

Attention-deficit/hyperactivity disorder has a state-dependent association with asthma: The role of systemic inflammation in a population-based birth cohort followed from childhood to adulthood

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Abstract

There is a high comorbidity between attention-deficit/hyperactivity disorder (ADHD) and asthma, and inflammation has been proposed as a potential pathophysiological mechanism behind this association. Most studies conducted so far have used a cross-sectional design, and none has evaluated the prevalence of asthma symptoms in patients with ADHD followed from childhood to adulthood. We relied on data from the 1993 Pelotas birth cohort to evaluate the association between ADHD and asthma in patients with distinct patterns of incidence, persistence and remission, and to explore the potential role of inflammatory markers in the comorbidity. We analyzed data from 3281 individuals from the 1993 Pelotas birth cohort collected at birth (1993), 11 years (2004), 18 years (2011), and 22 years (2015). Subjects were first classified according to their ADHD and asthma status as early-onset (EO) persistent (positive screening for ADHD at 11 years and diagnosis of ADHD according to DSM-5, except criterion E, at either 18 or 22 years), EO-remittent (positive screening for ADHD at 11 years only), late-onset (diagnosis of ADHD according to DSM-5, except criterion E, at 18 or 22 years only), or healthy subjects (negative for both conditions in all evaluation). After controlling for confounders, significant associations were observed between EO-remittent ADHD and EO-remittent asthma (OR 1.68, 95% CI 1.11-2.55), EO-persistent ADHD and EO-persistent asthma (OR 4.33, 95% CI 1.65-11.34), and between late-onset ADHD and late-onset asthma (OR 1.86, 95% CI 1.28-2.70), suggesting a state-dependent association. Serum interleukin-6 (IL-6) and C-reactive protein (CRP) were measured at the 18- and 22-year evaluations and compared between subjects positive for ADHD, asthma, and subjects with both or none conditions, regardless of the previously defined trajectories. Subjects with comorbid ADHD and asthma presented higher levels of IL-6 at the 18- and 22-year evaluations when compared to subjects negative for both conditions. Our results demonstrate a state-dependent association between ADHD and asthma despite underlying trajectories. Higher levels of serum IL-6 in patients with both conditions suggest that a pro-inflammatory environment might have a role in the pathophysiological mechanisms underlying the comorbidity.

Keywords: ADHD; Adulthood; Asthma; C-reactive protein; Childhood; Cohort; Comorbidity; Inflammation; Interleukin-6; Trajectories.