

## EMOTIONAL STRESS IN MYASTHENIA GRAVIS- THE BRIDGE BETWEEN THYMUS AND HEART

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Clinical and scientific evidence points towards the connection between emotional stress and immunity. This review article explains the association of immunological response and stress with emphasis on a specific autoimmune disease myasthenia gravis (MG) and its connection with broken heart syndrome. Predisposing genetic and environmental factors as well as sex hormones have a role in MG induction. Research has demonstrated that stress can increase or suppress immunological response depending on different genetic and epigenetic characteristics. Effect of glucocorticoids and catecholamines on immunological processes can differ in systemic and local response. Experimental model of myasthenia gravis has shown that increased share of Th1 and Th17 cells contributes to MG development while increased share of Th2 and regulatory T cells mitigates it. Takotsubo cardiomyopathy (TTC) is among most frequent cardiological complications of myasthenia gravis and is usually associated with thymoma or thymic hyperplasia. Although there isn't an unambiguous explanation of TTC pathophysiological mechanism, evidence points to the excessive sympathetic and catecholaminergic stimulation. Takotsubo cardiomyopathy is dominantly described in women which points to the importance of the role sex hormones have in TTC during MG or myasthenic crisis. We emphasize the significance of interdisciplinary approach in treating myasthenia gravis patients which includes evaluation and teaching of stress management techniques.

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## COMORBIDITIES IN PATIENTS WITH MULTIPLE SCLEROSIS IN CROATIA

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**Background:** Comorbidities in multiple sclerosis (MS) have a big role in management of this chronic demyelinating neurodegenerative disorder.

The aim of this study was to evaluate comorbidities in patients with MS in Croatia.

**Subjects and methods:** This was a prospective cross-sectional study carried out in an out-patient setting at a tertiary healthcare centre over 10 months, which included 101 consecutive patients with MS

(mean age 42.09 (range 19-77) years, 75 female, 26 male, EDSS score 3.1 (range 0.0-7.0)). The average duration of the disease was 13.5±7.487 (range 1-42) years. Thirty-six patients were treated with disease modifying therapies (DMTs). Information on comorbidities was obtained during the medical interview. Data was analysed using software package IBM Corp. Released 2015. IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp.

**Results:** 33% (n=34) patients did not have any comorbidities, and there is an equal number of patients (n=34, 33%) that just had one comorbidity. 17.6% (n=18) of patients had two comorbidities, and 15.7% (n=16) three or more comorbidities. The most frequent comorbidity was depression found in 25 (24.75%) patients (19 (18.8%) women, 6 (5.9%) men), followed by the hypertension in 12.87% (n=13). Hyperlipidemia and migraine were each found in 6.93% (n=7), and hypothyreosis and arrhythmia each in 3.96% (n=4). The number of the comorbidities was found to significantly increase with the duration of MS ( $r=0.232$ ,  $p=0.037$ ). Women were found to have significantly bigger numbers of comorbidities than men ( $t=-2.59$ ,  $df=74$ ,  $p<0.05$ ). Older patients with MS were found to have significantly more comorbidities ( $r=0.335$ ,  $p<0.01$ ).

**Conclusions:** This study gives insight into the presence of comorbidities in Croatian patients with MS. Connection with comorbidities must be considered when managing patients with MS. Any other comorbidity in MS may also affect the condition of the patient in general, and also their quality of life, and requires a tailored approach in management.

**Key words:** Multiple sclerosis (MS) - comorbidities - Croatia - depression - vascular risk factors (VRFs) - migraine

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## PSYCHIATRIC COMORBIDITIES IN PARKINSON'S DISEASE SEEN THROUGH THE PRISM OF GENOMICS AND EPIGENETICS

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Parkinson's disease (PD) is a neurodegenerative disorder clinically characterized by motor dysfunctions due to progressive loss of dopaminergic neurons and a broad spectrum of non-motor symptoms. Interestingly, non-motor symptoms like depression, anxiety and psychosis are often present several years before the occurrence of classic motor features seriously affecting patient quality of life. Their presence is often misleading, delaying the correct diagnosis of PD. Despite its high incidence, the pathophysiology and aetiology of neuropsychiatric symptoms associated with PD remains unclear. Currently, a lot of interest lays in research looking for genetic predictors of motor and non-motor symptoms in PD. The availability of next-generation sequencing technology for genome, epigenetic and transcriptional analysis opens the door to a new way of studying multifactorial diseases like PD and their comorbidities. In this review we will present new insights in the genomic and epigenetic background of psychiatric comorbidity in Parkinson's disease.

**Key words:** Parkinson's disease - neuropsychiatric symptoms - genomics - epigenetics

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## IMMUNOSENESCENCE, INFLAMMAGING AND RESILIENCE: AN EVOLUTIONARY PERSPECTIVE OF ADAPTATION IN THE LIGHT OF COVID 19 PANDEMIC

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The evolution of immunology enabled the study of role of innate and adaptive immunity in systems biology network of immunosenescence and inflammaging. Due to global reduction in birth rates and reduced mortality, in year 2025 there will be about 1.2 billion of people over age of sixty, worldwide. The notion that the real age is not chronological, but the biological one led to the concept of „bioage“,