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 $^{99m}$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

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