ISSN 1307-8798

Official Publication of the Turkish Society of Anatomy and Clinical Anatomy

www.anatomy.org.tr

anatomy

An International Journal of Experimental and Clinical Anatomy

Volume 12
Supplement 1
May 2018



Special Issue includes abstracts for the 16th Turkish Neuroscience Congress 20–23 May 2018, Istanbul, Turkey

deomed®

employed to OSMS patients. In the tests p<0.05 was considered statistically significant.

Results: Age, onset of disease,duration of illness,total number of attacks and annual episodes of MS, NMO and OSMS cases included in this study were compared by ANOVA,gender characteristics by chi-square test and EDSS and progression index were compared with Kruskal-Wallis test.There was no statistically significant difference between the study groups in these parameters. Aqp-4 antibody was only detected in NMOSD patients, whereas MOG antibody was not detected in any of the participants. OSMS and CMS patients had significantly increased IL-6, IL-17 and TNF-α and reduced IL-8 and IL-10 levels than NMOSD patients and healthy controls (p<0.001). Serum IL-6 levels,memory and executive test scores were correlated with progression indices of OSMS patients.

Conclusion: Serum cytokine profile of OSMS patients is distinct from NMOSD patients but identical to CMS patients,suggesting that OSMS is a clinical variant of MS and cytokine measurements can be utilized for diagnostic discrimination of OSMS and NMOSD. IL-6 might be involved in pathogenesis and cognitive dysfunction of OSMS patients.

Keywords: OSMS, CMS, NMOSD, cytokines

O-42

Role of NF-kappa B p65 in meningeal inflammation triggered by cortical spreading depression

Zeynep Kaya, Emine Eren Koçak, Hülya Karataş Kurşun, Müge Yemişci Özkan, Turgay Dalkara

Institute of Neurological Sciences and Psychiatry, Hacettepe University, Ankara, Turkey

Objective: Migraine is a common disorder. Migraine pathophysiology needs deeper understanding in order to develop more effective drugs. Cortical spreading depression (CSD) is the neurophysiological correlate of migraine aura. The idea that "CSD-triggered migraine pain emerges as a result of parenchymal and subsequent meningeal sterile inflammatory response" is generally accepted. Among the members of the nuclear factor kappa B (NF-kappa B) transcription factor family, p65 is an inflammatory mediator that has been shown to be activated in different systems and under different pathological conditions. This study investigates the role of NF-kappa B p65 in relation to the persistence of CSD-induced parenchymal as well as meningeal inflammation

Methods: A single CSD was induced by pinprick in Swiss Albino mice. Activation of NF-kappa B p65 in S100B (+) astrocytes and meningeal cells after CSD was investigated by assessing its nuclear translocation using immunofluorescent labeling. Brain and dura mater sections were assessed for the study.

Results: Activation of NF-kappa B p65 was found to be persisting in the brain parenchyma when assessed immediately and 1, 2, 3, 4, 5 hours after CSD. Activation was observed in 25% of all parenchymal cells at the aforementioned time points, which corresponded to 64% in S100B (+) astrocytes. NF-kappa B p65 activation (nuclear translocation) was also detected in meningeal cells after CSD.

Conclusion: In conclusion, NF-kappa B p65 is immediately activated in the brain parenchyma by CSD and this activation lasts at least five hours. At the same time, p65 is also translocated to nucleus in dural cells suggesting that it has a role in meningeal inflammation after CSD. This study is supported by Hacettepe University Scientific Research Projects Coordination Unit (project number: TSA-2017-14418).

