The potential role of pre- and postnatal testosterone levels in attention-deficit/hyperactivity disorder: is there a sex difference?


Abstract

OBJECTIVE:
Both prenatal testosterone (T) exposure and postnatal T levels have been associated with developing neural circuitry and behavioral systems. This study examined the potential correlation between pre- and postnatal T levels and behavioral and neurocognitive profiles of children with attention-deficit/hyperactivity disorder (ADHD).

METHODS:
Two hundred ADHD patients with a mean age of 8.7±2.0 years (158 boys and 42 girls) were recruited. The ratio of the length of the right index finger (2D) to that of the right ring finger (4D) (2D/4D ratio) served as a surrogate of prenatal T exposure, and postnatal T was determined using salivary T concentration. Behavioral symptoms were evaluated using the Swanson, Nolan, and Pelham - Version IV Scale for ADHD (SNAP-IV). Neurocognitive function was assessed using the Wechsler Intelligence Scale for Children - Fourth Edition (WISC-IV) and Conners' Continuous Performance Test (CPT).

RESULTS:
Lower 2D/4D ratios were associated with comorbid disruptive behavior disorders (t=2.15, P=0.033) in all participants. Among the boys with ADHD, neither 2D/4D ratios nor salivary T levels were associated with behavioral symptoms or neurocognitive function. Among the girls with ADHD, the salivary T level was positively correlated with the Perceptual Reasoning Index of the WISC-IV (r=0.48, P=0.001) and the Confidence Index (r=0.37, P=0.017) and Omission Errors of the CPT (r=0.62, P<0.001).

CONCLUSION:
Findings suggest that a higher prenatal T exposure is associated with a greater risk of developing disruptive behavior disorders, and T may exert differential neurocognitive effects between boys and girls with ADHD. However, the neurobiological mechanisms of T involved in the pathogenesis of ADHD warrant further investigation.