# Comparison of Fast Spin Echo T2 Weighted Image, Diffusion Weighted Image, and MR Spectroscopy in Hyperacute Cerebral infarction of a Cat Model

조영민, 서정진, 송상국, 강형근, 정광우, 정태웅, 황아실이, 양경승*, 신용진*

*전남대학교 의과대학 진단방사선과학교실, *조선대학교 이과대학 물리학과*

**Purpose:** In order to evaluate the utility of fast spin echo T2 weighted image, diffusion weighted image(DWI), and single-voxel localized proton MR spectroscopy(MRS) in the early detection of hyperacute cerebral infarction, we examined a cat model of common carotid artery(CCA) occlusion.

**Material and Method:** In fifteen cats weighing 4-5 Kg(mean 4.4 Kg), the right CCA and distal branches were occluded using a Histoacryl blue and suture techniques. After 30minutes, 1,2, and 3hours, we subsequently imaged the brains with 1.5T MR scanner using spin echo T1 weighted image, fast spin echo T2 weighted image, diffusion weighted image(b-value=1,000sec /mm$^2$). MRS was performed with same MR scanner using single-voxel STEAM sequence with CHESS pulse for water suppression. We evaluated the detection of hyperacute cerebral infarction over the time course in each techniques.

**Results:** In all animals, fast spin echo T-2 weighted images didn't show abnormal signal intensity within 3 hours after ictus, but DWI showed bright signal intensity in right cerebral hemisphere within 1 hour. MRS showed metabolic changes as early as 30 minutes after the vascular occlusion: the concentrations of Lac and $\alpha$-Glx increased over the time course ,while the levels of the rest of metabolites such as NAA, Chol, ml, $\beta, \gamma$-Glx, did not significantly change.

**Conclusion:** DWI and MRS have the enhanced ability to detect hyperacute cerebral infarction in early stage. Moreover, because MRS show ongoing cellular metabolic changes during hyperacute cerebral infarction, this technique may be useful for predicting the prognosis in patients with hyperacute cerebral infarction as well as early diagnosis. Learning Objectives(Teaching points): 1. Compare the sensitivity of fast spin-echo MRI, DWI, and MRS after CCA occlusion in a cat. 2.Describe the capability of predicting the prognosis in hyperacute ischemic stroke with MR spectroscopy.