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MEASUREMENT OF CEREBROVASCULAR REACTIVITY BY HMPAO--SPECT AFTER CAROTID ENDARTERECTOMY

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By using quantitative Tc-99-m-HMPAO SPECT were investigated the cerebrovascular reactivity before and months after carotid endarterectomy.
13 patients (11 man, 2 woman) participated into the study who did not have previous anamnesis of cerebral circulation injury and had contrast angiography proven, at least unilateral significant (more than 70%) carotid artery stenosis. In 6 patients we performed right sided, in 5 patients left sided internal carotid artery endarterectomy (2 patients were not operated because of their cardial status). Postoperative complications occured in 2 cases. The control examinations were performed mean 22.9 months after surgery. Before operation the patients underwent both basic and actazolamide challenge cerebral perfusion SPECT examination with Tc-99m-HMPAO. During the follow up we performed only azetazolamide study
Results: In the patient with carotid stenosis there was no difference between the baseline level and the values measured during acetazolamide stimulation ($p > 0.1$)In healthy acetazolamid provocation produced mean 20% perfusion increase whereas in carotis stenosis patients reserve capacity was not detectable. During follow up we did still not observe significant improvement in cerebrovascular reactivity of operated patients.
Our result suggests, that despite the embolisation preventive effect of the carotid endarterectomy, it seems not to have any beneficial effect on the improvement of cerebral perfusion reserve capacity.

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THE ROLE OF CSF-SPECT AND RCBF-SPECT IN THE PRESURGICAL EVALUATION AND FOLLOW-UP OF PATIENTS WITH ENDOSCOPIC FENESTRATION OF THE THIRD VENTRICLE

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Objective: Our purpose was to determine the role of Tc-99m-DTPA CSF-SPECT combined with Tc-99m-HMPAO/ECD brain perfusion SPECT studies in the preoperative evaluation and postoperative follow-up of patients who underwent endoscopic fenestration of the third ventricle.
Material and methods: 5 patients were studied pre-and postoperatively, with a standard technique due to occlusive hydrocephalus. The results of combined SPECT studies were correlated with CT, MRI, clinical and surgical findings.
Results: In 4 cases the preoperative CSF-SPECT showed triventricular occlusive hydrocephalus (CT/MRI showed aqueduct stenosis in 3 cases, and the adhesion of velum medullare superior to the brainstem in 1 case). In 1 patient with a history of head trauma, the CSF-SPECT showed partially communicating hydrocephalus with asymmetrically enlarged lateral ventricles. The preoperative rCBF SPECT demonstrated perfusion abnormalities of different extent, localization, and severity, partly depending on the enlargement of ventricles. In the postoperative CSF-SPECT studies 4 patients demonstrated high tracer activity in the third ventricle and lateral ventricles on early SPECT images. In 1 patient, there was no ventricular reflux, and this patient underwent a shunt implantation in two weeks. There was no sign of changes in size of the ventricles as demonstrated by CT/MRI during follow-up studies. Also, there were no significant changes in rCBF in the first two months by follow-up rCBF-SPECT studies. However, the late (1-2 years) follow-up studies showed improved rCBF of different extent and grade.
Conclusions: The sensitivity and specificity of CSF-SPECT is higher than that of CT/MRI in differentiating communicating versus non-communicating forms of hydrocephalus, and in the evaluation of abnormalities of CSF hydrodynamics. The combined rCBF-SPECT and CSF-SPECT are useful not only in the presurgical selection of candidates for endoscopic fenestration of the third ventricle, but also in timing and follow-up of surgical intervention. Additionally, due to strong correlation of rCBF-SPECT patterns with clinical findings, the method is an important tool in patients follow-up.

