DEBATE: STRESS HAS A CAUSATIVE ROLE IN AD AND MILD COGNITIVE IMPAIRMENT (MCI)
YES
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Introduction: Etiologically, neurodegenerative diseases are multifactorial pathological entities that require multifactorial diagnosis and treatment algorithms. According to the bio-psycho-social model, illness results from the interplay between aggressive environmental factors and the inner susceptibility of the organism to that illness. In the light of newly acquired molecular understandings, it seems that illness basically results from the bad functioning of genes chronically facing aggressive environmental demands (1). The presentation deals with the arguments that plead for stress as one of the most important environmental aggressions able to facilitate the susceptibility of developing dementia and the onset of the illness.
Methods: The first part of the presentation overviews the main issues related to the causative role of endogenous and environmental stress factors in dementia. The second part puts under discussion a series of preliminary results obtained in our recent pilot study on 15 male and female subjects, 11 of them aged over 60, 5 with dementia and 6 with mild cognitive impairment (MCI), and four of them aged 41-60 years and normal from cognitive viewpoint. Beside their general health status evaluation and their cognitive status evaluation with a clinical battery of psychological tests, the subjects' evaluation additionally included the history of back and/or recent stressful events (at work place, in the family, improper life and nutritional style, various worries about his/hers own person etc.). The measurement of their actual stress level and their stress recovery resources was comparatively done by means of the "Firstbeat" monitoring system (2)
Results: Even if not equally developed like in other degenerative diseases (heart diseases, diabetes, cancer or multiple sclerosis), a continuously growing number of studies provide arguments for the important etiological role of environmental stress in dementia onset. For example, in a 2.5 years long study conducted by Peavy GM et al. (2012), the chronically acting stressful events were associated with a greater conversion from MCI to dementia (3). Other studies have documented the association between psychological stress in middle-aged women and the development of dementia later in life, especially that Alzheimer's type (4). Recently, Alzheimer's Society signaled the study conducted by C. Holmes (Southampton University), which investigates the role of chronic stressful conditions as facilitators of MCI progression to dementia (5). Also, Wang XH and his colleagues (2012) have shown that the chronic exposure to psychosocial stress (low job control and high job strain), was associated with increased risk for late-life Alzheimer's dementia, independently of other known risk factors (6). In our pilot study, the preliminary, still unpublished results seem to indicate that a chronically high emotional stress level correlates with the incidence of MCI and dementia, and that an enhanced recovery from stress as measured by the "Firstbeat" monitoring system, induced by an improved sleep quality, may equally improve the cognitive functioning, heart functioning and the depressive mood in MCI and AD patients. The mechanisms by which chronic environmental stress acts as trigger for dementia onset are also under study. The mostly incriminated are the damaging effects of stress on the hippocampic neuronal networks plasticity, either due to cortisol cascade or oxidative stress (7). Of great scientific relevance and interest for future treatment approaches are the reports related to the role of the endogenous 'methylomic' stress, that means the endogenous methyl group metabolism disturbed for example by a not adequate nutritional style and linked with aberrant methylation and expression of clusters of genes of interest for Alzheimer's disease (8,9).
Conclusions: The actual scientific and technological progress allows the development of more and more thorough, basic and clinical research paradigms. There are increasingly

numerous proofs that the environmental stress (at work place, in family, nutritional etc.) and the endogenous stress (oxidative, methylomic, cortisol cascade etc.), play a critical role in triggering the susceptibility to dementia or the onset of the disease. The acquired research data seem able to profile a better future in the area of multifactorial approach of dementia prevention, diagnosis, and development of medical and non-medical disease-modifying means. Consecutively, these new findings may significantly result in improved public health strategies and management of dementia care costs.

References

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