

Metabolic Parameters of Patients with Posttraumatic Stress Disorder

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ORIGINAL PAPER

SUMMARY

Introduction: Posttraumatic stress disorder (PTSD) is the postponed or the prolonged response to the provocative event/incident, or to the situation of extremely threatening or catastrophic nature. Biologic alterations of noradrenergic and serotonergic functions, hypothalamic-pituitary-adrenal axis, endocrine and opioid systems, in the patients with PTSD, lead to organ disorder. The aim of this research: the aim is to determine the level of glucose in fasting blood and the level two hours after glucose tolerance test in patients with PTSD. **Examinees and methods:** this prospective study was held at the Cabinet of Neurophysiology Clinic for neuropsychiatric diseases at the Health Center in Tuzla in the time period from March 2008 until December 2008. The control group consisted of 50 clinically healthy subjects (44 men) age between 49,65±6,7 (30-61). The group that was examined consisted of 50 patients treated for PTSD, aged between 50,5±5,61 (39-62), of the same gender distribution as the control group. **Results:** the average level of glucose in blood was 7±2,74 mmol/L. A great number of patients with PTSD had that level higher than the standardized range for a healthy person. The average value of blood glucose after 120 minutes at glucose tolerance test was 6.1 ± 2.78 (2.7 to 12.7) mmol/L, and a larger number of subjects (52%) had this value within the standard range. **Conclusion:** the evaluation of the patients with the changed glucose tolerance tests may have the importance in determining further treatment strategy.

Key words: posttraumatic stress disorder, metabolic syndrome, glucose tolerance test.

1. INTRODUCTION

According to the MKB-10 classification, a posttraumatic stress disorder is the postponed or the prolonged response to a provocative incident / event or the situation of extremely threatening or catastrophic nature, which makes majority of people feel uncomfortable (1).

Biological alterations of noradrenergic and serotonergic functions, hypothalamic-pituitary-adrenal axis, endocrine and opioid systems, inevitably gradually lead to organ disorder (2, 3).

Growing 'strain' of vegetative and endocrine system, and later even cardio circulatory and immune systems of people who suffer from PTSD is accompanied by various changes of laboratory parameters. Observations showed glucose intolerance, the growth of blood lipids, the change of blood coagulation, the increase in erythrocyte sedimentation rate, the number increase of leucocytes, and some other abnormalities as well (4). Researches that were taken upon 235 war veterans showed a serious connection between PTSD with the risk factors that determine metabolic syndrome (MS): systolic and diastolic blood pressure, waist circumference, HDL-cholesterol, serum triglyceride and glucose concentrations in plasma (5).

Police officers with the symptoms of PTSD carry three times bigger chance of succumbing to MS (6). The connection between MS and PTSD intensity in war veterans in Croatia

has been proved (7, 8). There is often a co-morbidity of PTSD and depressive syndrome, and those who suffer from depressiveness, very often, have a poor glycemic control. This work also describes co-morbidity of PTSD and diabetes, and the potential connection of PTSD and diabetes (9, 10).

This research paper is a partial attempt to clarify metabolic changes in patients with PTSD.

2. AIM OF THE RESEARCH

The aim of this research is to determine the level of fasting blood glucose and two hours after receiving glucose, in patients with PTSD.

3. EXAMINEES AND METHODS

This prospective study was held at the Cabinet of Neurophysiology Clinic for neuropsychiatric diseases at the Health Center in Tuzla in the time period from March 2008 until December 2008.

The control group consisted of 50 clinically healthy subjects (44 men or 88%) age between 49,65±6,7 (30-61), and all of them had the glucose level in peripheral blood inside the limits of standardised laboratory parameters (3,9-6,1 mmol/L). Approximate glucose value in peripheral blood of the control group was 4,99±0,56 (3,9-6) mmol/L.

The group that was examined consisted of 50 patients treated for PTSD, aged between 50,5±5,61 (39-62), of the

same gender distribution as the control group, randomly selected, after regular check-ups at the Center for Mental Health at the Health Center in Tuzla. All men were war veterans who fulfilled the criteria for PTSD according to DSM IV classification. The average duration of PTSD symptoms was $10 \pm 4,6$ (1-20) years. 40 patients had further diagnosis for depressive or anxiety-depressive disorder. Three patients had already been treated for diabetes mellitus during the course of the study, and 38 patients have complained to have sensory symptoms in their hands (numbness and burnin pain, extensified at night).

All the examenees had their sugar level in blood checked, and those with PTSD were tested on the glucose tolerance.

Fasting glucose level in blood, given in mmol/L, and after the glucose tolerance test after 120 minutes, are presented with mean value with standard deviation.

4. RESULTS

The average value of fasting blood glucose proved to be higher than it was normal for healthy population according to the standardised laboratory values, and it was $7 \pm 2,74$ (3,9-18) mmol/L. The majority of patients (58 %) had those values higher than the standardised ones (Figure 1).

