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SIMULTANEOUS MEASUREMENT OF CEREBRAL BLOOD FLOW AND METABOLISM IN RATS BY AUTORADIOGRAPHIC TECHNIQUE.

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We performed an autoradiographic technique for the simultaneous quantitative measurements of local cerebral blood flow (reference sample method) and local cerebral metabolic rate for glucose (Sokoloff's method) using N-isopropyl-p-[I-123]iodoamphetamine and C-14-deoxyglucose, respectively.

I-123 is a gamma emitting isotope with a half-life of 13 hours and can be detected with adequate resolution on standard autoradiographic films. Autoradiograms were made before and after decay of I-123, I-124 and I-126; the time interval between the 2 tracers were adjusted to avoid significant cross-contamination. In this way, two films were obtained like single tracer autoradiograms.

Coupling was observed in the entire brain in healthy rats and cortical surface and putamenal region of the brain in rats with ischemia. On the other hand, uncoupling was observed in pale globe and thalamus in rats with ischemia.

This technique seems to be useful to assess the precise local cerebral blood flow and glucose metabolism under various conditions.

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CLINICAL TRIAL OF N-ISOPROPYL(I-123)-IODOAMPHETAMINE.

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A single photon ECT with N-isopropyl (I-123)-iodoaphetamine was performed in 20 patients who were suspected of cerebral vascular disorders. Dectability as to ischemic regions by ECT with I-123 IMP and transmission CT scan(TCT) was compartible in 11/14(79%) in cerebral infarction. ECT showed false positive findings in 2 cases without an infarction. Tree false negative cases showed small low densities in a white matter ,basal ganglia and pons and also were imaged using high sensitivity collimator for medium energy. As false positive causes, reconstraction technique might be appriciated. ECT with I-123 IMP could not be superior than TCT in demonstration of cerebral infarcted areas. However, this could be due to our inmature experience as to a new technique and cloud not mean radiopharmaceutical inferiority of I-123 IMP for demonstrating cerebral disorder rather than by TCT.

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COOPERATIVE STUDY ON CLINICAL EFFICACY OF SPECT IMAGES OF THE LIVER WITH SPECIAL REFERENCE TO THE DETECTABILITY OF SOL.

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This study was planned to evaluate the significance of SPECT images of the liver when they were added to the ordinary scintigrams with special reference to the detectability of SOLs. Since 1983, the Efficacy Committee collected liver scintigrams together with the SPECT images on 435 cases from 9 hospitals. This is to report the results of our first trial on 80 cases selected from 229 cases presented from 5 hospitals. Forty eight of 80 had SOLs and 32 were free of SOLs. Thirteen doctors jointed to this trial, 11 of them had more than 5-year experience in nuclear medicine. At first planar images were read. When SOL was definitely or likely present, its segment was asked to be checked. Secondly, the planar images were again checked with SPECT images. The results (average value) were as follows: sensitivity (planar image only/with SPECT image), 45.4/45.0; specificity, 70.9/66.4; and accuracy, 62.7/61.2.

Although these values indicated that the efficacy of adding the SPECT images were not as good as we expected, there were cases in which SPECT images were definitely helpful in identifying SOLs. One of the reasons of such unfavorable results with SPECT images might be due to the fact that the participants were unfamiliar with the images offered from other hospitals. Next trial is now being planned to be performed on the rest of the patients group.

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A FUNDAMENTAL STUDY OF I-123-IMP IMAGING BY SPECT FOR EVALUATION OF CEREBRAL BLOOD FLOW IN PATIENTS WITH CEREBROVASCULAR DISEASE.

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I-123-IMP have recently been developed for tomographic measurement of local cerebral blood flow in patients with cerebrovascular disease. This paper describes a fundamental study of I-123-IMP imaging by SPECT using phantom. The instruments used was a GE MaxiCamera 400A/T with various collimators such as low energy general purpose collimator(LEGP), low energy high resolution collimator(LEHR) and medium energy general purpose collimator(MEGP). Reconstruction was performed by a filter back projection method using GE MaxiStar computer system with 64x64 matrix image. In our study in this series, high sensitivity was found in the data with LEGP than those with LEHR or MEGP. In addition, high contrast resolution was shown in the data with LEGP and with LEHR than those with MEGP. The sampling time for each projection was offered enough information density with 30 seconds per projection. From our data suggested that the clinical procedure for I-123-IMP imaging by SPECT in patients with cerebrovascular disease recommended with LEGP collimator and with recorded the data for 30 seconds per projection.

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