

**TOF-MRA and MRI features in a canine model of ischemic stroke:
Correlation between the volume of the ischemic lesion and
neurobehavioral status during the subacute stage**

**Byeongteck Kang¹, Dongpyo Jang³, Suhyun Gu¹, Chaeyoung Lim¹, Jonghwan Lee²,
Youngbo Kim³, Eunge Woo⁴, Zanghee Cho³, and Heemyung Park^{1,*}**

¹*Departments of Veterinary Internal Medicine and ²Veterinary Anatomy, College of
Veterinary Medicine, Konkuk University, Seoul, Korea*

³*Neuroscience Research Institute, Gachon University of Medicine and Science, Incheon,
Korea*

⁴*College of Electronics and Information, Kyunghee University, Yongin-si, Korea*

Purpose: The purpose was to evaluate the diagnostic value of time-of-flight magnetic resonance angiography (TOF-MRA) and MR imaging (MRI) in the canine ischemic stroke.

Materials and Methods: An ischemic stroke was induced in six healthy laboratory beagle dogs by permanent middle cerebral artery occlusion (MCAO). T2-weighted and fluid-attenuated inversion recovery (FLAIR) imaging, diffusion-weighted imaging (DWI), measurement of the apparent diffusion coefficient (ADC) ratio, TOF-MRA, and neurobehavioral evaluation were serially performed three times with a 1.5-tesla MR system: before, 3 and 10 days after the MCAO.

Results: The TOF-MRA showed the main cerebral arteries and their branches. T2 hyperintensity, FLAIR hyperintensity and DWI hyperintensity were noted in the ischemic lesions. The ADC ratio was initially decreased however, it then increased between 3 and 10 days after the MCAO. Ischemic lesion volumes, on T2-weighted and FLAIR imaging, were not significantly different on the DWI. There was a strong correlation between the lesion volume and the neurobehavioral score ($r=0.90$, $P<0.05$).

Conclusion: Conventional MRI and TOF-MRA may be reliable diagnostic tools during the subacute stage of ischemic stroke. In addition, the lesion volume was associated with the level of neurobehavioral deficits and might provide useful information for the care of dogs after an ischemic stroke.

Key words: ischemic stroke, magnetic resonance imaging, lesion volume, neurobehavioral status, time-of-flight magnetic resonance angiography

This research was supported by the SRC/ERC program (R11-2002-103) and the Korea Research Foundation Grant funded by the Korean Government (MOEHRD, Basic Research Promotion Fund) (KRF-2008-314-E00246).

*Corresponding author: parkhee@konkuk.ac.kr