

P-8. The Relation between Motor Function of Stroke Patients and Diffusion Tensor Imaging Findings for the Corticospinal Tract

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Objective: Although the corticospinal tract (CST) is a major neural tract for motor function, the detailed role of the CST has not been clearly elucidated. We investigated relations between motor function of patients with chronic hemiparetic stroke and diffusion tensor imaging (DTI) findings for the CST.

Methods: We recruited 82 consecutive chronic stroke patients. Medical Research Council, Modified Brunnstrom Classification, and Functional Ambulatory Category were used in measurement of the affected side. And using statistical program, We investigated relations between motor function and diffusion tensor imaging of the CST

Results: All motor functions showed positive correlations with fractional anisotropy (FA) and fiber number (FN) ratios ($p < 0.05$). With regard to Medical Research Council, shoulder abductor ($r=0.70, 0.68$), elbow flexor ($r=0.75, 0.72$), finger flexor ($r=0.73, 0.74$), and finger extensor ($r=0.69, 0.77$) showed strong correlations with FA and FN ratios. Modified Brunnstrom Classification ($r=0.70, 0.73$) also showed strong correlation. According to our findings, it appears that the CST is related to motor function of upper and lower extremities, with particular relation to motor function of upper extremities, including the hand, compared with other motor functions.

Conclusion: Using DTI, We investigated relations between motor function of patients with chronic hemiparetic stroke and DTI of finding for the CST. Result of this study would be useful for clinicians in the field of neuroscience.

MEMO



P-9. Moving Dipoles Analysis and It's Implication during Stroop Task: MEG Study

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Objective: Magnetoencephalography is a functional neuroimaging technique for mapping brain activity by recording magnetic fields produced by electrical currents occurring naturally in the brain. MEG is a very effective way of spatial and temporal analysis of the number of nerve activity in the brain. While performing the cognitive task that we want to find area of the brain is activated and the reaction by the analysis of neural activity.

Methods: Stroop effect is a demonstration of interference in the reaction time of a task. When the name of a color (e.g., “blue”, “green”, or “red”) is printed in a color not denoted by the name (e.g., the word “red” printed in blue ink instead of red ink), naming the color of the word takes longer and is more prone to errors than when the color of the ink matches the name of the color. When the name and color are matched we called “congruent”, aren't matched “incongruent”.

Results: In the behavior response, Congruent and incongruent reaction time showed a difference. Congruent reaction time is more faster than incongruent. Percentage of correct answers in the case of some falling trend seems incongruent. But not the trend seems to be common from all subjects. The dipole analysis in the period of stroop task, dipole be formed in the same area of brain. And also we can find the difference of dipole strength between congruent and incongruent.

MEMO



P-10. Fluoroscopy-guided Percutaneous Radiofrequency Thermocoagulation for Trigeminal Neuralgia under General Anesthesia

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Objective: Percutaneous radiofrequency thermocoagulation (PRT) is a safe and effective means in treatment of drug-resistant, medically refractory trigeminal neuralgia (TN). Most procedures of PRT can be performed with local anesthesia without difficulty. However, some patients pacing repeated PRT for recurrence of TN wanted to avoid the painful experience during initial PRT. We adopted a general anesthesia (G/A) in selected patients with recurrent TN.

Methods: Eight patients with idiopathic TN (F:M 3:5, age ranged 48-83) underwent fluoroscopy-guided PTR under G/A. Primary pain was located in V3 (N=5), V2+V3 (n=3). 5 of them were repeated PRT and 1 was 2nd repeated PRT, and one patient with V3 TN underwent as first procedure. Our technique of fluoroscopy-guided PRT was described previously. According to the status of the patient and degree of preoperative sensory loss, degree and duration of thermocoagulation was modified (70-75°C).

Results: There was no complication (cranial nerve deficit) related to thermocoagulation and preoperative pain was controlled immediately following PRT as those of PRT in local anesthesia. All discharged at the day after PRT. The median operation time was 15 minutes (range, 10-25). With a mean follow-up of 28 months (range, 18-48 months), One of 8 patient experienced a recurrence 1.5 years after PRT under G/A and took a cyberknife radiosurgery.

Conclusion: Although our experience is still small, it seems that PRT was safe and effective under G/A, if fluoroscopically guided. For V3 TN, we assume it is always safe. However, in V2 PRT, some consideration shall be given to avoid possible complication of PRT. Further clinical experience and longer follow-ups are warranted.



P-11. Spinal Cord Stimulation (SCS) Using Real-time CT Scan in Treatment of a Patient with Complex Regional Pain Syndrome

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Spinal cord stimulation (SCS) has been widely used in the treatment of complex regional pain syndrome. A 60-year-old man had had low back pain on his right thigh, anterior tibia area and lower posterior leg pain for 3 years. He took microdiscectomy L4-5, right in a local hospital. After the surgery, however, he suffered from allodynia, hyperalgesia, motor weakness (hip flexion Gr 5/5, knee extension Gr 5/5 ankle dorsiflexion Gr 4/5 great toe dorsiflexion Gr 4/5, and planter flexion Gr 4/5) and temperature fluctuations. The severity of pain was usually visual analogue scale (VAS) 9/10. Despite of multi-modal treatments, his leg pain failed to improve. Thus, in this case, a lead type spinal electrode lead was implanted. Though spinal cord stimulator insertions have been usually accompanied by x-ray guided, but we used real time CT scans, in order to manipulate the location of lead tip more delicately. The results along with the patient's satisfaction were favorable. We report a case of CT-guided spinal cord stimulator insertion and examine the overall advantages of the treatment.

