Oxidative stress contribution to attention deficit hyperactivity disorder in children with epilepsy

Elhady M, Youness ER, Mostafa RSI, Abdel Aziz A, Hussein R.


Abstract

Children with epilepsy have a high incidence of attention deficit hyperactivity disorder (ADHD). Oxidation stress and disturbed neurotransmitters are suggested mechanisms; however, their role is not fully explored. This study evaluates the association between circulating malondialdehyde as an oxidation stress marker, apelin neuropeptide, and ADHD in children with epilepsy. Fifty children with epilepsy of unknown etiology, of which 25 have ADHD, as well as 35 healthy children were included. Serum levels of malondialdehyde and apelin were estimated. We investigated the association between seizure severity, response to medications, malondialdehyde, apelin levels, and ADHD in children with epilepsy. Serum malondialdehyde and apelin levels were higher in children with epilepsy, especially those with ADHD. Malondialdehyde and apelin levels have significant positive correlation with the Chalfont Seizure Severity Score. Regression analysis showed that elevated malondialdehyde is an independent risk factor for ADHD in children with epilepsy (OR: 1.401, 95%CI: 1.056-1.859, p= 0.02). No significant association was found between malondialdehyde and apelin levels and the type of epilepsy or ADHD. Longer duration of epilepsy, increased seizure severity, and uncontrolled seizures are associated with increased oxidation stress, which further increased susceptibility for ADHD. In spite of elevated apelin in children with ADHD, the elevation did not increase the risk of ADHD in children with epilepsy.