EFFECT OF ADMINISTRATION OF ALENDRONATE SODIUM AND RETINOL ON THE MECHANICAL PROPERTIES OF THE FEMUR IN OVA RIECTOMIZED RATS

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Alendronate sodium, an aminobisphosphonate with potent antiresorptive activity, is used in the treatment of postmenopausal osteoporosis. Retinol, as a component of multivitamin preparations, is frequently used especially by elderly people. There are no reports on the interaction of alendronate sodium and retinol. The aim of the present study was to investigate the effect of administration of alendronate sodium and retinol on mechanical properties of the femoral bone in bilaterally ovariectomized rats.

The experiments were carried out on 3-month-old Wistar rats, divided into 7 groups: I – sham-operated control rats, II – ovariectomized control rats, III – ovariectomy + alendronate sodium 3 mg/kg po, IV – ovariectomy + retinol 700 IU/kg po, V – ovariectomy + retinol 3500 IU/kg po, VI – ovariectomy + alendronate sodium 3 mg/kg po + retinol 700 IU/kg po, VII – ovariectomy + alendronate sodium 3 mg/kg po + retinol 3500 IU/kg po.

The drugs were administered to the rats daily by oral gavage for 28 days. Body mass gain, bone mass, bone mineral content and calcium content in the femur and L-4 vertebra and mechanical properties of the whole femur (extrinsic stiffness, ultimate load, breaking load, deformation caused by the ultimate load) and the neck of the femur (load at fracture), were examined.

Bilateral ovariectomy induced osteopenic changes in the rat skeletal system. Alendronate sodium (3 mg/kg po) counteracted the development of osteopenia induced by ovariectomy. Retinol at both used doses unfavorably affected the examined bone parameters of ovariectomized rats. Retinol administered with alendronate sodium lessened the preventive action of alendronate on the development of osteopenic changes in the skeletal system of ovariectomized rats.

Key words: bone mechanical properties, ovariectomy, retinol, alendronate, rats

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