MEMO



P-12. Mesial Temporal Lobe Epilepsy with Hippocampal Sclerosis is a Network Disorder with Altered Cortical Hubs

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Objective: Electrophysiological hubs within the large-scale functional networks in mesial temporal lobe epilepsy (mTLE) with hippocampal sclerosis (HS) have not been investigated. We hypothesized that mTLE with HS have different resting-state network hubs in their large-scale functional networks compared to the hubs in healthy controls (HC). We also hypothesized that the hippocampus would be a functional hub in mTLE patients with HS.

Methods: Resting-state functional networks, identified by using magnetoencephalography (MEG) signals in the theta, alpha, beta, and gamma frequency bands, were evaluated. Networks in 44 mTLE patients with HS (left mTLE=22; right mTLE=22) were compared with those in 46 age-matched HC. We investigated betweenness centrality at the source-level MEG network.

Results: The main network hubs were at the left temporal pole of the superior temporal pole in the beta band, left temporal pole of the middle temporal pole in the beta and gamma bands, left hippocampus in the theta and alpha bands, and right posterior cingulate gyrus in all 4-frequency bands in mTLE patients; all of which were different from the main network hubs in HC. Only left mTLE patients showed profound differences from HC at the left hippocampus in the alpha band.

Conclusions: Our analysis of resting-state MEG signals shows that altered electrophysiological functional hubs in mTLE patients reflect pathophysiological brain network reorganization. Since we detected network hubs in both hippocampal and extra-hippocampal areas, it is probable that mTLE is a large-scale network disorder rather than a focal disorder. The hippocampus was a network hub in left mTLE but not in right mTLE patients, which may be due to intrinsic functional and structural asymmetries between left and right mTLE patients. The evaluation of cortical hubs, even in the spikefree resting-state, could be a clinical diagnostic marker of mTLE with HS.



P-13. Usefulness of Wide Time Window and Multiple Frequency Band Analysis in Source Localization for Ictal MEG

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Objective: We evaluated the diagnostic value of multiple frequency band MEG source localization for power spectral activity using wide time window during preictal period in relation with surgical outcome, and compared the results with manually selected time and frequency analysis at ictal onset.

Method: Thirteen patients who underwent resective surgery for intractable epilepsy and showed ictal event during MEG recording were selected for the retrospective analysis. Several seconds of preictal and ictal data (15 s before, 10 s before, 5 s before, and 1 s before to 1 s after ictal onset) were localized in multiple frequency band of theta (4-7 Hz), alpha (8-12 Hz), beta (13-29 Hz), and gamma (30-70 Hz) bands using wavelet transformation and sLORETA algorithm. The same source localization analysis was separately performed with manually selected time and frequency. Localization concordance to the surgically resected cavity with various time windows and frequency bands analysis was compared according to surgical outcome, MRI findings, and pathology.

Results: Source localizations of gamma band in time window for 10 seconds period before ictal onset showed best concordance rate to the resection cavity among other frequencies and time windows. Eight of 13 (62%) patients showed sub-lobar concordance in 10 seconds gamma localization, whereas 3 of 13 (23%) showed sub-lobar concordance in the analysis of manually selected time and frequency. In terms of surgical outcome and pathology, 4 of 7 patients with focal cortical dysplasia pathology achieved seizure free outcome. Two of 4 (50%) showed no abnormal findings on MRI. All of 4 patients showed sub-lobar concordance, whereas none of remaining 3 showed the concordance.

Conclusion: Gamma source localization of time window of 10 seconds at preictal state may act as potential non-invasive localizing biomarkers of epileptogenic zone in candidates of surgical intervention, especially in case MRI suspected focal cortical dysplasia or even non-leisonal cases.



P-14. Navigation Guided ICH Removal Using Previous Burr Hole without Removal of Electrode after DBS Surgery

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Many previous studies have shown that placement of deep brain stimulation (DBS) electrodes carries a considerable risk of hemorrhage or asymptomatic hemorrhage. Postoperative ICH is one of most annoying complications to patients. We have introduced Navigation guided ICH removal using previous burr hole without removal of electrode after DBS surgery. 63 y/o male patients underwent bilateral STN-DBS due to Parkinson disease. We have experienced delayed intracranial hemorrhage after postoperative 2 day. The patient did not have hypertension but history of hepatectomy. The patient had hepatectomy because of hepatoma 7 years ago. Platelet counts decreased 90K, and increased delayed intracranial hematoma. We have to decide whether craniotomy or not. Using same burr hole without removal of proximal lead and electrode, we can escape unwanted craniotomy. It can be used for permanent electrode after recovery. We have confirmed the electrode still in position using merged CT-MR image.

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