Dokumenttyp: journal article

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Titel des Beitrags: Dopaminergic dysfunction in attention deficit hyperactivity disorder (ADHD), differences between pharmacologically treated and never treated young adults: a 3,4-dihydroxy-6-[18F]fluorophenyl-l-alanine PET study.

Abstract: The dopaminergic system plays a key role in attention-deficit/hyperactivity disorder (ADHD). Methylphenidate (MP), a dopamine (DA) reuptake inhibitor, is a drug of first choice for treating ADHD. This cross-over study investigated alterations in DA metabolism in young males with ADHD who had never been pharmacologically treated and MP-treated patients in comparison to healthy subjects. Dynamic 3,4-dihydroxy-6-[18F]fluorophenyl-L-alanine (FDOPA) PET scans were carried out on 20 male patients with ADHD and 18 healthy men. Eight ADHD patients had never been treated with psychostimulants, the rest had received MP. Based on the tissue-slope-intercept plot parametric images of FDOPA influx rate constant (Ki) were generated for each subject from dynamic 3D FDOPA datasets and transformed into standard stereotactic space. First a volume of interest analysis was performed on each single subject. In a second step data were introduced to a SPM2 analysis to detect significant changes in mean voxel Ki values between the normal control group and each patient group. In comparison to controls, ADHD patients as a group (irrespective of treatment status) showed a lower Ki in bilateral
putamen, amygdala and dorsal midbrain. There was a lower Ki in the left putamen, right amygdala and right dorsal midbrain in untreated patients compared to controls together with a relative higher influx in the left amygdala and right anterior cingulate cortex. In contrast, methylphenidate treatment was associated with a significantly lower Ki in the striatum and amygdala bilaterally, and in the right dorsal midbrain. Untreated young adult ADHD patients showed a dopamine dysfunction that might be partly due to compensatory mechanisms. MP seems to down-regulate dopamine turnover. This effect might be one component in the mechanism of action of this drug in ADHD treatment.