Effect of administration of etidronate and retinol on bone mechanical properties in ovariectomized rats

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Abstract:
The experiments were carried out on rats, divided into 7 groups: I – sham-operated control rats, II – ovariectomized (OVX) control rats, III – OVX + etidronate (10 mg/kg po), IV – OVX + retinol (700 IU/kg po), V – OVX + retinol (3 500 IU/kg po), VI – OVX + etidronate (10 mg/kg po) + retinol (700 IU/kg po), VII – OVX + etidronate (10 mg/kg po) + retinol (3 500 IU/kg po). The drugs were administered once a day for 4 weeks.

Bone mass, content of mineral substances and calcium were examined in the femur, tibia and L-4 vertebra. In the femur, mechanical properties of the whole bone supported on its epiphyses (the ultimate load, the breaking load and the deformation caused by the applied load) and of the femoral neck (the load causing the fracture) were studied.

Bilateral ovariectomy induced unfavorable changes in mechanical properties of rat bones, which were partially prevented by administration of etidronate. Retinol at 3 500 IU/kg po caused intensification of the osteoprotic changes, especially it worsened the mechanical properties of bones.

The results of the present study do not indicate the existence of any interaction between retinol and etidronate concerning mechanical properties of bones in OVX rats.

Key words:
bone mechanical properties, calcium, etidronate, ovariectomy, rat, retinol