Attention-deficit/hyperactivity disorder in offspring of mothers with inflammatory and immune system diseases

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Abstract

Background
Prenatal inflammatory mechanisms may play a role in the pathogenesis of psychiatric disorders, and could be relevant for attention-deficit/hyperactivity disorder (ADHD). We aimed at investigating maternal chronic somatic diseases with immune components as possible risk factors for offspring ADHD.

Methods
We performed a population based nested case-control study by linking data from longitudinal Norwegian registers. We included all individuals born 1967-2008 and alive at record linkage (2012). Individuals receiving ADHD medication in 2004-2012 were defined as ADHD patients (N=47,944), and remaining individuals (N=2,274,713) as controls. The associations between maternal diseases and offspring ADHD were analyzed using logistic regression models.

Results
Chronic diseases with immune components were related to offspring ADHD: Multiple sclerosis (adjusted odds ratio (adjOR) 1.8; 95% confidence interval (1.2 -2.5)), rheumatoid arthritis (1.7 (1.5-1.9), type 1 diabetes (1.6 (1.3-2.0), asthma (1.5 (1.4-1.6) and hypothyroidism (1.2 (1.1-1.4)). In contrast, chronic hypertension or diabetes type 2 showed no significant associations. Estimates were almost unchanged with additional adjustment for parental ADHD, infant birth weight and gestational age. Although point estimates for male and female offspring were different for some diseases (e.g. maternal asthma: adjOR 1.7 (1.5-1.8) for female offspring and 1.5 (1.4-1.6) for males), none of the associations differed significantly by offspring sex.

Conclusions
Several maternal somatic diseases with immune components were found to increase the risk of offspring ADHD. The associations could involve several causal pathways including common genetic predisposition and environmental factors, and increased insight into the mechanisms behind these relations could enhance our understanding of ADHD etiology.