allied academies

18th International Conference on

Neurology and Neurological Disorders

August 23-24, 2018 | Paris, France

Parietal-thalamic dysconnectivity during sustained attention processing in young adults with Traumatic Brain Injury

Xiaobo Li and **Ziyan Wu**
New Jersey Institute of Technology, USA

Traumatic brain injury (TBI) is a major public health problem with potentially serious long-term neurobehavioral sequelae. Attention deficits occur in approximately 15-20% of TBI survivors and are the most common persistent cognitive impairments post TBI. The consensus regarding appropriate evaluation of attention deficits in adults with TBI is rather limited due to lack of understanding of the neurobiological substrate associated with this syndrome.

In this study, functional magnetic resonance imaging data during a visual sustained attention task were obtained from 14 young adults who had history of one or multiple diffuse axonal TBIs which were clinically confirmed at least 6 months prior the study and 15 demographically matched normal controls. Task responsive brain activation map was constructed for each participant using FEAT/FSL (www.fmrib.ox.ac.uk/fsl). Between-group comparisons of whole brain voxel-based functional activations were conducted using unpaired two-sample t-test. Relative to controls, subjects with TBI showed decreased activations in frontal and parietal cortices and increased activations in bilateral thalami (Figure 1A). Based on these results, four regions of interest (ROIs) from the right middle frontal cortex, left inferior parietal cortex and bilateral thalami were located. The average time series inside each ROI was calculated. Functional connectivity between each pair of the ROIs was examined by calculating the Pearson's correlation coefficient of the average time series of the two ROIs. Between-group comparisons of the functional connectivity measures were carried out using unpaired two-sample t-test. Multiple comparisons were corrected using the FDR at $\alpha = 0.05$. Relative to controls, subjects with TBI showed significantly decreased functional connectivity between the left inferior parietal cortex and right thalamus.

Parietal cortex and thalamus are key components in attention and cognitive processing pathways. The results of decreased functional activations in parietal region, increased functional activations in thalamic area and reduced interactions between these two areas during visual attention processing in patients with TBI, thus suggest that functional alterations in parietal cortex and thalamus may significantly contribute to TBI induced attention deficits. Further study can focus on investigating associations between brain imaging and attention-related behavioral measures in TBI patients in a larger study sample.

Speaker Biography

Xiaobo Li is an Associate Professor and Director of the Computational Neuroanatomy and Neuroinformatics lab (CNN lab) in the Department of Biomedical Engineering at New Jersey Institute of Technology (NJIT). Dr. Li received her Ph.D. in 2004 from the University of Birmingham, UK, on geometrical modeling in digitized data. She has extensive research experience in developing and translating mathematical techniques to quantitatively evaluate the structural and functional organization in the human brain using structural MRI/fMRI/DTI data, and extensive clinical application experience in brain development and disorders such as Attention Deficit/Hyperactivity Disorder (ADHD), Autism Spectrum Disorder (ASD), schizophrenia, etc.

e: xli.aecom@gmail.com

Notes: