included a diagnosis of status epilepticus, clinically or electrographically, and MR that included pulsed arterial spin labeling images.

Results: Two patients were identified. The number of cases were limited due to the lack of routine PASL acquisition. The first patient had altered mental status and left sided hemiplegia. An MRI was ordered to evaluate for stroke as a possible cause with PASL sequences revealing hyperintensities throughout the right hemisphere. An EEG was subsequently performed due to the PASL findings and demonstrated rhythmic delta seizure activity in the right hemisphere. The second patient had a witnessed 30 minute seizure consisting of left arm clonic movements with loss of consciousness. An MRI, performed during the next day, showed hyperintensities in the right hippocampus on the PASL images. The EEG showed frequent sharp waves within the right frontotemporal region. These findings localized the ictal onset to the temporal region within the right hemisphere.

Conclusions: In this small series, PASL identified regions of hyperperfusion which correlated with EEG and clinical findings. In one patient, this technique helped to yield the diagnosis of seizures as a cause of neurological deficit which were initially thought to be due to stroke. Prospective studies of patients suspected of having status epilepticus using this technique would be of value to determine its usefulness where EEG patterns and standard MRI are unable to distinguish between focal deficits due to ischemia versus the occurrence of seizure activity.

1.152
WHITE MATTER CHANGES AFTER THE SELECTIVE REMOVAL OF AN EPILEPTOGENIC LESION IN THE HUMAN BRAIN

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Rationale: The epileptic activity emanating from an epileptogenic lesion causes widespread changes in the grey and white matter in the human brain. We previously reported that functional improvement occurs in the remote projection areas after an epileptogenic area was selectively resected in patients with mesial temporal lobe epilepsy (*Takaya et al., Brain 2009: 132; 185-194*). However, plastic changes in white matter architecture after selective removal of an epileptogenic region have not been reported. The purpose of the current study was to investigate whether the white matter integrity improves after subtemporal selective amygdalohippocampectomy in patients with intractable mesial temporal lobe epilepsy.

Methods: We studied 7 consecutive patients with medically intractable mesial temporal lobe epilepsy with unilateral hippocampal sclerosis. Diffusion tensor images (DTI) were acquired using 3T MRI before and after subtemporal selective amygdalohippocampectomy. Postoperative change in diffusion tensor parameters were evaluated using tract-based spatial statistics (TBSS) implemented in FSL.This study was approved by the Ethics Committee of the Kyoto University Graduate Schoool of Medicine, and informed consent was obtained from all patiens.

Results: All patients were seizure-free following subtemporal amygdalohippocampectomy. Post operative fractional anisotropy was increased in the fronto-parietal areas contralateral to the resected region and reduced in the temporal lobe ipsilateral to the resected region.

Conclusions: This study suggests that the white matter integrity might improve in the brain regions remote from the epileptic focus after the selective removal of an epileptogenic lesion.

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1.153
DIFFUSION TENSOR IMAGING OF PARAHIPPOCAMPAL GYRUS AS A LATERALIZING TOOL IN INTRACTABLE TEMPORAL LOBE EPILEPSY

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Rationale: The role of Diffusion Tensor imaging (DTI) in the presurgical evaluation of patients with epilepsy is not entirely clear. Some studies have suggested that this technique might be helpful in lateralization of the seizure focus. However only limited data is available regarding DTI in the white matter of the parahippocampal region. We hypothesize that DTI of this region may be helpful in lateralization of the seizure focus in patients with intractable temporal lobe epilepsy (TLE).

Methods: We retrospectively analyzed DTI images of 15 consecutive patients who had temporal lobectomy (8 left, 7 right) between 2007 and 2009 as well as those of healthy normal controls. Other inclusion criteria for patients were: 1) Engel Class 1a outcome after surgery, and 2) preoperative MRI scans with 25 directional DTI. Tractography was performed on each patient and control in the white matter of both parahippocampal regions using DTI studio software. Using this software, measures of Fractional Anisotropy (FA), Relative Anisotropy (RA) and Volume Ratio (VR) were obtained. In addition, Apparent Diffusion Coefficients (ADC) were also measured in all subjects. For statistical comparisons we used the t-test to examine the significance of differences in DTI measurements (FA, RA, VR).

