

Perfusion MR imaging of Hippocampal sclerosis: Preliminary study

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Purpose: Cerebral perfusion, as measured by interictal SPECT and PET, is known to be decreased in the affected hippocampus of the patients with hippocampal sclerosis. The purpose of this study is to evaluate the capability of perfusion MR imaging to demonstrate ipsilateral hypoperfusion in patients with hippocampal sclerosis.

Materials and Methods: 18 patients with unilateral hippocampal sclerosis (M:F=12:6, mean age=30) were prospectively examined with perfusion MR image. 8 of them were examined with interictal SPECT. Diagnosis of hippocampal sclerosis was based on the presence of intractable temporal lobe epilepsy and unilateral atrophy and/or high T2 signal of the hippocampus on MR images (right:left=8:10). The perfusion MR imaging was performed on a 1.5T MR system by using an interleaved single shot gradient echo EPI sequence (TR/TE/flip angle=2000ms/50ms/90, FOV=240mm, matrix size=128x128, slice thickness/gap=5mm/2.5mm). A bolus of 15ml Gd-DTPA was administered intravenously at a rate of 2cc/sec using an autoinjector at 10 sec after the start of scanning. A total of 300 consecutive axial images in 6 slices (50 images per slice) were acquired in 100 sec. We obtained four perfusion imaging data; rCBV (regional cerebral blood volume), rCBF (regional cerebral blood flow), MTT (mean transit time) and TTP (time to peak) using the integral of the concentration-time curve and the arrival time to its peak from both hippocampal areas. Image processing was done on a SUN SPARCstation 20 developed on IDL (Research Systems, Inc., USA) platform. We compared four hippocampal perfusion imaging data between both sides by Paired sampling test. In addition, we compared the result of perfusion MR imaging with it of SPECT.

Results: The rCBV and rCBF of the affected hippocampus were lower in 44%(n=8/18) and higher in 56%(n=10/18) than those of the contralateral normal side. By paired sampling test, there was no significant difference ($p>0.05$) between the affected and normal sides. MTT and TTP maps also showed no significant differences between the abnormal and normal sides ($p>0.05$). On the contrary, SPECT demonstrated that the perfusion of the affected hippocampus

was lower than normal side in 7 of 8 patients.

Conclusions: Cerebral hypoperfusion as measured by perfusion MR imaging was demonstrated in the affected hippocampus approximately in only about a half of patients with hippocampal sclerosis. Further study with technical refinement in larger size of patient population is needed to improve the sensitivity of the perfusion MR imaging in epilepsy patients.