Prevention of meteopathy in patients with arterial hypertension: a pilot comparative randomized study

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The influence of change in the weather on the risk of developing meteopathic response in patients with arterial hypertension have been extensively studied in recent times. The potency of non-drug technologies in prevention and correction of meteopathy is also actively exploring.

The open randomized, prospective and comparative study aimed to estimate the efficiency of carbon dioxide gas-air baths for the prevention of meteopathy in patients with arterial hypertension.

Materials: The study included 39 patients, both men and women with arterial hypertension (AH) who had pathological meteosensitivity: feeling sick on previous or coinciding weather changes days. All patients aged 57 (30-77) years were randomized into two groups comparable at baseline in demographic and clinical characteristics, blood pressure level and antihypertensive drug treatment. The patients of active group 1 (n = 19) received carbon dioxide gas-air baths (temperature 28°C, carbon dioxide delivery rate 20 l/min, 10 serial application per 15 minutes, daily), while control group 2 patients (n = 20) were treated only with antihypertensive medications.

Methods: We used baseline and 3 weeks follow-up evaluations of all the patients included arterial stiffness determined by three-dimensional sphygmography (carotid-femoral pulse wave velocity (PWV)), systolic and dyastolic blood pressure (SBP, DBP) measured by manual cuff sphygmomanometer, blood platelet and triglycerides levels, whole blood viscosity measured using a Vilastic bioprofiler (platelet and erythrocyte aggregation), degree of meteodependence questionnaire, keeping a self-checking meteopathy diary.

Results: 6 patients of group 2 left the study for various reasons. In both groups there was a significant reduction in blood pressure: in group 1 SBP from 140 (125-145) to 120 (111-134,5) mm Hg, $p < 0.01$ and DBP from 90 (80-100) to 77 (75-79.5) mm Hg, $p < 0.01$, in group 2 SBP from 143.5 (131.25-160) to 131 (127.25-

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134.5) mm Hg, p <0.01 and DBP from 90.5 (90-100) to 82.5 (75-85) mm Hg, p <0.01. There was insignificant difference of degree of reduction in blood pressure. Platelet level in group 1 significant decreased from 236 (223.75-278.25) to 211.5 (196.5-241.5), p<0.01, and the rheological blood properties also improved: erythrocyte aggregation was obviously decreased (η 2 / η 1) from 5.1 (4.7-5.6) to 4.8 (4.5-5.6), p <0.01, and triglyceride level was decrease from 1.14 (1.02-2.24) mmol/l to 0.97 (0.84-1.4) mmol/l, p<0.05 compared with those in control group 2. In both groups, the arterial stiffness evaluated by PWV was reduced: in group 1 from 13.3 (12.6-14.9) to 12.8 (12-13.9) m/c, p<0.05, in group 2 - from 12.5 (11.5-13.3) to 12 (11.6-13) m/c, p <0.05. 4-6 months after beginning of the study degree of meteodependence questionnaire were calculated in 13 patients of both groups. Decrease in meteopathic reaction on previous or coinciding weather changes days noted 9 patients (69,2 %) of group 1 and 4 (30,8%) of group 2 (by $\chi 2$ p<0.05).

The results of the study allows to assume positive effect of carbon dioxide gas-air baths on blood pressure reduction, blood viscosity and rheology, prevention of meteopathy in patients with arterial hypertension and gives grounds for continuation of research.