completed between January 1997 and December 1998. After excluding those with emphysema/chronic bronchitis or implausible or missing body mass index (BMI) data, case-control analysis was performed on 2577 asthma cases and 36 347 controls. Because asthma was self-reported, the investigators selected random samples of 1000 cases and 1000 controls for verification. Status of the subject as a case or a control was verified by cross-referencing the cases and controls with medication profiles obtained from a computerized military health record system. Univariate analysis and multiple logistic regression was performed on both the larger case-control group and the verified case-control sample.
Results. Analysis performed on the larger, unverified study population showed that subjects with asthma were more likely to be female and younger and less likely to engage in exercise at least 3 times per week. When BMI was examined, enrollees with asthma were more likely to have BMIs 25.0 to 29.9 kg/m² than enrollees without asthma (odds ratio [OR]: 1.2; 95% confidence interval [CI]: 1.1–1.4). Enrollees with asthma were also more likely to be obese (BMI ≥30 kg/m²). These findings held after adjustment for age and sex and when the analysis was performed on the verified sample. The OR for asthma increased with increasing BMI in both the larger study population and the verified sample. These findings remained in the final multivariate regression model for the larger study population and the verified sample, with a maximal asthma risk with BMI between 35 to 39.9 kg/m² in the verified sample (OR: 3.8; 95% CI: 2.0–7.2).

Conclusion. BMI >25.0 is associated with asthma and increasing BMI is associated with increasing odds of asthma.

Reviewers’ Comments. This large study confirms findings of previously published smaller studies and suggests that obesity is a risk factor for the general adult population. Although selection bias may be a weakness of this study, its strength lies in the large study population. Whether obesity plays a causal role in the development of asthma or vice versa remains unclear.

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IMPACT OF LOW BIRTH WEIGHT ON EARLY CHILDHOOD ASTHMA IN THE UNITED STATES


Purpose of the Study. To study the contribution of low birth weight to the prevalence of asthma in children under 4 years old in the United States.

Study Population. A total of 8071 children on whom data was collected in the 1988 National Maternal-Infant Health Survey (NMIHS) and the 1991 Longitudinal Follow-up Survey. The NMIHS collected data from the primary caretakers of a set of children born in the United States in 1988, and then follow-up information was collected in their third year of life. African American and low birth weight infants were oversampled, increasing their representation in the database. Data were weighted to be nationally representative.

Methods. The primary endpoint was whether a health care provider had ever told the primary caretaker that the patient had asthma. Data on birth weight, sex, race, maternal age, maternal education and socioeconomic status, maternal smoking, and poverty were also collected. Birth weight was stratified to very low birth weight (VLBW) (<1500 g), moderately low birth weight (1500–2499 g), and not low birth weight (LBW). Data were then analyzed to determine relative contributions of birth weight and other factors to development of asthma.

Results. The prevalence of asthma was higher at lower birth weights: 6.7% in children weighing ≥2500 g at birth, 10.9% in children weighing 1500 to 2499 g at birth, and 21.9% in children weighing <1500 g at birth. Birth weight was independently associated with prevalence of asthma, as was African American race. Although LBW and VLBW infants had similar risks of developing asthma regardless of race, the prevalence of VLBW was tripled in African Americans.

Conclusions. These data identify a strong association between LBW and asthma. A total of 4000 excess asthma cases were attributable to LBW. The substantially increased prevalence of VLBW in the African American community may contribute to the higher prevalence of asthma in this community.

Reviewers’ Comments. The major weakness of this study is that it relies on retrospective data reported by the primary caretaker. The only measure of asthma used was the answer to a single question on whether the child had ever been diagnosed with asthma by a health care professional. This measure may simultaneously miss some patients in whom the caretaker failed to recall the diagnosis of asthma and overcount some patients who do not actually have asthma. Nonetheless, the data is compelling and supportive of other studies. These results provide another reason for improving prenatal care to prevent LBW and VLBW births and also suggest we should be targeting the LBW and VLBW children for asthma screening and early intervention with asthma therapies.

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DETECTION OF IgA AND IgG BUT NOT IgE ANTIBODY TO RESPIRATORY SYNCYTIAL VIRUS IN NASAL WASHES AND SERA FROM INFANTS WITH WHEEZING


Purpose of the Study. The role of respiratory syncytial virus (RSV) in stimulating an immunoglobulin E (IgE) antibody response and enhancing the development of asthma remains controversial. The aim of this study was to measure IgE, immunoglobulin A (IgA), and immunoglobulin G (IgG) antibody responses to immunodominant RSV antigens in nasal washes and serum samples from infants with and without respiratory symptoms.

Study Population. Forty infants aged 6 weeks to 2 years (20 with wheezing, 9 with rhinitis, and 11 without respiratory tract symptoms) were included in the investigation.

Methods. The children were enrolled in an emergency department during the mid-winter months and seen again at follow-up when they were asymptomatic. Nasal washes were obtained by standard methods and were evaluated for RSV antigen. Moreover, determination of antibody isotypes (IgE, IgA, and IgG) to RSV antigens was performed in nasal washes and serum samples by using an enzyme-linked immunosorbent assay. In a subset of nasal washes, IgE to RSV was also evaluated by using a monoclonal anti-F-receptor antibody-based assay.

Results. At enrollment, 15 patients with wheezing, 2 with rhinitis, and 1 control subject tested positive for RSV antigen. Thirteen patients with wheezing were <6 months old, and most (77%) were experiencing their first attack. Among the children with positive test results for RSV antigen, an increase in both nasal wash and serum IgA antibody to RSV-Fa and G2 was observed at the follow-up visit. There was no evidence for an IgE antibody response to either antigen.

Conclusions. Both IgA and IgG antibodies to the immunodominant RSV-Fa and G2 antigens were readily detected in the nasal washes and serum samples from patients in this study. The investigators were unable to demonstrate specific IgE antibody to these antigens and concluded that the production of IgE as a manifestation of a Th2 lymphocyte response to RSV is unlikely.
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