EFFECTS OF RETINOL ON DEVELOPMENT OF OSTEOPENIC CHANGES INDUCED BY BILATERAL OVARIECTOMY IN RATS.

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Skeletal disorders occurring in experimental model of osteopenia caused by bilateral ovariectomy in rats are similar to those observed in postmenopausal women. Retinol is a commonly used vitamin, especially by elderly people. The role of retinol in bone remodeling is not well-established. The aim of the present study was to investigate the effect of retinol administered at doses of 700 IU/kg po daily and 3500 IU/kg po daily for 28 days on the development of osteopenia induced by bilateral ovariectomy in 3-month-old Wistar rats. The experiments were carried out on 4 groups of animals: I (C) – sham-operated control rats, II (OVX) – ovariectomized control rats, III (OVX + R700) – OVX rats treated with retinol (700 IU/kg po daily), IV (OVX + R3500) – OVX rats treated with retinol (3500 IU/kg po daily). Body mass gain, bone mass, mineral and calcium content in the tibia, femur and L-4 vertebra, histomorphometric parameters of the right tibia (width of osteoid, periosteal and endosteal transverse growth, the area of the transverse cross section of the bone marrow and cortical bone) and the right femur (width of epiphyseal and metaphyseal trabeculae, width of epiphyseal cartilage), and mechanical properties of the femur were investigated. Bilateral ovariectomy induced osteopenic skeletal changes in mature female rats. Retinol at doses of 700 IU/kg po daily and 3500 IU/kg po daily decreased bone mass (statistically significantly after treatment with 3500 IU/kg po daily). Retinol at both doses caused statistically significant increases in the width of periosteal osteoid, and, at a dose of 3500 IU/kg po daily, of endosteal osteoid. The increase in the width of osteoid may be the effect of disorder of its mineralization, as the decreases in bone mineral and calcium content were also noted. In mechanical tests of the femur, dose-dependent decreases in the ultimate load, the breaking load and the deformation caused by the applied load were observed after administration of retinol (in comparison with the OVX control rats). Concluding, retinol (especially administered at the dose of 3500 IU/kg daily) intensified the changes in the osseous system caused by estrogen deficiency in rats.

Key words: retinol, ovariectomy, bone, rats