membranes, the imbalance of ions and the release of hemoglobin into the blood plasma. The appearance of free hemoglobin in the blood plasma leads to the formation of reactive oxygen species and has a toxic effect on the cells of the renal tubules. Another consequence is the instability of the cell membrane, the reduction of surface area and changes in cell shape.

**Materials and Methods.** Four groups of pregnant women were identified: the first group included 11 pregnant women with preeclampsia developed on the background of hypertension, the second group included 23 pregnant women with severe hypertension, the third group included 25 pregnant women with severe preeclampsia, the fourth group – a control group consisting of healthy non-pregnant women. In red blood cells the concentration of MSG was determined according to Toktamysova Z. S. (1990). The results were processed using the Kruskal-Wallis criterion.

**Results.** There was a significant change in the concentration of membrane-bounding hemoglobin relative to the control (p < 0.05) in the erythrocytes of group 1 and 2 women, but the concentration of membrane-bounding hemoglobin in the first and second groups did not have significant differences between them (p < 0.05). While the concentration of membrane-bounding hemoglobin in the third group has no significant differences relative to the control, but significantly (25% p < 0.05) lower than in the first and second groups.

Conclusion. Our data showed that pregnant women with preeclampsia developed against the background of hypertension, pregnant women with severe chronic hypertension develop intracellular oxidative stress, which has an unconditional effect on the metabolic processes and functions of red blood cells and it is likely to affect the stability of the cytoskeleton of red blood cells. “Damaged” red blood cells are less resistant to stress shift, easily enough destroyed in the bloodstream, are a marker of oxidative stress. The decrease in the concentration of membrane-bounding hemoglobin in the third group relative to the first and second groups is probably due to protective mechanisms to increase the affinity of hemoglobin to oxygen. Thus, the data obtained by us show the important role of studying membrane-bounding hemoglobin as one of the first markers of erythrocyte damage as a result of oxidative stress and requires further investigation.

Prospects for further: prognostic markers of preeclampsia development in pregnant women with physiological pregnancy and other somatic pathology will be studied.

**References:**


Keywords: studying membrane-bounding hemoglobin, preeclampsia, oxidative stress.

Accepted for printing on 25 Aug 2018

DOI: 10.29256/v.02.02.2018.escbm26

**POSSIBLE FACTORS AND INTENSITY OF SOMATIZATION SYMPTOMS AS A RESPONSE TO STRESS IN THE STUDENT POPULATION**

Osmanbegović A.¹, Tomić N.², Prtvar D.², Mujala A.², Pojskić L.³

University of Sarajevo – Faculty of Medicine, Bosnia and Herzegovina
University of Sarajevo – Faculty of Sciences, Bosnia and Herzegovina
University of Sarajevo – Institute for Genetic Engineering and Biotechnology, Bosnia and Herzegovina

Stress in a medical context is a factor of physical, mental and emotional nature that stimulates the body to a physiological response. Due to the long duration of stress, somatization disorders are symptoms that manifest themselves through pain, neurological problems, gastrointestinal complaints and sexual symptoms. Members of student population are exposed to stress every day, with short periods of breaks. A typical manifestation of stress in the student population during the exam – period is through circadian rythm disorders, mostly as a consequence of sleep deprivation. In addition, hormones of stress also arise as a result of the desire for success and fear of failure. Due to inability to quantify the source and intensity of stressor as well as individual predisposition to the stress effect, this environmental factor of human health and wellbeing is often underestimated. In this we would like to emphasize...
the importance of psychological distress effect on health and quality of life in early adulthood and its effect on development of chronic somatization disorders. Several studies have shown that ACE gene is likely to be involved in the hypothalamic–pituitary–adrenal axis (HPA) regulation and the production of catecholamines by the generation of ATII and are therefore required for sympatico-adrenal activation during stress [4].

Materials and Methods: The aim of our study was to explore the association of ACE gene polymorphisms with the intensity of symptoms of somatization disorder in the sample of student population exposed to psychological distress during the exam period. Total of 93 students from various faculties at the University of Sarajevo participated in this study during the exam period June-August 2017. From each subject, a blood sample was collected in the amount of 1-5 μl to EDTA collection tubes following sterile finger pricking. To evaluate individual exposure to stress and somatization of stressful experiences, all respondents independently completed the questionnaire PHQ-15 [5]. Based on the results of the questionnaire, all participants were divided into two comparative groups. Respondents with values up to 4 are classified in the control group and with values over 4 in the test group. All respondents have signed informed consent for voluntary participation in the study and giving a sample for individual genotyping. Genetic analysis was initiated by DNA isolation according to the custom protocol [6], and genotyping by PCR method [7]. After completion of PCR, the samples were quantified on a 2% agarose gel. Allele gene association was tested using Fisher’s Exact Test and genotypic gene association was tested using Chi-square test over MedCalc software, MedCalc Statistical Software version 16.4.3 [8].

Results. Out of the total number of respondents, 23 respondents (24.73%) belong to the first category with absence of symptoms of somatization disorder. The other 70 (75.27%) of the respondents belong to categories with somatization disorder. We successfully genotyped 90 individuals (97%) for ACE gene polymorphism (NCBI, dbSNP: rs1799752). The observed alleles and genotypes are compared between The investigated population is separated into two comparison groups respondents based on total score of PHQ-15. First (control) group had a maximum score of <=4 with absent somatization symptoms and second (case) group had a maximum score of >4 which correspond to mild to severe somatization symptoms. There was no statistically significant difference between the two observed groups at the level of genotype (x²=1.651; P = 0.69) nor allelic frequencies (P = 0.73). Based on our results, it can be concluded that investigated ACE gene polymorphism is not associated with increased level of somatization of stress during the study period in the student population.

Discussion. Regardless of our findings, stress disturbs the balance of the autonomous nervous system (ANS) leading to its excessive excitation and inhibition. Somatization symptoms are an introduction to the development of a clinical manifestative disease in the «locus minoris resistentiae» area. It is not possible to prevent stress, but its intensity can be reduced through improving personal organizational skills, communication, physical activity, as well as through familiarization with personal «locus minoris resistentiae» and acting on the same [4].

In that respect, further genetic and genome studies of stress related somatization could be helpful in clinical interpretation of its impact on development of acute and chronic stress related conditions in youth population.

References:

Accepted for printing on 25 Sept 2018

DOI: 10.29256/v.02.02.2018.escbm27

CIRCULATING SERUM LEVELS OF GROWTH DIFFERENTIATION FACTOR-15 IN NON-VALVULAR ATRIAL FIBRILLATION PATIENTS WITH CONCOMITANT OBSTRUCTIVE SLEEP APNEA/HYPOPNEA SYNDROME

Balabanovich T.I., Shyshko V.I., Shulika V.R.
Grodno State Medical University, Belarus

Studies have suggested that the prevalence of obstructive sleep apnea-hypopnea syndrome (OSAHS) is higher in atrial fibrillation (AF) patients than in a sample of the general population without this arrhythmic disorder. Despite a confirmed association between OSAHS and AF, the precise mechanisms linking these two conditions are currently unknown. Oxidative stress and inflammatory reaction due to co-existing OSAHS are discussed to contribute to genesis, occurrence and recurrence of atrial fibrillation (AF) [1]. Growth differentiation factor-15 (GDF-15) is a biomarker of oxidative stress and inflammation which is independently associated with mortality and nonfatal events in AF and heart failure with preserved or reduced ejection fraction [2-5]. We thought that chronic hypoxia and oxidative stress...