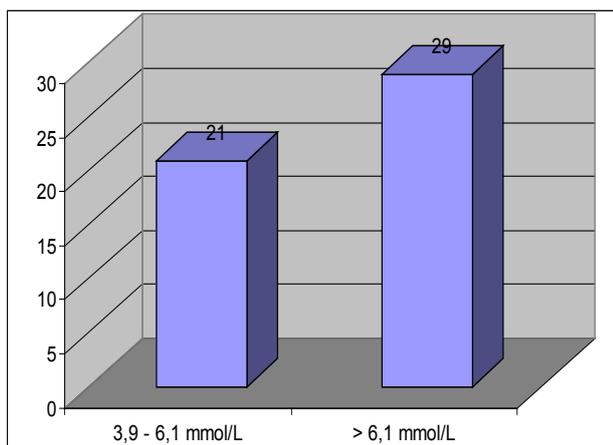


Figure 1. The distribution of glucose values expressed in mmol/L glucose in the fasting blood of subjects with posttraumatic stress disorder.

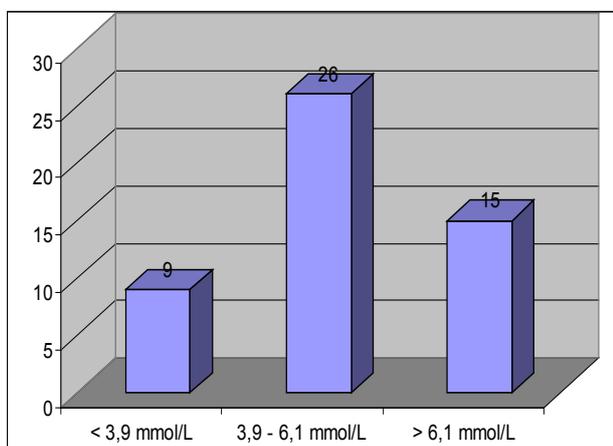


Figure 2. The distribution of glucose values expressed in mmol/L in the blood of subjects with posttraumatic stress disorder after 120 minutes in a glucose tolerance test.

The average value of blood glucose after 120 minutes at glucose tolerance test was 6.1 ± 2.78 (2.7 to 12.7) mmol/L, and a larger number of subjects (52%) had this value within the standard range (Figure 2).

5. DISCUSSION

The average level of glucose in fasting blood of the examined group was higher than the upper limit of the laboratory standardized values, and even 58 % of the examined subjects had the higher values than healthy population according to the standardized scale range. After the 120 minute-glucose-tolerance test, 48 % of respondents had their values changed, and a greater number of them (30% of total) had their values higher than the maximum of the laboratory standardized scale of a healthy person. This results confirm the disturbed glucose regulation at patients with PTSD.

80% of patients with PTSD had further diagnosis of depressive or anxiety-depressive disorder. Metabolic syndrome is actually more frequently found with patients with PTSD with symptoms of co-morbidity depression, than with those without it (11). The connection between metabolic and depression syndrom has been confirmed. Metabolic syndrom is characterized by the presence of abdominal obesity, diabetes type 2, hypertension and dyslipidemia, and insulin is one of the key pathophysilogic factors. Metabolic syndrom is an important factor for the development of the depressive disorder , and vice verca. On the otehr side, MS and depression are accompanied with insulin resistance, diabetes type 2, obesity and the increasing risk of myocardinal heart attack (12).

It has already been mentioned that MS, except hyperglycemia, a decrease of high density lipoprotein (HDL), triglyceride increase (TRG) and hypertension, is characterized by obesity as well. White adipose tissue is, in fact, multifunctional, endocrine secretory organ that releases a wide range of protein signals and factors—the adipokines. A certain number of adipokines are linked to inflammation and inflammatory response, including leptin, adiponectin, tumor necrosis factor alpha (TNF- α), interleukin (IL): IL-1 β , IL-6, monocyte hematoxic protein -1, macrophage migration inhibitory factor, nerve growth factor, vascular endothelial growth factor, plasminogen activation inhibitor 1 and haptoglobulin. An increased production of inflammatory adipokines is considered to be important for the development of some diseases associated with obesity, especially diabetes type 2 and MS (13). A specific pathogenic way of development of MS includes: increasing levels in tissues and plasma of pro-inflammatory cytokine IL-1, IL-6, TNF caused by inflammatory or emotional distress; high levels of neuro-trphyn, nerve growing factor/NGF in a plasma level, which results in insulin resistance which in turn leads to diabetes (14). It has been proved that PTSD is very often accompanied with obesity in women (15). Majority of our examinees were men. There are some interesting researches that show that a low level of total testosterone and sex hormone binding globulin represent a risk factor for the development of MS and diabetes mellitus in middle-aged men. Thus, a hypo-androgenism is an early marker for insulin and glucose metabolism disorder which may progress to MS or threatening diabetes, or can further contribute

to the pathogenesis of this disease (16). Namely, there are numerous proofs that show that psychological stress leads to making conditions for MS, and for that reason there is a need to make further diagnostic procedures aimed at demonstrating disturbed glucose tolerance or the existence of MS in patients with PTSD.

6. CONCLUSION

The evaluation of the patients with the changed glucose tolerance tests may have the importance in determining further treatment strategy: treatment for glycaemia disorder with the establishment of normal metabolic parameters.

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