EFFECT OF ETOPOSIDE ON THE PROCESSES OF OSSEOUS TISSUE REMODELING IN RATS

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In the course of tumor metastases into bones, the process of resorption is intensified both as a result of direct influence of tumor cells on normal bone cells, and as a result of bone cell stimulation by cytokines and growth factors, which leads to pathological remodeling of osseous tissue and, in majority of cases, to the development of systemic hypercalcemia. Clinical observations and in vitro research show that also cytostatic drugs may disturb remodeling of bone tissue and cause osteopenia, mostly as a result of their direct effect on osteoblasts. The aim of this study was to investigate in vivo the effect of etoposide on the processes of bone tissue remodeling in rats by assessing macrometric and histomorphometric parameters, as well as mechanical properties of the femur. The tests were carried out on male Wistar rats of initial body mass between 280–310 g, which were divided into three groups (n = 8): I – control group of rats, which were given 0.9% NaCl solution every 7 days (C group), II – rats which were administered etoposide at the dose of 25 mg/kg po every 7 days (E-25 group), III – rats which were given etoposide at one dose of 50 mg/kg iv (E-50 group). The experiment lasted 4 weeks. At the end of the experiment, the animals were killed by spinal cord displacement and the following values were determined: the mass, mineral and calcium content in the tested bones, length and diameter of long bones, transverse cross-section surface of tibial cortical bone and marrow cavity, transverse growth of the tibia and width of periosteal and endosteal osteoid in the tibia, as well as the width of osseous trabeculae, the width of epiphysial cartilage and mechanical properties of the femur. The tests showed that etoposide administered every 7 days at the dose of 25 mg/kg po or at one dose of 50 mg/kg iv over the period of 28 days, disturbed osseous tissue remodeling processes in rats as a result of impeding the process of bone formation, which led to the impairment of the process of mineralization, weakening mechanical endurance of the femur, and to the development of osteopenia.

Key words: etoposide, histomorphometry, bone mechanical properties, osteopenia, bones, rats

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