

July 19-20, 2018
Prague, Czech RepublicBiomark J 2018, Volume 4
DOI: 10.21767/2472-1646-C1-003

METABOLIC PECULIARITIES AND DYSFUNCTION OF THE RESTING STATE DEFAULT MODE NETWORK (RS DMN) IN PATIENTS WITH PARKINSON'S DISEASE (PD) AND DIFFERENT LEVEL OF COGNITIVE IMPAIRMENT (CI): 1H MRS AND FMRI STUDY

Z Rozhkova, I Karaban and N Karasevich

Medical Clinic Boris, Institute of Gerontology of the Academy of Medical Sciences of Ukraine, Ukraine

Purpose: The aim of our study was to investigate local metabolic state and integrity of RS DMN connectivity in patients with PD and different level of CI.**Materials & Methods:** Three groups of PD-patients (57-73y) with various cognitive statuses are studied by 1H MRS and fMRI with 1.5T Signa Excite (GE). The 1st group (DPDG) consists of 13 PD-patients with dementia. The 2nd group (CIPDG) includes 15 patients with mild CI, and 3rd group (NPDG)-12 patients with normal cognitive function. Spectra are recorded in both hemispheres in the white matter of the anterior (APCG), and in the posterior portion of cingulate gyrus (PPCG) with the SVSS TEAM: TR/TE=1500/144ms. EPI BOLD scans were acquired using EPI: TR/TE=3000/71ms. ICA analysis was used to identify 20 unique networks of RS-activity using MELODIC.**Results:** In APCG the mean values of NAA/Cr in DPDG, CIPDG, and NPDG are: (1.68±0.02), (2.04±0.03), (2.32±0.05), Cho/Cr: (0.84±0.02), (0.81±0.05), (0.53±0.03). In PPCG the mean values of NAA/Cr in DPDG, CIPDG, and NPDG are: (1.14±0.12), (1.81±0.02), (1.98±0.04), and of Cho/Cr: (0.96±0.02), (0.77±0.03), (0.68±0.03). We have found the progressive decreasing NAA/Cr in the PPCG and increasing of Cho/Cr for the patient of NPDG, CIPDG, and DPDG that is associated with poorer cognitive function. The analysis of the DMN revealed a gradual reduction in functional connectivity for the patients of DPDG in the cuneus, precuneus and PPCG, which correlate with severity of CI. Our findings suggest that RSNs involving areas of the cerebellum and frontal lobe, that could be interpreted as a potential compensatory mechanism to functional disorders caused by the CI: increasing the functional activity of specific areas in response to a gradual cognitive decline. In the NPDG connections between the APCG and PPCG, and inferior parietal gyrus bilaterally were found. In the NPDG, activation of APCG decreased, but connectivity patterns persisted. In CIPDG activated clusters were found precuneally, and in PPCG, however no connection to the parietal lobe or APCG.**Conclusion:** Metabolic alterations in PPCG are indicators of neuronal loss and dysfunction, and may be useful marker of CI in patients with PD. fMRI and MRS give new approach for understanding pathophysiological changes in PD-patients associated with CI.**Clinical relevance:** Bringing together fMRI in the resting state and 1H MRS data we obtain very useful markers of neuronal dysfunction and neuronal loss in patients with PD and different level of CI.

invivo@ukr.net