Keywords: Cortical spreading depression, migraine, neuroinflammation

O-43

The relationship between resting state connectivity and episodic memory in Alzheimer's disease

Elif Yıldırım[1], Ezgi Soncu Büyükişcan[1], Çiğdem Ulaşoğlu Yıldız[2], Elif Kurt[2], Başar Bilgiç[3], Aslı Demirtaş Tatlıdede[3], Haşmet Hanağası[3], Burak Acar[4], Tamer Demiralp[2], İ. Hakan Gürvit[3]

[1]Department of Neuroscience, Aziz Sancar Institute of Experimental Medicine, Istanbul University, Istanbul, Turkey; [2]Neuroimaging Unit, Hulusi Behçet Life Sciences Research Laboratory, Istanbul University, Istanbul, Turkey; [3]Department of Neurology, Behavior and Movement Disorders Unit, Istanbul Medical School, Istanbul University, Istanbul, Turkey; [4]Department of Electrical-Electronics Engineering, Faculty of Engineering, Boğaziçi University, Istanbul, Turkey

Objective: This study aimed at identifying the extent to which resting state connectivity relates to episodic memory performance within different stages of Alzheimer's disease.

Methods: 78 participants were enrolled in the study. Each participant was assigned to one of the three groups: subjective cognitive impairment (SCI, n=31), mild cognitive impairment of the amnestic type (aMCI, n=31), and early-stage Alzheimer's dementia (AD, n=16). Episodic memory performance was assessed via Free and Cued Selective Reminding Test (FCSRT). Resting state networks were obtained by using independent component analysis (ICA) in Group-ICA fMRI Toolbox. ICs corresponding to RSNs including default mode (DMN), dorsal attention (DAN), executive control (ECN), and salience (SN) networks were evaluated by computing network expression scores of each participant.

Results: The results of Spearman correlational analyses indicated that ECN connectivity was significantly correlated with total recall (rs=.453) and cue index scores (rs=.425) of FCSRT within SCI group (p<.05). ECN connectivity was also significantly correlated with both total recall (rs=.361) and cue index scores (rs=.461) in the aMCI group (p <.05). In this group, DAN connectivity was also positively correlated with FCSRT cue index score; rs =.389, p<.05). As for the AD group, on the other hand, DMN connectivity was strongly related to FCSRT free recall (rs=.543, p<.05), total recall (rs=.514, p<.05), and delayed total recall (rs=.664, p<.01).

Conclusion: Significant correlations were obtained between resting state functional connectivity measures and episodic memory performance within different stages of the Alzheimer's continuum. Specifically, episodic memory performance was related to ECN connectivity within SCI and aMCI groups whereas it was correlated with DMN connectivity within the AD group. This study is supported by Turkish Scientific and Technological Research Council (TUBITAK) Project #114E053 and Turkish Ministry of Development Project #2010K120330.

Keywords: Alzheimer's disease, functional connectivity, episodic memory

O-44

Structural and functional alterations related with cognitive impairment in Parkinson's disease

Ani Kıçik[1], Emel Erdoğdu[2], Dilek Betül Arslan[3], Sevim Cengiz[3], Başar Bilgiç[4], Zeynep Tüfekçioğlu[4], Haşmet Hanağası[4], Aziz Müfit Uluğ[3], Erdem Tüzün[1], Tamer Demiralp[5], Esin Öztürk Işık[3], İ. Hakan Gürvit[4]

[1]Department of Neuroscience, Aziz Sancar Institute of Experimental Medicine, Istanbul University, Istanbul, Turkey; [2]Institute of Psychology and Cognition Research, University of Bremen, Bremen, Germany; [3]Institute of Biomedical Engineering, Boğaziçi University, Istanbul, Turkey; [4]Department of Neurology, Istanbul Faculty of Medicine, Istanbul University, Istanbul, Turkey; [5]Hulusi Behçet Life Sciences Research Laboratory, Neuroimaging Unit, Istanbul University, Istanbul, Turkey

Objective: Parkinson's disease-mild cognitive impairment (PD-MCI) has a higher risk of developing PD dementia (PDD) and a reliable biomarker for the diagnosis of PD-MCI has not developed yet. In this study, in order to develop discriminative neurobiological parameters for PD-MCI, functional and structural differences among PD-MCI, cognitively normal PD (CN-PD) and healthy controls (HC) were investigated using resting-state functional MRI (rs-fMRI) and diffusion tensor imaging (DTI) modalities.

