Attention-deficit/hyperactivity disorder as a risk factor for cardiovascular diseases: A nationwide population-based cohort study

Classification: Comorbidity

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Abstract

Accumulating evidence suggests a higher risk for cardiovascular diseases among individuals with mental disorders, but very little is known about the risk for overall and specific groups of cardiovascular diseases in people with attention-deficit/hyperactivity disorder (ADHD). To fill this knowledge gap, we investigated the prospective associations between ADHD and a wide range of cardiovascular diseases in adults. In a nationwide population-based cohort study, we identified 5,389,519 adults born between 1941 and 1983, without pre-existing cardiovascular diseases, from Swedish registers. The study period was from January 1, 2001 to December 31, 2013. Incident cardiovascular disease events were identified according to ICD codes. Hazard ratios (HR) with 95% confidence intervals (CI) were calculated using Cox proportional hazards regression model, with ADHD as a time-varying exposure. After an average 11.80 years of follow-up, 38.05% of individuals with ADHD versus 23.57% of those without ADHD had at least one diagnosis of cardiovascular disease ($p<0.0001$). ADHD was significantly associated with increased risk of any cardiovascular disease (HR=2.05, 95% CI:

1.98-2.13) after adjusting for sex and year of birth. Further adjustments for education level, birth country, type 2 diabetes mellitus, obesity, dyslipidemia, sleep problems and heavy smoking attenuated the association, which however remained significant (HR=1.84, 95% CI: 1.77-1.91). Further adjustment for psychiatric comorbidities attenuated but could not fully explain the association (HR=1.65, 95% CI: 1.59-1.71). The strongest associations were found for cardiac arrest (HR=2.28, 95% CI: 1.81-2.87), hemorrhagic stroke (HR=2.16, 95% CI: 1.68-2.77), and peripheral vascular disease/arteriosclerosis (HR=2.05, 95% CI: 1.76-2.38). Stronger associations were observed in males and younger adults, while comparable associations were found among individuals with or without psychotropic medications and family history of cardiovascular diseases. These data suggest that ADHD is an independent risk factor for a wide range of cardiovascular diseases. They highlight the importance of carefully monitoring cardiovascular health and developing age-appropriate and individualized strategies to reduce the cardiovascular risk in individuals with ADHD.

Key words: Attention-deficit/hyperactivity disorder, cardiovascular diseases, cardiac arrest, hemorrhagic stroke, peripheral vascular disease, arteriosclerosis, psychotropic medications, psychiatric comorbidities