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Effects of electromagnetic radiation on the microwave range excretion 8-oxoG in men with hypertension

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Oxidative DNA damage plays a significant role in pathogenesis of the majority of pathological processes, which occurs in case of excessive formation of ROS due to intense prooxidant effects or reducing the antioxidant defense system. The study has shown that oxidative stress causes endothelial dysfunction, which leads to high blood pressure stabilization in patients with AH.

The study included 42 men (mean age 37.1 ± 6.0 years) with AH, who worked from 4 to 22 years (mean age 14.6 ± 6.8 years) under the influence of UHF EMR (group 1). The dose of UHF EMR was within the range of 4320–31065 kW (16288.7 ± 7844.9 kW average). The control group consisted of male patients of respective age with AH, who were not exposed to prolonged UHF EMR (group 2, n=35). Body mass index in patients of group 1 was 28.5 ± 4.7 kg/m², patients of group 2 29.8 ± 3.9 kg/m².

5 days after admission, all patients underwent daily blood pressure monitoring using the ABMP-04 "Meditech" monitors (Hungary) and were daily measured for urine marker of oxidative DNA damage 8-oxoguanine (8-oxoG) by spectrophotometry using the SF-46 unit.

Daily average systolic blood pressure in 1 group of patients was 144.3 ± 12.8 mmHg vs. 126.3 ± 11.8 mmHg in patients of the control group ($P < 0.05$), diastolic blood pressure 83.2 ± 5.9 mmHg vs. 79.4 ± 10.5 mmHg ($P < 0.05$) respectively.

The average rate of 8-oxoG excretion in group 1 patients significantly exceeded the value of those in group 2 (16.3 ± 4.9 nmol/kg/day vs. 11.7 ± 3.1 nmol/kg/day, $P < 0.05$).

A significant ($P < 0.005$) direct correlation discovered between the blood pressure level and excretion rate of oxidative DNA damage marker ($r = 0.52$), the negative relationship between the daily excretion rate of 8-oxoG and work experience ($r = -0.63$; $P < 0.001$).

In patients who protractedly worked in conditions of UHF EMR, the rate of DNA damage increased, which, possibly due to the genome operation instability in endothelial cells, determined the high daily average level and low blood pressure control. The results can be used as a marker of oxidative stress during the damaging influence of UHF EMR on human's body.