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cortex). This finding might explain the different clinical features (myoclonus) observed in these patients.

p0922
BRAIN MORPHOLOGY IN JUVENILE MYOCLONIC EPILEPSY AND ABSENCE SEIZURES

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Purpose: We evaluated the differences in brain morphology among patients with juvenile myoclonic epilepsy according to the occurrence of absence seizures.

Method: Twenty-one juvenile myoclonic epilepsy patients with (n = 6) and without (n = 15) absence seizures were enrolled. We analyzed whole-brain T1-weighted MRI using FreeSurfer 5.1. Measures of cortical morphology, such as thickness, surface area, volume, and curvature, and the volumes of subcortical structures, the cerebellum, and cerebrum were compared between the groups. Moreover, we quantified correlations between clinical variables and each measures of abnormal brain morphology.

Results: Compared to normal controls, patients without absence seizures demonstrated thinning of the cortical thickness in the right hemisphere, including the post-central, lingual, orbitofrontal, and lateral occipital cortex. Compared to normal controls, patients with absence seizures had more widespread thinning of the cortical thickness, including the right post-central, lingual, orbitofrontal, and lateral occipital cortexes as well as the right inferior temporal cortex. Additionally, the volume of cerebellar white matter in patients without absence seizures was significantly smaller than that in normal controls. Patients with absence seizures had a much smaller cerebellar white matter volume than normal controls or patients without absence seizures. Moreover, there was significantly positive correlation between age of seizure onset and the volume of cerebellar white matter in patients with JME.

Conclusion: We demonstrated that there were significant brain morphology differences in patients with juvenile myoclonic epilepsy according to the presence of absence seizures. These findings support the hypothesis that juvenile myoclonic epilepsy may be a heterogeneous syndrome.

Neuroimaging 5
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p0924
AUTOMATIC SEGMENTATION OF DEPTH ELECTRODES IMPLANTED IN EPILEPTIC PATIENTS: A MODULAR TOOL ADAPTABLE TO MULTICENTRIC PROTOCOLS

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Purpose: Automating the localization of implanted depth electrodes, as well as their visualization in three-dimensional (3D) space, can greatly decrease the amount of resources needed for planning, executing and validating resection in epilepsy surgery. We present an integrated and automated image processing modular research tool that uses pre-operative MR and post-operative CT images to accurately detect the position of each implanted electrode.

Method: First, an initial segmentation of different brain structures is carried out, followed by a CT to MRI rigid registration. Then, electrode contacts are segmented using a watershed transform-based algorithm followed by different image processing steps allowing for correct feature classification. Meshes of all segmented structures are generated for visualization with Slicer. An interactive tool may be used in case any mistakes in the segmentation process have been found. Finally, the MRI is normalized to the MNI space to automatically calculate the anatomical label for each contact and visualize the results on coregistered subject images.

Results: Data from ten patients (from two centers) have been used. The method was able to automatically detect all the electrodes in most patients, allowing an interactive refinement when the automatic approach was not totally accurate. The whole process takes around 10 minutes for each patient, in contrast to the multiple hours that an operator would take to manually localize all the contacts. Software was easily used by operators without prior image processing experience.

Conclusion: We propose an easy to use, novel research tool for accurately segmenting and visualizing depth electrodes in 3D space on epileptic patients. Although the method is yet to be validated, first results are promising and feedback from operators is encouraging. A connection with a tool for electroencephalography monitoring is being developed. Unlike manual localization procedures, our algorithm achieves excellent results without time-consuming and difficult judgments from an operator.

p0925
1H-MRS IN MESIAL TEMPORAL LOBE EPILEPSY WITH AND WITHOUT HIPPOCAMPAL ATROPHY

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Purpose: To investigate changes in proton magnetic resonance spectroscopy (1H-MRS) in relation to response to antiepileptic drugs (AED) and hippocampal atrophy (HA) in patients with mesial temporal lobe epilepsy (mTLE). We analyzed myo-inositol/creatine (Ins/Cr+PCr), N-acetyl aspartate+N-acetyl-aspartate-glutamate/creatine (NAA+NAAG/Cr+PCr), and glycerophoscholine/creatine (GPC/Cr+PCr) as markers of cellular structural and functional alterations.

