

THE RELATIONSHIP BETWEEN VITAMIN D STATUS, METABOLIC PARAMETERS AND ADIPOKINE LEVELS IN OVERWEIGHT AND OBESE ADOLESCENTS

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Introduction: Overweight and obesity affect vitamin D status in the body by additional depositing vitamin D in adipose tissue, which contributes to a decrease in its active metabolites due to a violation of hydroxylation processes. Increases in adipose tissue affect the serum adipokine levels, which affects metabolic processes and general condition of the body.

The aim of the study was to determine the relationship between vitamin D status and parameters of lipid and carbohydrate metabolism with adipokine levels in overweight and obese adolescents.

Materials and methods: 136 adolescents with overweight and obesity (60 overweight and 76 obese adolescents) were examined. The mean age of children was 15.5 ± 2.3 years. Anthropometric measurements and body mass index (BMI) were established in all adolescents. BMI was determined according for world health organization recommendation. To determine vitamin D status using the immune-enzyme method, blood serum levels of calcidiol (25(OH)D) were determined. The leptin and adiponectin levels, basal insulin levels were measured in all adolescents by using the immune-enzyme method. The blood glucose level, total cholesterol (TC), high-density lipoprotein cholesterol (HDL-C), low-density lipoprotein cholesterol (LDL-C) and triglycerides (TG) by were measured by enzymatic methods. Based on the obtained research results homeostasis model assessment of insulin resistance (HOMA-IR) index, atherogenic index of plasma (AIP), very low-density lipoprotein cholesterol (VLDL-C) and non-HDL-C were calculated in all adolescents with overweight and obesity. All research results were processed statistically. The relationship level was established using correlation analysis.

Results: The mean serum level of 25(OH)D was 14.69 (10.27–20.30) ng/mL in overweight adolescents and 12.71 (9.36–17.37) ng/mL in obese adolescents. The study has determined vitamin D deficiency among overweight adolescents with BMI 85–97th percentiles – in 70.0 % and obese adolescents with BMI over 97th percentile – in 77.6 %. Serum 25(OH)D levels in overweight and obese adolescents have a positive significant correlation with adiponectin ($r=0.592$, $p=0.000$) and inverse significant correlation with leptin ($r=-0.498$, $p=0.000$), were defined. The effect of adipokines on metabolic processes in the body was confirmed by their relationships with the main parameters of lipid and carbohydrate metabolism. It has been established that leptin levels have significant inverse correlation with HDL-C ($r=-0.631$, $p=0.000$) and positive significant correlation with LDL-C ($r=0.189$, $p=0.028$), TG ($r=0.384$, $p=0.000$), non-HDL-C ($r=0.261$, $p=0.002$), basal insulin level ($r=0.788$, $p=0.000$), HOMA-IR ($r=0.743$, $p=0.000$). Adiponectin levels have positive significant correlation with HDL-C ($r=0.587$, $p=0.000$) and inverse significant correlation with LDL-C ($r=-0.244$, $p=0.004$), TG ($r=-0.359$, $p=0.000$), non-HDL-C ($r=-0.306$, $p=0.000$), basal insulin level ($r=-0.755$, $p=0.000$), HOMA-IR ($r=-0.709$, $p=0.000$).

Conclusions: The vitamin D status in overweight and obese adolescents have a relationship with the serum adipokine levels. The severity of lipid and carbohydrate metabolism metabolic disorders in overweight and obese adolescents have a relationship with the adipokine levels.

KEY WORDS: vitamin D, adipokines, metabolic syndrome.

CAD PATIENTS WITH HYPERTENSION AND SOMATOFORM DISORDERS REHABILITATION STRATEGIES

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Introduction: In the COVID-19 pandemic improvement of blood oxygen transport function and stabilization of the psychoemotional sphere is a priority for rehabilitation of CAD patients with hypertension, especially at anxiety-depressive disorders.

The aim: Investigated the functional activity of erythrocytes (ER) and hemoglobin (Hb), cardiohemodynamics and psychological status at landscape imagi-native kinesiotherapy, holographic modeling and correction with mildronate.

Materials and methods: In 50 patients (men aged 47.8 ± 1.8 years) with stable exertional angina pectoris II-III FC, stage II hypertension, anxiety-depressive disorders under traditional treatment (β -blockers, calcium channel blockers, nitro drugs, tranquilizers), conventional rehabilitation exercises (1 gr.) and in 50 patients (men aged 46.7 ± 1.6 years) with mildronate combination - the metabolic drug, 10% -5ml intravenous bolus under holographic modeling (2 gr.) before and after 10 days of rehabilitation were studied ER resistance, its glycolytic enzyme activity and antioxidant protection, the level of 2,3-diphosphoglycerate (2,3-DPhG), hydroxy-, deoxy-, methemoglobin (MetHb), Hb fractions - HbA₀, HbA₁, HbF, cardiohemodynamics.

Coronary artery angiography, bicycle test, Holter ECG, 24-h our blood pressure monitoring, disc electrophoresis, EchoCG, "Test self-identification system", "Self-assessment of the level of psychoemotional exertion", holographic modeling - the spatial unfolding of the internal holo-gram of our state (engram) created by the unfolding of an integrative image with its subsequent reflection in external objects with positive feedback to stabilize and restore cardiovascular sys-tem and psychoemotional sphere.

