BRAIN PERFUSION IMAGE BY USE OF Kr-81m

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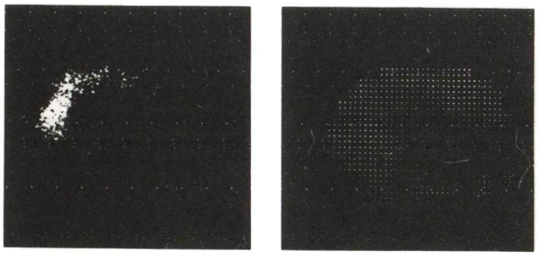
The cerebral hemodynamics in cerebrovascular disease have been studied by the rCBF functionl image with Xe-133 washout principle. Recently,Fazio et al reported the new method of the assessment of rCBF by continuous carotid infusion of Kr-81m.

In our study,the correlation between Kr-81m perfusion image and Xe-133 rCBF functional image was examined in patients with cerebrovascular disease. The Kr-81m in saline was infused by a infusion pump through a small polyethylene catheter into the internal carotid artery. During continuous infusion of Kr-81m, perfusion images were obtained by simply collecting counts upto 250000 with a gamma camera and recording on Polaroid film. The reproducibility of the brain perfusion image was excellent in all cases. After Kr-81m perfusion images were obtained, Xe-133 rCBF functional images were obtained by the method previously reported. Both images in one case with cerebral infarction of MCA territory were represented in the Figure. Kr-81m perfusion image showed a sharply difined area of reduced activity in territory of MCA, and Xe-133 rCBF functional image also showed a low flow area in the same territory. Similar results were achieved in other cases with cerebrovascular disease.

In conclusion,Kr-81m perfusion image was well correlated with Xe-133 rCBF functional image. And there were some features of this method. Although this method provided no quantitative information on rCBF, it was simple and did not require the computer analysis. The procedure could be repeated in order to get brain perfusion image in multiple views or to follow minute by minute changes of flow distribution.

Figure



Kr-81m perfusion image — Xe-133 rCBF functional image

RE-EXAMINATION OF REGIONAL TIME-ACTIVITY CURVE WITH TC-99mHSA IN CEREBROVASCULAR DISEASE

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Proposal parameters reflecting regional changes in the cerebral blood flow has been evaluated by imaging the first transit of Tc-99m HSA, following an IV bolus injection as an useful information for cerebral disease.

Wagner et al reported that the mean transit time (MTT) of ROIs can not be determined from the T/A curve because the shape of the curve is a function of the physical shape of bolus of radiotracer as it enters the ROI as well as its MTT through the ROI. As he mentioned we analysed relative MTT from the point of bolus division to and through the ROI, by obtaining the T/A curve at the aortic arch.

Gamma-camera image was accumulated in a computer every second in vertex or anterior view, for about 50sec after bolus injection. T/A curves were obtained from two ROIs of equal size selected to cover the diseased portion and identical area in the other hemisphere and another ROI at the aortic arch. Fitting the curves to the gamma function, the first moment transit time from the aortic arch to and through the ROI was measured. The relative cerebral blodd flow (RrCBF) was determined from the relative integral of these curves.

The time in the ROI from injection to positive and negative peak by differentiating the T/A fitting curve were named mode of appearance and disappearance time (MAT, MDT). Difference between MAT or MDT of each hemisphere (dMAT, dMDT) was obtained as a linear index of cerebral hemodynamics by an atraumatic procedure.

RrCBF decreased in affected hemisphere and dMAT increased in the group of cerebrovascular disease. The dMDT increased in brain tumor group.

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