

[ LETTERS TO THE EDITOR ]

**Development of Ivy Sign and Infarction in the Lateral Part of the Hemisphere or the Middle Cerebral Artery Territory in Association with Steno-occlusive Involvement of the Posterior Cerebral Artery in Moyamoya Disease**

**Key words:** moyamoya disease, posterior cerebral artery, leptomeningeal collaterals, infarction, cerebrovascular reserve, ivy sign

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*To the Editor* We were very interested in the case report by Hamada et al. (1), which clearly showed that decreases in the superficial leptomeningeal collaterals from the distal posterior cerebral artery (PCA) branches due to occlusive changes in the proximal PCA were related to a decreased cerebrovascular reserve as suggested by the ivy sign on fluid-attenuated inversion recovery (FLAIR), with resultant infarction in the lateral part of the hemisphere or the middle cerebral artery (MCA) territory (2, 3).

In patients with moyamoya disease without steno-occlusive PCA involvement, deep leptomeningeal collaterals through the posterior pericallosal artery from the proximal PCA and superficial leptomeningeal collaterals from the distal PCA branches develop to compensate for the reductions in cerebral blood flow (CBF) in the anterior circulation (4). In such cases, the deep collaterals predominantly perfuse the medial part of the hemisphere or anterior cerebral artery territory, including the pericallosal area, while the superficial collaterals perfuse the lateral part of the hemisphere or MCA territory.

When steno-occlusive changes affect the PCA predominantly in the proximal segment, the CBF in the lateral part of the hemisphere or MCA territory will decrease drastically due to decreased superficial collaterals, which may result in an even higher risk of developing infarctions and ivy sign in this region (2, 3, 5). Indeed, in the case of Hamada et al., the PCA in the right hemisphere was occluded on MR angiograms. The lateral part of the hemisphere or MCA territory (parietal lobe) was involved in the expansion of the infarction, and the adjoining but not infarcted region was associ-

ated with enhancement of the ivy sign.

In contrast to the lateral part of the hemisphere or the MCA territory, the CBF in this case was relatively well preserved without infarction in the pericallosal area or its adjacent region of the anterior cerebral artery territory. This is presumably because even in patients with PCA involvement, the deep collaterals receive their blood supply from the proximal PCA via the well-developed Moyamoya vessels from the PCA, including the enlarged medial posterior chorooidal arteries known to have anastomoses with the posterior pericallosal artery (3).

The PCA territory was only partially infarcted in this case. This could be because the PCA branches forming the superficial collaterals are dilated when the PCA has no steno-occlusive lesions, and it is unlikely that the branches would be completely lost when steno-occlusive changes occur in the proximal PCA.

**The authors state that they have no Conflict of Interest (COI).**

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