Methods: 60 PD (27 PH-CN, 33 PD-MCI) patients and 17 HC were included in this study. MR imaging was performed on 3T Phillips MRI scanner. Resting state networks (RSN) were obtained by using independent component analysis (ICA) in Group-ICA fMRI Toolbox. Expression scores specific for each subject were fed into logistic regression to obtain RSNs discriminating three groups from each other. ROI based approach was used for analysis of DTI data and fractional anisotropy (FA) values of each subject were compared with one-way ANOVA.

Results: Logistic regression analysis yielded maximum separation of between PD-MCI and PD-CN groups with default mode network (DMN) – posterior cingulate component with an overall accuracy of 63,3% (χ^2=6.945, df=1, p=0.008). Sensorymotor and visual network provided maximum separation between PD-MCI and HC groups with an overall accuracy of 80% (χ^2=9.514, df=2, p=0.009). FA values differed among three groups in the superior longitudinal fasciculus (SLF) (p=0.028) and SLF-temporal part (p=0.026) and FA values in these ROIs significantly decreased in PD-MCI compared to HC.

Conclusion: In previous studies, lower connectivity in DMN and decreased FA values in SLF have been demonstrated in patients with PDD. In this regard, our similar results in PD-MCI may be an indicator for cognitive decline in PD. Additionally, lower connectivity in visual network could be associated with visuospatial impairment in PD-MCI. Supported by TUBITAK #115S219 and IU-BAP #21336.

Keywords: Parkinson's disease, mild cognitive impairment, fMRI, diffusion tensor imaging

O-45

MRI based classification of mild cognitive impairment in Parkinson's disease using machine learning

Ozan Genc[1], Dilek Betül Arslan[1], Sevim Cengiz[1], Gökçe Hale Hatay[1], Ani Kıçik[2], Emel Erdoğdu[3], Özge Can Kaplan[1], Zeynep Tüfekçioğlu[4], Başar Bilgiç[4], Haşmet Hanağası[4], İ. Hakan Gürvit[4], Tamer Demiralp[5], Aziz Müfit Uluğ[1], Esin Öztürk Işık[1]

[1]Biomedical Engineering Institute, Boğaziçi University, Istanbul, Turkey; [2]Hulusi Behçet Life Sciences Research Center, Istanbul University, Istanbul, Turkey; [3]Psychology and Cognition Research Institute, Bremen University, Bremen, Germany; [4]Department of Neurology, Istanbul University, Istanbul, Turkey; [5]Department of Physiology, Istanbul University, Istanbul, Turkey

Objective: The aim of this study was to classify Parkinson's disease mild cognitive impairment (PD-MCI), cognitively normal Parkinson's disease (PD-CN) and healthy control (HC) groups based on multimodal magnetic resonance imaging (MRI) using machine learning methods.

Methods: 33 PD-MCI, 27 PD-CN and 17 HC participated in this study. The participants were diagnosed by neurologists according to the neuropsychological test and physical examination results. MRI data was obtained at a 3T Philips clinical MR system using a 32-channel head coil. Mean cerebral blood flow (CBF), arterial blood volume (aBV) and bolus arrival time (BAT) maps obtained from arterial spin labeling MRI (ASL-MRI), fractional anisotropy (FA) and mean diffusivity (MD) maps obtained from diffusion tensor imaging (DTI), and metabolite peak ratios obtained from proton MR spectroscopic imaging (1H-MRSI) at various brain regions were used as features. Various machine learning methods were employed with appropriate hyperparameters. In addition, feature selection algorithms and dimension reduction techniques such as principal component analysis (PCA) and non-negative matrix factorization (NNMF) were assessed. Features having high correlation with each other were eliminated.

Results: Removing highly correlated features increased the model performance. The subset of features selected by the randomized logistic regression and leave one out cross-validation (RLR-LOOCV) method contained 10% of all features from all the MRI modalities. The classification accuracies were 77% for