Features of bone tissue remodeling in patients with type 2 diabetes mellitus

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Abstract: The article gives information about features of bone tissue remodeling in patients with type 2 diabetes mellitus.

Keywords: diabetes; osteosynthesis; IPC; TKI; ethnic characteristics, glycated hemoglobin

INTRODUCTION. Structural and metabolic disorders of bone tissue in women with type 2 diabetes mellitus (T2DM)most often have no clinical manifestations, but are accompanied by a risk of fractures[1,2,3].

RELEVANCE. Diabetes mellitus is a global problem throughout the world. According to WHO, today about 422 million people suffer from diabetes, which is 6.028% of the total population of the planet. Diabetes incidence statistics are growing every year. If the situation develops at the same pace, then by 2025 the number of patients with diabetes will double. By 2030, diabetes will become the 7th cause of death worldwide[4-8]. This problem is also relevant for our country. Over the past 20 years, the number of patients with diabetes in Belarus has tripled. As of January 1, 2019, 336 thousand people were registered, of which (according to the Ministry of Health of the Republic of Belarus): 18 thousand patients with type 1 diabetes, 315 thousand patients with type 2 diabetes; in addition, 434 cases of gestational diabetes and 2648 cases of other specific types of diabetes were recorded. Diabetes mellitus poses a real threat due to early disability and high mortality from vascular accidents[9-11]. Diabetes is the only non-communicable disease (this refers to especially dangerous infections - plague, smallpox, etc.) taken under control by the United Nations (UN). Key facts: The risk of stroke is 4 times higher with diabetes. Diabetes is the leading cause of blindness. The risk of developing a heart attack in diabetes is increased by 300%, and heart disease by 4 times. The likelihood of developing kidney failure is increased by 4 times[12,13,14]. Diabetes mellitus is the main atraumatic cause of lower limb amputations. Every 30 seconds, a lower limb

amputation occurs worldwide due to diabetes[15,16,17]. From 2.5 to 15% of the annual health care budget in various countries is spent on the fight against diabetes, and indirect costs exceed these figures by 5 times[18,19,20]. It is obvious that in order to improve the quality of life of patients, as well as reduce the economic costs of the state in providing care to people with diabetes, it is necessary to actively implement measures for the prevention and treatment of diabetes and its complications. The WHO has published economic statistics showing that $1 invested in prevention saves $20 spent on treatment[25,26,27].

PURPOSE OF THE STUDY. Study indicators of bone tissue metabolism, microarchitecture and bone mineral density (BMD) in patients with T2DM in the Buryat population.

MATERIALS AND METHODS OF RESEARCH. The observational, single-center, one-stage controlled study included 73 women with T2DM, who were divided into 2 groups depending on their functional status ovaries (reproductive or postmenopausal periods). Subgroups were identified in each group. The first group included 34 patients with T2DM of the reproductive period: subgroup 1a - 16 and 1b - 18[25,26,27]. The second group consisted of 39 patients with T2DM of the postmenopausal period: 2a 17 - 2b-22. A study of BMD in the lumbar spine (L1-L4) was carried out. , femoral neck (Neck), in the proximal femur (Total hip),trabecular bone index (TBI), osteocalcin (OC), N-terminal propeptide of type 1 procollagen (P1NP), serum 25(OH) vitamin D, C-terminal telopeptide of type I collagen (β-Cross laps) and ionized calcium blood plasma. (iCa).

RESEARCH RESULTS. In patients with T2DM of the reproductive period of the Buryat population, an increase was found as markers of osteosynthesis P1NP (p=0.035), OK (p=0.047), and bone resorption β-Cross laps (p=0.040) relativepatients of the Russian population[23,24]. In women with T2DM in the postmenopausal period of subgroup 1a, an increase in P1NP (p = 0.016), OC (p = 0.048), β-Cross laps (p = 0.020) was also observed compared with postmenopausal women in subgroup 1b. Structural disorders, characterized by a decrease in TCI, were detected only in the postmenopausal period in patients of subgroup 2a compared with women of subgroup 2b (p = 0.029)[17,18,19]. A comparative analysis of women with T2DM subgroup 2a, depending on the functional state of the ovaries, showed that postmenopausal women are characterized by activation of bone remodeling with an increase in P1NP (p=0.019), OK (p=0.004) and β-Cross laps (p=0.004), accompanied by a decrease in Neck BMD(p=0.006), BMD Total hip (p=0.003), BMD L1-L4 (p=0.049) and TCI (p=0.020) relative to patients with T2DM in the reproductive period.

CONCLUSION. In women of subgroup 2a, patients with T2DM, both in the reproductive and postmenopausal periods, an increase in markers of bone remodeling and stability of BMD were found when compared with patients of subgroup 2b. The

postmenopausal period is characterized by an additional decrease in TCI in patients with T2DM of subgroup 2a relative to women of subgroup 2b.

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