Results: In 14 of 15 patients, all measures of anisotropy (FA, RA, VR) of white matter tracts in the parahippocampal region were significantly reduced ($p<0.001$) on the side of the seizure focus. One patient with left TLE had reduced anisotropy measures in the contralateral parahippocampal region. In the control group, anisotropy measures could be lower on either side. Computation of ADC values revealed equal ADC values bilaterally in 10 patients. Four patients had increased ADC values in the ipsilateral parahippocampal region and 1 patient had an increased ADC value in the contralateral parahippocampus. ADC values were equal on both sides in the control group. Review of preoperative brain MRI revealed the presence of unilateral hippocampal sclerosis (HS) on the operated side in 12 patients. One patient had evidence of bilateral hippocampal abnormalities and 2 patients had normal brain MRIs. Five of 15 patients had subdural electrodes implanted prior to resection because of uncertainty in localization of the epileptogenic zone. Neuropathology was available for 14 patients and revelealed HS in 8 patients, gliosis in 2, mild cortical dysplasia in 1 and neuronal heterotopia in 1 patient. Nonspecific changes were seen in 2 patients including the 1 patient with incongruent anisotropy findings. DTI was also helpful in lateralizing the epileptogenic zone in all 3 patients who had normal MRI or bilateral MRI changes. In addition, all 5 patients who needed implantation of intracranial electrodes were correctly lateralized using this technique.

Conclusions: DTI of the white matter tracts of the parahippocampal gyrus may be helpful in lateralization of the epileptogenic zone in intrac-

table TLE including in cases where standard noninvasive studies have yielded ambiguous results.

1.154
ALTERATION OF DOPAMINE D2/3 RECEPTOR BINDING IN PATIENTS WITH JUVENILE MYOCLONIC EPILEPSY

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Rationale: To quantify extrastriatal and striatal D2/D3 receptor binding in patients with juvenile myoclonic epilepsy (JME) using the high affinity dopamine D2/D3 receptor PET-ligand 18F-Fallypride.

Methods: Twelve patients with JME (defined by seizure semiology and interictal EEG) and 21 age matched control subjects were studied. Dynamic images (180 minutes) were acquired after injection of 18F-Fallypride. Patients were seizure free for all seizure types for at least 10 days before scanning. Parametric images of binding potential (BP) were created using the simplified reference tissue model. The images were stereotactically normalized using a ligand-specific template. We performed a voxel-based analysis with statistical parametric mapping (SPM2). ROI analysis was done comparing the BP of thalamus, caudate nucleus, anterior (ventral) and posterior (dorsal) putamen, ventral striatum and temporal lobe.

Results: Compared to controls patients with JME showed a significant decrease in 18F-Fallypride binding potential (BP)(SPM analysis corr. $p<0.001$ at cluster level) restricted to the bilateral posterior putamen. There was no significant alteration of 18F-Fallypride binding in other brains regions. Region of interest (ROI) analysis revealed a significant ($p<0.05$) decrease of 18F-Fallypride BP in the left (mean: −14.8%) and right (mean: −16.9%) posterior putamen, but not in anterior putamen, caudate, ventral striatum, thalamus and temporal lobe.

Conclusions: Patients with JME show a reduction in D2/3 receptor binding restricted to the bilateral posterior putamen, suggesting a specific alteration of the dopaminergic system. Whether these changes can be regarded as merely functional or relate to the pathophysiology of juvenile myoclonic epilepsy remains so far unclear.

