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COMPARATIVE STUDIES OF D₂ RECEPTORS AND CEREBRAL BLOOD FLOW IN HEMI-PARKINSONISM RATS

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Objective: To study the relationship between dopamine (DA) D₂ receptors and cerebral blood flow in hemiparkinsonism rats. **Methods:** Hemi-parkinsonism rats were made by stereotaxic 6-hydroxy dopamine (6-OH-DA) lesions in substantia nigra and ventral tegmental area, apomorphine (Apo) which could induce the successful model rat rotates toward the intact side was used to screen the rats, ¹²⁵I-IBZM in vivo autoradiography and ^{99m}Tc-HM-PAO regional brain biodistribution were used to study D₂ receptors and cerebral blood flow. The HPLC-ECD were used to measure the concentration of DA and its metabolites homovanillic acid (HVA), 3,4-dehydroxyphenyl acetic acid (DOPAC) in bilateral striatum (ST). **Results:** The lesioned side ST DA and its metabolites HVA DOPAC reduced significantly than that of the intact side and pseudo-operated control group, ST/cerebellum (CB) ¹²⁵I-IBZM uptake ratio was 8.04 ± 0.71 in lesioned side of hemi-parkinsonism rats, significantly increased compared with the intact side and the pseudo-operated group (P<0.05), 30.11±4.53% enhancement as compared to the intact side, and also show good correlation with 30 min Apo induced rotation numbers (r=0.98), the regional cerebral blood flow study didn't show significant difference between bilateral brain cortex area (P>0.05). **Conclusions:** The DA content decreased significantly and induced an up-regulation of ST D₂ receptor binding sites in 6-OH-DA lesioned side in hemi-parkinsonism rats, the increased percentage of lesioned-intact side ST/CB ¹²⁵I-IBZM uptake ratio showed good correlation with rotation behavior induced by Apo. Compare with cerebral blood flow, D₂ receptor reflected by IBZM seems to be more specific and earlier to detect the cerebral functional impairment in experimental hemi-parkinsonism.

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A Voxel-Based Analysis of Cerebral Perfusion with ^{99m}Tc-ECD Brain SPECT in Obsessive-Compulsive Disorder

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Objectives: Many neuroimaging studies, especially metabolic imaging with PET, showed a specific frontal-subcortical brain circuit connecting the orbitofrontal cortex (OFC), anterior cingulate gyrus, elements of basal ganglia and thalamus is involved in obsessive-compulsive disorder (OCD). Despite consistent metabolic alteration on PET, blood flow studies with SPECT were inconsistent and various cortical and subcortical structures showed abnormal perfusion patterns. In this study, brain SPECT images of seven patients with OCD were evaluated with a sophisticated method of statistical parametric mapping (SPM). **Methods:** Seven patients with severe, primary OCD (6 males and 1 female) with mean age of 25.4 ± 4.7 yrs (20 - 32 yrs) were studied. The SPECT data of the patients were compared with those of healthy subjects and patients with drug naive schizophrenia using SPM. The SPM parameters were p value of 0.001 with Z value of 3.09 (higher threshold) or p value of 0.005 with Z value of 2.58 (lower threshold). **Results:** On a higher threshold (p<0.001), five of the seven patients showed hyperperfusion within the anterior cingulate cortex, however, hyperperfusion within OFC or caudate nucleus was seen in only one patient. On a lower threshold (p<0.005), hyperperfusion within the anterior cingulate cortex was seen in all patients, and followed by thalamus (n=5), lentiform nucleus (n=4), caudate nucleus (n=3), and OFC (n= 3). Perfusion within the anterior cingulate cortex was also increased in OCD compared with drug naive schizophrenia. **Conclusion:** Anterior cingulate cortex appears to be an important anatomical structure in the pathogenesis of OCD symptoms. Brain SPECT using a sophisticated analysis method of SPM is useful for the diagnosis of OCD and differentiation from schizophrenia.