GP.04

CNS ANDRÉ BARBEAU MEMORIAL PRIZE

Network connectivity following a single unprovoked seizure using 7 Tesla resting-state fMRI

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Background: Predicting epilepsy following a first seizure is difficult. Network abnormalities are observed in patients with epilepsy using resting-state functional MRI (rs-fMRI), which worsen with duration of epilepsy. We use rs-fMRI to identify network abnormalities in patients after a first seizure that can be used as a biomarker to predict development of epilepsy. *Methods:* Patients after a single, unprovoked seizure and age/sex matched healthy controls underwent 7 Tesla structural and resting-state functional MRI. Data were analyzed using graph theory measures. Patients were followed for development of epilepsy. *Results:* Nine patients and nine control subjects were analyzed. There were no differences in baseline characteristics. No patients developed epilepsy (average follow-up 3 months). No differences between groups occurred on a whole-brain network level. At a 20% threshold, significant differences occurred in the default mode network (DMN). Patients demonstrated an increased local efficiency (p=0.02) and clustering coefficient (p=0.04), and decreased path length (p=0.02) and betweenness centrality (p=0.02). *Conclusions:* No whole-brain network changes occur after a single unprovoked seizure. No patient has developed epilepsy suggesting this group does not have network alterations after a single seizure. In the DMN, the alterations noted indicate increased segregation of network function.

GP.05

CACN PRESIDENT'S PRIZE

Sensory-motor network functional connectivity in hemiparetic children with perinatal stroke

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Background: Perinatal stroke is the most common cause of hemiparetic cerebral palsy. Post-stroke plasticity is well studied in adults, but mechanisms in children are poorly understood. To better understand the relationship between functional connectivity and disability, we used rsfMRI to compare connectivity with sensorimotor dysfunction. *Methods:* Subjects with periventricular venous infarction were compared to controls. Resting-state BOLD signal was acquired on 3T MRI and analyzed using SPM12. Functional connectivity was computed between S1 and M1 of the left/non-lesioned and right/lesioned hemisphere. Primary outcome was connectivity expressed as a Pearson correlation coefficient. Motor function was measured using the Assisting Hand Assessment (AHA), and Melbourne Assessment (MA). Proprioceptive function was measured using a robotic position matching task (VarXY). *Results:* Subjects included 17 PVI and 21 controls. AHA and MA in patients were negatively correlated with connectivity (increased connectivity=poorer performance). Correlations between AHA and connectivity between non-lesioned M1 to bilateral S1s were significant. VarXY in PVI was inversely correlated with connectivity (increased connectivity=improved performance), significantly between non-lesioned S1 and bilateral M1s. Control VarXY was positively correlated with connectivity between non-dominant S1 to bilateral M1s. *Conclusions:* We demonstrated significant correlations between connectivity and motor/sensory function in PVI patients. Greater insight into understanding reorganization of brain networks following perinatal stroke may facilitate personalized rehabilitation.

CACN CHAIR'S SELECT ABSTRACTS

A.01

The relationship between fatigue and health-related quality of life in a clinical trial population of Duchenne muscular dystrophy patients

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Background: Fatigue was recently reported to be the largest contributor to poor health-related quality of life (HRQOL) in paediatric Duchenne muscular dystrophy (DMD). Additional studies are necessary to confirm the generalizability of this finding. Our objective was to explore the longitudinal relationship between fatigue and HRQOL in an additional cohort of DMD patients. *Methods:* We performed a secondary analysis of data from a clinical trial (NCT00592553), which enrolled patients with nonsense mutation DMD, aged 5–20 years, from 37 sites in 11 countries (*N*=174). Fatigue and HRQOL were assessed using the PedsQL™ Multidimensional Fatigue Scale and Generic Core Scales, respectively, by patient- and parent-report at baseline and over 48 weeks. *Results:* Patients reported greater fatigue than healthy controls from published data. There was no significant difference between patient- and parent-reported fatigue. Fatigue was significantly correlated with worse HRQOL at baseline, by patient-report (r=0.70, $P<0.001$) and parent-report (r=0.70, $P<0.001$); and at 48 weeks, by patient-report (r=0.79, $P<0.001$) and parent-report (r=0.74, $P<0.001$). Change in fatigue was significantly correlated with change in HRQOL over 48 weeks, by patient-report (r=0.64, $P<0.001$) and parent-report (r=0.67, $P<0.001$). *Conclusions:* Fatigue is a major contributor to HRQOL in DMD. The strong association between fatigue and HRQOL corroborates previous studies, and suggests that reducing fatigue may improve HRQOL.

A.02

Assessing visual functions in children with an optic pathway glioma using steady-state visual evoked potentials

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Background: Optic pathway gliomas (OPG) represent 5% of pediatric brain tumours. Visual acuity measures are used to evaluate treatment response. Current clinical tests to assess visual field integrity are subjective and require verbal cooperation. Thus, the objective of this study was to evaluate the clinical effectiveness of Steady State Visual Evoked Potentials (ssVEPs) to measure visual field integrity