Method: 1H-MRS were acquired using a PRESS (Point Resolved Spectroscopy) sequence with repetition time (TR) = 2000 msec and echo time (TE) = 35 msec in a 3.0T Philips MRI scanner with a single voxel placed in the anterior portion of hippocampi. Individuals with unilateral HA or non-lesional mTLE on MRI were divided according to AED response:
(1) *refractory with HA*;
(2) *refractory non-lesional*;
(3) *responders with HA*,
(4) *responders non-lesional*, and compared to
(5) *healthy controls*.
Metabolite were quantified ipsi- and contralateral to the EEG lateralization using LCModel. All patients with HA had concordant EEG lateralization. Metabolites from controls were defined as the mean values of right+left hippocampi. We performed statistical analyses with SPSS (Version 22.0) using MANCOVA co-varying for age with Bonferroni post hoc comparisons.

Results: We found a relative increase of Ins/Cr+PCr, a marker of astrocytes, in groups *refractory with HA* and *refractory non-lesional*, in the ipsilateral hippocampus, when compared to the other groups ($p < 0.0001$, $p = 0.001$ and $p = 0.024$). Moreover, NAA+NAAG/Cr+PCr, a marker of neuronal damage, was reduced in group r*efractory with HA* in the ipsilateral hippocampus compared to all other groups ($p = 0.028$, $p = 0.048$, $p = 0.041$ and $p < 0.0001$, respectively). In addition, GPC/Cr+PCr, a

product of choline metabolism, was increased in the group *responders with HA* in the contralateral hippocampus compared to group *responders non-lesional*, although this finding needs further investigation.

Conclusion: Our findings indicate that 1H-MRS changes in mTLE appear to be related to the presence of HA rather than the pattern of AED response.

p0926

MAPPING AND VOLUMETRY OF HESCHL'S GYRUS BY VBM AIDS IN PLANNING TEMPORAL LOBE RESECTION IN PATIENTS WITH *"TLE WITH AUDITORY AURA"*

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Purpose: TLE with auditory aura (TLE-AA) form a specific subgroup of patients where the ictal onset zone extends to Heschl's gyrus (HG). After anterior temporal lobectomy (ATL), TLE-AA patients seldom become seizure-free. Through VBM of HG, we analyzed the reasons for surgical failure in them.

Methods: Of 456 consecutive patients operated for TLE from 2000–2010, we identified TLE-AA patients. Their HG was mapped by VBM pre-and post-surgically. Automated anatomical labeling using T1 image *"normalized"* to customized template was then *"segmented"* into GM, WM and CSF using probability maps. *"Modulation"* and *"smoothing"* with a 12-mm isotropic Gausian Kernel was done. The volume of the HG (cm^3) was computed by multiplying and summing voxel-by-voxel volume. Bivariate followed by multivariate logistic regression model analysis was performed comparing TLE-AA from patients with other auras. Pre-and-post-surgical VBM of HG was compared by ANOVA.

Results: Of 456 patients who underwent ATL, 344 (75.4%) had aura; 19 (5.5%) were TLE-AA. 11/19 (57.8%) with TLE-AA had prior encephalitis ($p = 0.006$),10/19 (52.6%) had normal MRI and 8/19 (42.1%) had normal histopathology ($p = 0.000$). 10/19 had persistent seizures after surgery versus 86/325 with other auras ($p = 0.01$). 7/10 (70%) patients underwent left ATL ($p = 0.01$). HG was intact in 9/10 patients (90%) who had seizures postoperatively. In nine patients without seizures, the HG was disrupted completely by more than two-third its volume (mean pre- vs. post-surgery volume, 2.02 cm^3 vs. 0.41 cm^3, $p = 0.001$).

