Evaluation of remote effect from hypertensive intracerebral hemorrhage confined to the basal ganglia and thalamus on cerebral blood flow using Tc-99m ECD brain SPECT.

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Purpose: To evaluate the remote effect of the hypertensive intracerebral hemorrhage (HICH) only confined either to the basal ganglia or thalamus on regional cerebral blood flow using Tc-99m ECD brain SPECT.

Methods and Materials: This study included 23 HICH patients who had single hematoma strictly confined to the basal ganglia (n=12) or thalamus (n=11), respectively, sparing cortex on CT and MRI and 20 normal subjects free of neurological deficits and structural lesions on MRI as control. SPECT was performed after intravenous injection of 740MBq of Tc-99m ECD using brain dedicated gamma camera. Regional cerebral blood flow (rCBF) was visually assessed, and asymmetry index (AI) was measured at the level of thalamus, basal ganglia, cerebellum, frontal, parietal and temporal cortex and compared with control group. We defined that hypoperfusion was evident when a patient had an AI greater than that of the mean +2*SD of normal control.

Results: rCBF was significantly reduced in the affected basal ganglia, ipsilateral thalamus (12/12), cerebral cortex (10/12) and contralateral cerebellum (12/12) in patients with basal ganglia hemorrhage. As for the thalamic hemorrhage patients, significant reduced perfusion was noted in the affected thalamus, ipsilateral basal ganglia (7/11), cerebral hemisphere (7/11) and contralateral cerebellum (9/11). AI analysis also demonstrated the concordant significant differences between the patients and control subjects.

Conclusion: We can attribute blood flow reductions resulting from HICH confined to the thalamus or basal ganglia sparing cortex to a functional depression akin to diaschisis. Our findings are concordant basically to the well-known crossed cerebellar diaschisis; however, our cases are hematomas confined to thalamus or basal ganglia sparing cortex. It may be proposed that lesions confined to the thalamus or basal ganglia itself may play an important role for deactivation of cortico-cerebellar pathways other than cortico-pontocerebellar tract.