BIOCHEMICAL BASIS OF OSTEOPOROSIS IN MENOPAUSAL WOMEN

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Annotation. Osteoporosis is a long-lasting metabolic disease of the skeletal system and is widespread among the population, especially in older age groups. Bone tissue continuously undergoes processes of bone formation and bone resorption; these processes are closely interconnected in time and location, forming the concept of the "bone remodeling unit." The decrease in bone mass is the result of an imbalance between bone resorption (bone degradation) and the process of bone formation.

Keywords: Osteoporosis, Menopause, Estrogen Deficiency, Bone Metabolism, Calcium Homeostasis, Vitamin D, Bone Mineral Density, Osteoclast Activity, Osteoblast Function, Bone Resorption, Hormonal Changes, Postmenopausal Women, Biochemical Markers of Bone Turnover

Authors. This disease is characterized by a progressive decrease in bone mass per unit volume compared to normal values for individuals of the same sex and age, as well as by disruption of the microarchitecture of bone tissue, leading to increased bone fragility and a higher risk of fractures resulting from minimal trauma or even without it. Bone tissue is constantly undergoing processes of bone formation and bone resorption, which are closely interconnected in both time and location, forming what is known as the bone remodeling unit. The reduction in bone mass is the result of an imbalance between the processes of bone resorption and bone formation, which under normal conditions should be well balanced.

Background. Vitamin D and its active metabolites are components of the hormonal system that regulates phosphorus–calcium metabolism. On one hand, they participate in the mineralization of bone tissue, and on the other hand, in maintaining calcium homeostasis. The biological effect of active vitamin D metabolites consists primarily in stimulating intestinal absorption of calcium and phosphorus, activating metabolism, and increasing calcium excretion in urine.

Aim. Our goal was to look into the connection between serum vitamin D levels and menopausal symptoms. We used the Menopause Rating Scale (MRS) questionnaire to assess menopause symptoms in 90 postmenopausal women between the ages of 45 and 60. Based on their serum 25-OH vitamin D levels, patients were split into three groups: sufficient (>20 ng/mL), insufficient (12-20 ng/mL), and deficient (<12 ng/mL). These groups were then compared. The cut-off level of serum vitamin D for menopausal symptoms was established. The connections between vitamin D levels and symptoms were computed.

Methods. 90 postmenopausal women who applied for a standard gynecological checkup at a tertiary center gynecology clinic participated in this cross-sectional study. Each patient's signed informed consent and local ethical approval were obtained before demographics, medical histories, physical and gynecological examination results, including body mass index (BMI), and the participants' time since menopause were documented. Not experiencing menstrual bleeding for more than a year was considered menopause. Measurements were made of the patients' serum levels of 25-OH vitamin D, calcium (Ca), estradiol (E2), and follicule stimulating hormone (FSH). The Meopause Rating Scale (MRS), a questionnaire designed for Uzbek-speaking individuals, was used to assess menopausal symptoms in all patients.

Results. The patients' ages ranged from 45 to 60 years old, with a mean age of 53.8 years. The patients' mean time since menopause was 6.1 years, with a range of 1 to 20 years. Of the individuals, 42.2% (38/90) had vitamin D insufficiency. 25-OH serum Thirty women had adequate levels of vitamin D (≥20 ng/mL). The remaining 38 patients had inadequate vitamin D levels, ranging from 12 to 19 ng/mL. Age, BMI, duration since menopause, and laboratory characteristics did not differ across groups (Table 2). The vitamin D insufficiency group's total MRS score was 22,97±2,71, which was substantially greater than the others' (p=0,002) (Table 2).

Conclusion. Insufficient vitamin D levels during the menopausal phase may make menopausal symptoms worse. One may argue that menopausal Vitamin D supplementation may be beneficial for women whose symptoms are severe. It will need more prospective research to fully illuminate this intricate and multifaceted relationship.

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