Conclusions: Volumetric mapping of HG pre and post-surgically in patients with TLE-AA confirmed that major disruption or removal of HG will only make the patient seizure-free. A presurgical VBM-HG mapping to incorporate it in resection should be attempted by anatomic landmarks or by neuronavigation.

p0927

WHITE MATTER ABNORMALITIES IN PATIENTS WITH HOT WATER EPILEPSY REVEALED BY DIFFUSION TENSOR IMAGING ANALYSIS IN A VOXEL WISE APPROACH

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Purpose: We investigated changes of White Matter (WM) integrity in patients with Hot water epilepsy (HWE), and their relationships with epilepsy-specific clinical factors by comparing the fractional anisotropy (FA) and the mean diffusivity (MD) maps between patients and the controls.

Method: We performed diffusion tensor imaging (DTI) in 100 patients with HWE and 57 controls matched for age and gender. Between-group, comparisons of DTI parameters were carried out in a whole-brain voxel-wise manner using tract-based spatial statistics (TBSS).In addition ROI based evaluation of both, FA and MD was correlated with epilepsy-specific clinical variables.

Results: Compared to controls, patients with HWE had significantly reduced FA and increased MD in both hemispheres, mainly in the frontal lobes, cingulum, and forceps major and minor, anterior thalamic radiation, superior longitudinal fasciculus, uncinate fasciculus, cortico-spinal tract, and inferior fronto-occipital fasciculus. HWE subgroup with family history had higher FA values in bilateral anterior thalamic radiation, cingulum (hippocampus), forceps major, inferior fronto-occipital fasciculus, right inferior longitudinal fasciculus, superior longitudinal fasciculus and uncinate fasciculus. Subgroup with frequent seizures had lower FA values in left -anterior thalamic radiation,superior longitudinal fasciculus, cingulum, inferior fronto-occipital fasciculus, uncinate fasciculus and forceps minor. Drug naïve HWE subgroup had lower FA values in bilateral anterior thalamic radiation,corticospinal tract, hippocampal,cingulate gyrus, uncinate,inferior fronto-occipital fasciculus, inferior longitudinal fasciculus, superior longitudinal fasciculus, forceps major and minor. On ROI based evaluation, MD value of the superior longitudinal fascicle and the splenium of the corpus callous had a positive co-relation with age at onset of seizure.

Conclusion: Relative to healthy controls, hot water epilepsy subjects showed aberrations in several major inter-and intra-hemispheric tracts. Patients with family history of epilepsy had increased connections in the right hemisphere.The frequency of seizure, the age at onset of seizure and treatment influenced the DTI parameters.

p0929

RESTING-STATE FUNCTIONAL CONNECTIVITY IN THE BABOON MODEL OF GENETIC GENERALIZED EPILEPSY

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Purpose: The baboon provides a natural model of genetic generalized epilepsy (GGE) that closely resembles juvenile myoclonic epilepsy. This study uses a data-driven approach to determine the intrinsic connectivity networks of epileptic (EPI) and healthy control (CTL) baboons using resting-state fMRI and assess any group-wise functional connectivity (FC) differences.

Method: Twenty baboons, matched for age and weight, were classified into two groups (10 EPI, 10 CTL) on the basis of scalp EEG findings. Each animal underwent one MRI session–one 5-minute resting state (rs-fMRI) and one anatomical MRI. All images were pre-processed using the most current rs-fMRI techniques. Using independent component analysis (ICA), we identified 14 unique components (i.e. networks) which were then used to characterize each network's functional connectivity. We utilized a data-driven approach to evaluate functional connectivity so that our results would not be influenced/limited by our seed selection. Each network mask was then thresholded ($|z| > 2.3$), then used to assess group-wise FC differences using cluster analysis.