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ACETAZOLAMIDE-ENHANCED ^{99m}Tc-HMPAO SPECT IMAGING OF CEREBRAL BLOOD FLOW CHANGES IN PATIENTS SUFFERING FROM AUTOIMMUNE DISEASES AND ASSOCIATED ENCEPHALOPATHY

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Objective: Our purpose was to evaluate the role of acetazolamide enhanced rCBF-SPECT in the patient management of patients suffering from Hashimoto thyreoiditis, SLE and multisystemic autoimmune diseases associated with different neurological manifestations.
Material and methods: Four patients (m/f: 1/3), with a history of Hashimoto thyreoiditis (2), SLE (1) and multisystemic autoimmune disease (1) were studied. The assessment included CT/MRI, pre- and posttreatment acetazolamide-enhanced rCBF SPECT studies and neurological examination. ^{99m}Tc-HMPAO SPECT studies were carried out with a standard technique, and the results were compared to the clinical findings and morphological data. SPECT data were analysed visually and by a special region of interests (ROIs) program. Circular ROIs were placed over the striatum, thalamus, frontal, temporal, parietal, occipital cortex, and cerebellum. ROIs were normalized to the whole brain average.
Results: The acetazolamide-enhanced rCBF-SPECT studies showed a typical cerebral rCBF pattern, typical for encephalopathies, with wide interindividual variability. There was a reduced cerebrovascular reserv capacity in all of our patients. The posttreatment rCBF-SPECT demonstrated significant improvement in the baseline rCBF (8-24% region by region), with an increased CVR (the rCBF reduction after acetazolamide administration decreased from 21% to 5.6% in most of the involved regions) in 2 cases with dramatical clinical improvement. In 2 patients, the posttreatment SPECT demonstrated a deterioration in baseline rCBF with a progression in CVR reduction. SPECT results correlated well with clinical findings in all of the patients.
Conclusions: rCBF SPECT studies showed a strong correlation with clinical findings. Acetazolamide-enhanced rCBF-SPECT seems to be useful in identifying and evaluating CNS involvement in patients suffering from autoimmune diseases and in follow-up of patients for monitoring the adequate therapy.

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IMAGING OF DOPAMINE TRANSPORTER WITH ^{99m}Tc-TRODAT-SPECT: EFFECTS OF BUPROPION IN DEPRESSION

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^{99m}Tc-TRODAT, an analog of cocaine, has shown promise as a tracer for the imaging of dopamine transporter activity. We examined the antidepressive effect of bupropion. Bupropion is thought to treat depression by blocking the dopamine transporter (DAT). The purpose of this study was to determine the occupancy of bupropion for the DAT during clinical treatment with depression.
Material and methods: We evaluated 7 depressed patients (3 female 4 male, mean age: 46.6±9.31) using ^{99m}Tc-TRODAT-SPECT. Each patient was investigated twice by ^{99m}Tc-TRODAT. First scan was done in drug free state. The ^{99m}Tc-TRODAT-SPECT was repeated four weeks after bupropion treatment has been started. SPECT scans of the brain were obtained 3 hours after administration of 1000 MBq ^{99m}Tc-TRODAT. The reconstructed slices were analysed semi-quantitatively: we calculated DAT occupancy ratios. DAT occupancy equals: $\{[(\text{n. caudate} - \text{occipital})/\text{occipital}]_{1^{st}\text{week}} - [(\text{n. caudate} - \text{occipital})/\text{occipital}]_{4^{th}}\}/\{[(\text{n. caudate} - \text{occipital})/\text{occipital}]_{1^{st}\text{week}}$. The severity of depression was measured by Hamilton Depression scale.
Results: Due to the bupropion treatment 3 patients clinically improved, 4 patients' clinical state was unchanged. Between the to groups in relation of initial Hamilton score and ^{99m}Tc-TRODAT nucleus caudatus/occipital activity was no significant difference. In aspect of bupropion effect, DAT occupancy was significantly lower ($p < 0.05$) in patient group with remission. The DAT occupancy showed a good correlation ($p = 0.01$) with the Hamilton score changes.
Conclusions: The DAT occupancy in contrast to our expectations decreased during effective therapy. One possible explanation, that the improvement of depression causes a distinct increase of the presynaptic DAT, influencing our results, and so the occupancy only relatively decreased.