Results: After a 10-day rehabilitation cardiohemodynamics and psychological status improved more significantly in the 2gr. than in the 1gr. patients: an increase in the minute volume of blood circulation, cardiac and stroke indices, a decrease in pressure in the pulmonary artery, and a reduction in the phase of tension in the right ventricle ($P < .05$). After rehabilitation in the 1gr. systolic blood pressure decreased from 177 ± 2 to 148 ± 1 mm Hg ($P < .05$), diastolic – from 107 ± 2 to 94 ± 1 mm Hg, in the 2 gr respectively - from 178 ± 1 to 132 ± 1 mm Hg ($P < .05$) and from 109 ± 2 to 82 ± 1 mm Hg ($P < .05$). In 84% of patients of 2gr. and 21% – 1 gr. decreased the frequency and duration of ischemic episodes.

After rehabilitation in patients 2 gr. favorable changes in the ER state were revealed: the con-tent of MetHb and HbA1 significantly decreased, the level of HbA0 increased ($P < .05$). At the same time, the number of ER with increased resistance and the content of 2,3-DPhG in them in-creased, which optimizes the supply of O₂ to tissues and its utilization. In patients of 1gr there was a tendency to an increase in the levels of MetHb, HbA1, maximum hemolysis of ER and a shift to the left of the peak of the phase of the maximum hemolysis rate.

Psychoemotional exertion indices (PEI) prior to the start of rehabilitation in the 1gr. and 2gr. were respectively: anxiety – 8.77-8.79, aggressiveness – 4.67-4.64, fear of death – 8.14-8.13, feeling of loneliness – 8.52-8.53; suicide – 4.38-4.36. After rehabilitation in the 2gr. and 1gr. PEI were: anxiety – 3.52 and 7.33, aggressiveness – 2.32 and 3.98, fear of death – 3.72 and 7.21, feeling of loneliness – 4.27 and 7.35; suicide rates – 2.18 and 3.78 respectively. Before the rehabilitation start 79% of patients 2 gr. and 77% of the 1gr. rated their condition as bad, 12% and 13% – very bad. After rehabilitation in 1gr. 5% of patients indicated poor condition, 51% –satisfactory, 44% – good, in 2gr. 34% of patients reported satisfactory condition, 57% – good and 9% – excellent. In 67% of patients of the 2gr. the doses of β -blockers and calcium channel blockers drugs are reduced while maintaining stable parameters of cardiohemodynamics, 54% of patients stopped taking psychotropic drugs.

Conclusions: Holographic modeling at landscape imaginative kinesiotherapy in combination with mildronate improve cardiohemodynamics, psychological status and blood oxygentransport function in CAD patients with hypertension and anxiety-depressive disorders.

KEY WORDS: CAD, Hemoglobin, Hologram

CHRONIC INFLAMMATION AND ITS ASSOCIATION WITH PLASMA OXALIC ACID IN END-STAGE RENAL DISEASE PATIENTS

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Introduction: Chronic inflammation is considered a characteristic feature of end-stage renal disease (ESRD) and a strong risk factor for both cardiovascular and all-cause mortality in the dialysis population. Unfortunately, although oxalate balance disorders are a common feature in ESRD patients, clinical studies on the relationship between the concentration of oxalic acid and blood cytokines in ESRD patients have not been conducted before.

We hypothesized that xalate imbalances might be involved in chronic inflammation and thus increase the risk of cardiovascular disease (CVD) in ESRD patients.

The aim: Our study aimed to analyze the association between chronic inflammation and oxalate homeostasis metrics in ESRD patients.

Materials and methods: A total of 50 ESRD patients and 23 healthy volunteers were included in this cross-sectional observational study. Among the patients there were 29 hemodialysis and 21 peritoneal dialysis patients.

The study protocol was approved by the local ethics committee of the Institute of Nephrology of the National Academy of Medical Sciences of Ukraine and registered in the international database of clinical trials ClinicalTrials.gov under identification number NCT04399915.

Concentrations of interleukin 6 (IL-6), tumor necrosis factor- α (TNF- α) and monocyte chemoattractant protein-1 (MCP-1) were determined in serum using STAT FAX-303 PLUS and commercially available test kits for enzyme-linked immunosorbent assay (ELISA) (Diaclon, France; DRG, Germany; Ukrmedservice, Ukraine) according to the manufacturer's protocols.

The plasma oxalic acid (POx) concentration of oxalate in the blood was determined spectrophotometrically using the reagent Oxalate Assay Kit (MAC-315) (Sigma-Adrich, Spain). Data are presented as median (Me) and interquartile range [Q25-Q75]; nonparametric (U-test) Mann-Whitney was used for comparative analysis. The correlation was determined by the Spearman method.

Results: POx concentration in the examined patients varied from 15.7–116.2 $\mu\text{mol/L}$ and was significantly higher in the ESRD patients compared with the healthy volunteers: 44.05 [27.7-116.2] vs 27.2 [24.1-37.7] $\mu\text{mol/L}$, $p = 0.003$. The analysis demonstrated a gradually increasing trend in the majority of the examined inflammatory mediators according to the tertiles of POx. The dialysis patients in the upper tertile of POx concentration had higher levels of IL-6, TNF- α and MCP-1 compared with those in the middle and the low tertiles of Pox. The correlation analysis indicated a direct association between POx concentration and blood IL-6 ($r = 0.49$, $p < 0.0001$) and MCP-1 levels ($r = 0.55$, $p < 0.0001$).

Conclusions: Elevated POx concentration is associated with chronic inflammation in ESRD patients.

KEY WORDS: Oxalic acid, chronic inflammation, cytokines.