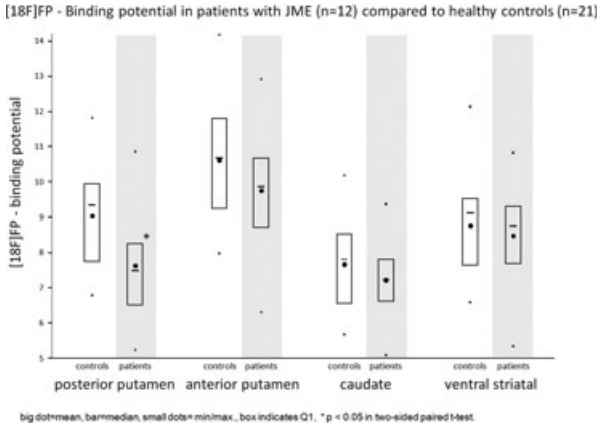

Figure 1.
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1.155
ANTI-CORRELATION BETWEEN THE DEFAULT-MODE NETWORK AND THE MESIAL TEMPORAL LOBE IN TLE

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Rationale: The default-mode network (DMN) of the brain supports resting consciousness [1]. It is believed that anti-correlation between the functional MRI (fMRI) signals in the DMN and the epileptogenic regions in temporal lobe epilepsy (TLE) may reflect the altered mental state caused by the epileptic discharges [2]. However, few simultaneous EEG-fMRI studies have detected negative activation in the DMN in response to interictal epileptic discharges (IED) which would support such a relationship [3-4]. In this study we mapped negative fMRI functional connectivity from a region in the default-mode network to the mesial temporal lobe to find evidence of this anti-correlation in a small homogeneous group of left TLE patients and healthy controls.

Methods: Five patients with left mesial temporal sclerosis or hippocampal structural abnormality [5] were reanalyzed for this study. All underwent left selective hippocampectomy and became free of disabling epileptic seizures. Ten healthy controls were also included. Subjects were imaged on a 3.0T MRI scanner including structural and fMRI scans at rest with eyes closed (64x64, FOV=240 mm, TE/TR=35/2000 ms, 200 volumes). Previous results showed that the 2dTCA [5-6] analysis performed on the patients detected transient fMRI signal spiking in the DMN [6] (Figure 1a (outline)). An average time course in an activated region in the posterior cingulate (pcc) of this map was used as a seed in the functional connectivity analysis (Figure 1a (white)). Motion and global time course signals were regressed from all data and images were low pass filtered at 0.10 Hz. A two sample t-test was used to determine significant differences between the groups.

Results: The controls had increased connectivity over the patients in the left posterior hippocampus (Figure 1b (white)) adjacent to the region in the anterior hippocampus that was found to have transient spiking by 2dTCA (Figure 1b (black)). The anterior hippocampal region coincides with the region of resection and is believed to be the epileptogenic region. Figure 1c shows that the connectivity to the posterior hippocampus is negative in the patients and positive in the controls, while the connectivity to the anterior hippocampus is not statistically different from zero in either.

Conclusions: This preliminary work shows evidence of a region of anti-correlation between the DMN and the left mesial temporal lobe in the patients, but not controls, which may account for the change in mental state associated with IEDs. This region of anti-correlation is located adjacent and posterior to the epileptogenic focus that was resected, suggesting a possibly indirect coupling between these effects.

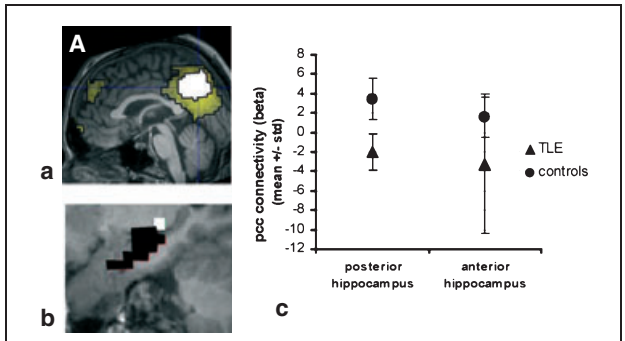

Figure 1.
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