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COMBINED TREATMENT WITH ESTRADIOL AND CALCIUM ENLARGES THE ADRENALS AND ELEVATES CIRCULATING ALDOSTERONE IN MIDDLE-AGED FEMALE RATS

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Advanced age is frequently entwined with the adrenal cortex function impairment, glucocorticoid excess and following metabolic syndrome. Also, age-dependent disturbances in aldosterone secretion and Na⁺/K⁺ homeostasis at least partly underlie the hypertension issues. Classical therapeutic approach in the treatment of some menopausal symptoms implies administration of estradiol or calcium, or their combination. Herein, we aimed to investigate the effects of chronic treatment with estradiol and calcium on some adrenal gland parameters in the ageing female rat model. Middle-aged (14-month-old) female Wistar rats were treated with estradiol dipropionate (EDP; 0.625 mg/kg b.m.) and calcium glucoheptonate (Ca; 11.4 mg/kg b.m.) daily for two weeks, while control rats received vehicle alone by the same schedule. Combined treatment caused the decrease (p<0.05) of body mass by 21.5%, while the absolute and relative adrenal gland weights were increased (p<0.05) by 16.2% and 43.8% respectively, compared to the adequate control values. The absolute adrenal gland volume, after treatment with EDP and Ca in the combination, was also increased (12.1%; p<0.05), in comparison with control group. In parallel with that, circulating aldosterone was elevated (p<0.05) by 50.0%, compared to the control levels. However, combined treatment with EDP and Ca insignificantly (p>0.05) affected Na⁺ and K⁺ blood concentrations. It can be concluded that simultaneous estradiol and calcium administration to middle-aged female rats enlarges the adrenal glands and have stimulatory influence on the mineralocorticoid output, which may represent unwanted effect from the perspective of blood pressure regulation.

Key words: ageing, female rat, adrenals, aldosterone