INFLUENCE OF BMI-PERCENTILE ON LUNG FUNCTION AND ASTHMA DIAGNOSIS IN CHILDREN

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Intro

Obesity increases the incidence of asthma in adults and children. This greater incidence of asthma in the obese could be due, in part, to misdiagnosis of pseudoasthma as asthma. We sought to test the hypothesis that obese children with PCP-diagnosed asthma (PDA) or asthma-like symptoms are less likely (compared to similar leans) to have: 1) confirmed Subspecialist Diagnosed Asthma (SpDA) after subsequent subspecialty evaluation, and 2) spirometry suggestive of asthma. Methods We conducted an electronic chart review involving 11 Nemours Children’s Clinic sites of patients referred with PDA or asthma-like symptoms to assess the association between body mass index (BMI)-percentile and respiratory complaints, pulmonary function, and asthma diagnosed by a specialist. From each initial visit, we collected: BMI, spirometry pre & post-bronchodilator, IgE, blood eos and neutrophils, and the primary, 2º, and 3º diagnoses made by a BC/BE Pediatric Pulmonologist or Allergist. Lastly, patients met “Strict criteria for asthma” (StCA) if they had SpDA AND either BD reversibility, FEV₁/FVC <0.8, blood eosinophilia (>4%) or IgE > 100 IU/ml. We used logistic regression models to assess the association between BMI% and asthma risk.

Results

Of the 2358 children (age 8-17) referred between Apr 01 and Dec 06, over 44% were overweight or obese. Nearly 28% were > 95th BMI%, while 9% were > 99th BMI%. This same pattern of extreme obesity (>99th%) was seen in PDA (9.6%), SpDA (9.3%), and StCA (9.6%) patients. Logistic regression analysis for all patients showed direct associations between BMI% and PDA (OR=1.006; p<0.0001), SpDA (OR=1.004; p=0.005), and StCA (OR=1.005; p=0.05). Diagnoses commonly responsible for pseudo-asthma (e.g. exertional dyspnea, VCD) were less common among obese patients (p=0.0001). Non-parametric/Kruskal-Wallis analysis showed significant associations between BMI% and FVC, FEV₁, FEV₁/FVC, FEF₂₅₋₇₅, total neutrophils, and total platelets (all p<0.05). Parametric linear regression analysis confirms the positive association between BMI% and FVC%(p<0.0001), FEV₁ (p<0.0001), and a negative association between BMI% and FEV₁/FVC (p=0.001). Above the 95th BMI%, increasing BMI% was associated with reductions in FEV₁, FEV₁/FVC ratio (p<0.05) and FEF₂₅₋₇₅. Patients >95th% BMI tended to increase percent and total neutrophils (p<0.05), WBC, and platelets, compared to leans. Conclusions These data suggest that the greater incidence of asthma in the obese is not due to misdiagnosis of asthma. Our results suggest that high BMI is associated with greater, not lesser, likelihood of true asthma, airflow obstruction and systemic inflammation, particularly > 95th% BMI. These effects remain even when held to stricter diagnostic standards for asthma. To our knowledge, this is the first report to show in children that obesity does not significantly confound the diagnostic accuracy of asthma.