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THE ROLE OF VITAMIN D DEFICIENCY IN THE FORMATION OF CARDIOMETABOLIC RISK IN PATIENTS WITH HYPERTENSION AND OBESITY

Tutor: senior lecturer Arlouskaya A.L.

*Department of outpatient therapy
Belarusian state medical university, Minsk*

Relevance. Vitamin D deficiency is a prevalent global issue linked to increased risk of cardiovascular diseases, including hypertension. This relationship is particularly complex in individuals with obesity. Key mechanisms include sequestration of vitamin D in adipose tissue and lower sun exposure.

Aim: to evaluate the relationship between the level of vitamin D insufficiency/deficiency, the degree of obesity and blood pressure in patients with arterial hypertension.

Materials and methods. The study included 100 patients (50 with vitamin D insufficiency/deficiency, obesity, hypertension, and 50 healthy controls) who had their vitamin D levels analyzed between November 2025 and March 2026. The study was conducted on the basis of the 34th Minsk city polyclinic. The criteria for inclusion in the main group were: arterial hypertension ≥ 6 months, body mass index (BMI) ≥ 30 kg/m², vitamin D $< 28,9$ ng/ml, age 18-65 years. Control group: normal blood pressure, BMI 18.5–24.9, vitamin D ≥ 30 ng/ml, no chronic diseases. Vitamin D levels, BMI, systolic and diastolic blood pressure, total cholesterol, low density lipoprotein (LDL), triglycerides, and glucose were analyzed.

Results and their discussion. The average age in group № 1 (vitamin D insufficiency/deficiency, obesity, hypertension) was 58.76 years, and in group № 2 (control group) 57.02 years. This means that any differences in other indicators (blood pressure, vitamin D, lipids) are less likely to be explained by the age difference rather than the factors studied. Vitamin D insufficiency (20-28,9 ng/ml) was registered in 36 patients (72%) and deficiency (< 20 ng/ml) in 14 patients (28%) in group № 1 and in the control group (group № 2), 100% of the patients had normal vitamin D levels (> 29 ng/ml).

A comparative analysis of the level of vitamin D revealed significant differences between the studied groups. The average vitamin D level in group № 1 was 21.77 ng/ml (range from 11.70 – 28.70 ng/ml), in group 2 - 41.00 ng/ml. Average difference: -19.22 ng/ml in group № 1.

Patients with a combination of hypertension, obesity, and vitamin D insufficiency/deficiency compared to conditionally healthy individuals have a significantly higher: body mass index - the average BMI in group №1 was 32.68 kg/m² (range 30-48 kg/m²), in group №2 - 22.44 kg/m² (range 20-24,9 kg/m²). Average difference: +10.24 kg/m² in group № 1; systolic blood pressure levels - group № 1 was 131.3 mmHg (range 120-165 mmHg) versus group № 2 was 126.4 mmHg (range 125-135 mmHg)). The average difference was 4.9 mmHg in group № 1; diastolic blood pressure levels - group № 1 was 79.9 mmHg (range 70-90 mmHg) versus group № 2 was 72.4 mmHg (range 60-85 mmHg). Average difference was 7.5 mmHg in group № 1; total cholesterol levels - group № 1 was 6.01 mmol/l versus group № 2 was 4.68 mmol/L. The average difference was +1.34 mmol/L in group № 1; LDL levels - group № 1 the average LDL value was 3.87 mmol/L (range 2.2-6.3 mmol/L), group № 2 was 2.86 mmol/l (range 1.8-3.4 mmol/l). The difference was +1.01 mmol/L in group № 1; triglyceride levels - group №1 was 1.49 mmol/L versus group № 2 - 0.89 mmol/L. The average difference was +0.6 mmol/L in group № 1; fasting glucose levels group № 1 was 5.195 mmol/l versus group № 2 was 4.826 mmol/l. The average difference was +0.369 mmol/l in group № 1.

Conclusion. The data obtained substantiate the expediency of a comprehensive assessment of vitamin D status, anthropometry, lipid profile and glycemia in patients with hypertension for early detection of persons with high cardiometabolic risk and timely correction of modifiable factors.