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CEREBRAL PERFUSION IMAGING WITH DUAL TRACER (Tc-99m and In-111) HAM SCINTIGRAPHY:APPLICATION FOR MAPPING OF CEREBRAL FUNCTION.
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The purpose of the present study is to demonstrate changes in blood flow in the cortical area of the hand during vigorrous hand grip exercise by the method of dual tracer(Tc-99m and In-111) human albumin microsphere(HAM) scintigraphy. Ten patients with only minor neurological symptoms or deficits and almost normal angiography were the subjects. In-111·HAMs(600μCi,80000 particles,15μm in diameter) were injected into the internal carotid artery in the resting state, and Tc-99m·HAMs(5mCi,80000 particles 15μm in diameter) were injected in the same way during vigorrous contralateral hand grip exercise. After injection of the tracers, two separate brain perfusion scintigrams for Tc-99m and In-111, from anterior, lateral and vertex views, were obtained with a gamma camera by pulse height discrimination. The Tc-99m scintigrams(cerebral perfusion images during hand grip) clearly showed a focal increase in blood flow corresponding to the hand area of cerebral cortex in comparison with the In-111 scintigrams(cerebral perfusion images at rest) in all cases. The results indicate that cerebral perfusion imaging with dual tracer HAM can be used as an effective tool in the study of the functional mapping of the human brain.

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REGIONAL CEREBRAL BLOOD FLOW MEASUREMENTS IN SHIZOPHRENIC DISORDERS BY XE-133 INHALATION METHOD.
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Regional cerebral blood flow measurement (rCBF) by Xe-133 inhalation method were performed in 14 patients with shizophrenic disorders (8 patients without auditory hallucination, 6 patients with auditory hallucination). These measured values were compared to age-matched normal values obtained from measurements of 20 healthy volunteers. Frontal pole showed high regional hemispheric percent values (rHPV), 107.7±3.0(Rt)106.4±3.7(Lt) in normal volunteers, while showed significant low values ($p<0.01$) 101.0±4.7(Rt)98.5±4.5(Lt) in patients without auditory hallucination (A.H.), 99.5±3.1(Rt)98.9±5.5 in patients with A.H. Mid-temporal region showed rHPV, 100.1±2.0(Rt)101.9±2.6(Lt), while showed significant high values ($p<0.01$) 106.5±4.1 (Rt)108.2±2.6(Lt) in patients with A.H. These results are supposed to support a hypothesis that negative symptoms are caused by hypofunction of frontal portion, while positive symptoms by hyperfunction of posterior potion in shizophrenic disorders.

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REGIONAL CEREBRAL BLOOD FLOW MEASUREMENTS IN ISCHEMIC CEREBROVASCULAR DISEASES BY XE-133 INHALATION METHOD.
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Forty regional cerebral blood flow measurements by Xe-133 inhalation method were performed in 33 patients with ischemic cerebrovascular diseases(TIA-9 cases, Noncortical small deep infarctions-10 cases, Cortical small infarction with area of one or two cortical branches of the unilateral middle cerebral artery-9 cases, Cortical large infarction with area of almost whole cortical branches of the unilateral MCA-5 cases). Detectability of abnormal flow areas was investigated by comparison with previously reported age-matched normal values and laterality indices(LI). As a whole, some sorts of abnormalities(subnormal hemispheric mean values(HMV), abnormal LI of HMV, subnormal regional absolute values (rAV), abnormal regional LI (rLI)) were detected in 18 of 20 measurements(90%). Subnormal rAV and abnormal rLI were observed not only in the regions corresponding to low density areas seen on CT-scan but also in other regions. Of 29 detector regions corresponding to l.d.a. seen on CT-scan in cortical small infarction group, 12 detector regions (41.4%) showed subnormal rAV, while 20 detector regions(69.0%) abnormal rLI. Moreover, abnormal rLI which suggested focal hyperemia were observed in two detector regions.

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EVALUATION OF CBF AND CO2 REACTIVITY IN TRANSIENT ISCHEMIC ATTACKS.
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Hemispheric mean CBF(mCBF), together with its CO2 reactivity in response to hyperventilation, was investigated in 18 patients with TIAs with intraarterial Xe-133 injection method in a subacute-chronic stage of the clinical course. In 8 cases, the lesion responsible for symptoms was unilateral ICA occlusion, while in 10 cases, it was unilateral ICA mild stenosis(<50% in diameter). Resting flow values were significantly($P<0.05$) decreased in the affected hemisphere of TIA due to the ICA occlusion as compared with the unaffected hemisphere of the same patient, regarded as the relative control. It was not decreased in the affected hemisphere of TIA due to the ICA mild stenosis as compared with the control. With respect to the responsiveness of CBF to changes in PaCO2, it was preserved in both TIAs, due to the ICA occlusion and ICA mild stenosis. In the relationship of blood pressure and CO2 reactivity, expressed as $\Delta CBF(\%)/\Delta PaCO_2$, pressure-dependent CO2 reactivity as a group was observed with significance ($P<0.05$) in 8 cases of TIA due to the ICA occlusion, while no such relationship was noted in 10 cases of TIA due to the ICA mild stenosis. From the observations, different possible mechanisms as to the pathogenesis of TIA might be expected, that is, all TIAs are not based on the same mechanism.