

Functional Image of Regional Cerebral Blood Flow (2) Clinical Application to the Cases of Internal Carotid Artery (ICA) Occlusion

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The functional image of regional cerebral blood flow (rCBF) was applied to eight cases of unilateral internal carotid artery (ICA) occlusion.

^{133}Xe in saline was injected through an intact ICA. A gamma camera was set at the vertex or Towne's view to the skull. Sequential data of the radioactivities were obtained at rest (control) and during the digital compression of an occluded-side common carotid artery. The functional images of rCBF were generated by processing the data.

^{133}Xe distributed not only to the injected-side hemisphere but also to the contralateral hemisphere. Eight cases were divided to two groups from the extent of the ^{133}Xe distribution in the contralateral hemisphere. In one group, the ^{133}Xe distribution extended to the territory of anterior cerebral artery of the contralateral hemisphere. In another group, it extended to the territory of anterior and middle cerebral arteries.

In the former group (4 cases), angiograms

showed good development of external-internal collateral pathway in the occluded side. Functional images showed no focal ischemic sign and rCBF values in both hemispheres were maintained as nearly as normal. By the carotid compression, rCBF values in both hemispheres were remarkably decreased, meaning the interruption of the collateral blood flow.

In the latter group (4 cases), angiograms showed poor development of collaterals. Functional images showed focal ischemic sign in an occluded-side hemisphere and rCBF values in both hemispheres were generally low. By the carotid compression, rCBF values were not changed significantly.

Neurological deficits of the latter group were more severe than those of the former.

The rCBF functional image offered clinically valuable informations on the cerebral hemodynamics in ICA occlusions.

Vertebro-basilar Imaging

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In the cerebrovascular imaging with radionuclides generally common carotid arteries are mainly demonstrated. Vertebral imaging has not reported usually. In this point, the purpose of this study is to develop the method of vertebro-basilar imaging using carotid compression and to evaluate the possible usefulness.

Patient has supine position on the detector and 20 mCi of $^{99\text{m}}\text{TcHSA}$ or pertechnetate intravenously injected, instantly after them compression of the bilateral common carotid arteries is taken.

1) One of total 15 patients (26 times procedure)

lateral, frontal, posterior imaging, have been studied.

- 2) The lateral view reveals bilateral common carotid artery almost compressed at the portion of finger press.
- 3) During 8–16 seconds after administration eight polaroid films are taken.
- 4) In 14 cases vertebral images are completely visualized by the compression method.
- 5) The characteristic abnormal findings of vertebral image are classified by pooling of radionuclide, stenosis, and sclerotic changes of

arteries.

- 6) By the compression method, there is no complain and clincial complication in any case.
- 7) This method precedes usually to the brain scintigraphy in all case.
- 8) We have compared the findings with or with-

out compression in each case. Conclusionally we have recongized that the compression of bilateral carotid arteries is practically ease and useful in the case of posterior, basilar insufficiency.

Radioisotope Cisternography in Cerebral Atrophy

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The purpose of this study was to compare radioisotope (RI) cisternographic patterns with computed cranial tomographic (CCT) patterns in the patients with cerebral atrophy and to obtain the characteristic pattern of RI cisternography in cerebral atrophy.

RI cisternography were performed on 15 patients, showing such CCT patterns of cerebral atrophy as lesser or moderate degrees of dilatation of the lateral, the third and the fourth ventricles, and moderate or severe degrees of dilatation of the Sylvian fissures and the cerebral sulci.

RI cisternography was done in the standard manner following the lumbar intrathecal administration of $^{169}\text{Yb-}$ or $^{111}\text{In-DTPA}$. And imaging and counting of three projections of the head were simultaneously performed with a scintillation camera in 3, 6, 24 and 48 hours after administration.

RI cisternographic patterns were evaluated with regard to the images of the cerebrospinal fluid pathway and to the mean ratio of 48 hours to 6

hours count rates (C_{48}/C_6) corrected by background and physical half life.

RI cisternographic images of 15 patients showed lesser degrees of the lateral ventricular reflux in 12, lesser to severe degrees of dilatation of the Sylvian fissures (cisterns) in 13 and lesser to severe degrees of pooling of the parasagittal convexities in 7 patients.

The degrees of dilatation of the Sylvian fissures and pooling of the parasagittal convexities shown by RI cisternography were considerably correlative to those of the Sylvian fissures and the cerebral sulci shown by CCT respectively. The degrees of the lateral ventricular reflux did not correspond with those of the lateral ventricles.

The mean values and standard deviations of C_{48}/C_6 were 0.32 ± 0.14 in 3 pediatric patients and 0.45 ± 0.13 in 12 adult patients. High values of C_{48}/C_6 in the both pediatric and adult patients were statistically significant, comparing with the values of normal pediatric and adult controls respectively.

“Hot Spot in Warm Area” Appearance in Tc-99m HEDP Brain Scan

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Eleven patients with a variety of intracranial neoplasms, including five meningioma, were studied with brain scanning using Tc-99m HEDP

following conventional Tc-99m pertechnetate study. Two convexity meningioma in five represented focally accentuated uptake in an area of