Evolution of the Ischemic Penumbra in Stroke-Prone Spontaneously Hypertensive Rats

To the Editor:

I have read with great interest the article published in Stroke that dealt with differences in the time course of perfusion-weighted MRI and diffusion-weighted MRI mismatch between stroke-prone spontaneously hypertensive (SHRSP) and normotensive Wistar-Kyoto rats. Hypertensive rats are relevant models of human stroke as the authors correctly emphasized, and SHR as well as SHRSP have an increased sensitivity to experimental stroke or middle cerebral artery occlusion compared with normotensive strains. However, I point out possible pitfalls of their use of hypertensive rats. First, it appeared extremely strange that baseline mean arterial blood pressure in SHRSP was normotensive (93±4 mm Hg). In our experience, baseline or resting mean arterial blood pressure in SHRSP was >200 mm Hg at 5 months, and ∼170 mm Hg even at 10 to 12 weeks. Second, the authors used SHRSP that were 12 to 16 weeks old, during which time the extent of ischemic damage becomes progressively more severe. For example, infarct size produced by distal middle cerebral artery occlusion was dramatically increased between 10 and 12 weeks old and 5 months old by 2.7-fold in SHRSP. Therefore, it is not an appropriate age range to examine temporal changes in the ischemic penumbra in SHRSP in comparison with Wistar-Kyoto rats. Furthermore, regular or stroke-resistant SHR are better than the SHRSP for this type of analysis (ie, stroke sensitivity), because SHR are more stable in terms of lower mortality after middle cerebral artery occlusion. Finally, the authors concluded that SHR had little mismatch tissue at 1 hour after middle cerebral artery occlusion and suggested less salvageable tissue available for acute stroke therapies in SHR, whereas the presumed penumbra indicated by the tissue volume rescued by early reperfusion after 1 hour of middle cerebral artery occlusion was ∼50% of total ischemic volume in SHR. How do the authors explain the discrepancy between the substantial amount of penumbra and the little perfusion-weighted MRI and diffusion-weighted MRI mismatch at the early stage of focal ischemia in hypertensive rats?

Disclosure

None.

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