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Kovalyova O.
PhD, Senior Lecturer, London South Bank University, United Kingdom

COMPREHENSIVE THERAPY PROGRAM FOR DRUG-RESISTANT ARTERIAL HYPERTENSION IN CERVICAL SPINE PATHOLOGY

Abstract. Hypertension is one of the most common cardiovascular system diseases. Adequate treatment design that takes into account its pathogenesis and associated risk factors is required to accelerate recovery and stabilize patients' condition in the long run while preventing possible complications. This article presents results of a complex therapy study aimed at optimizing treatment of hypertension developing against cervical spine pathology background. The study involved 39 men with hypertensive syndrome. The patients were monitored for 3 to 6 months. The control group (19 people) received standard drug therapy. The main group (20 patients) received the same standard treatment in combination with kinesiotherapy, massage and physiotherapy procedures, including modulated low-frequent electric current influence on reflexogenic zones.

A greater treatment effect has been observed in the main patient group. Comprehensive treatment program which included physiotherapy eliminated the condition-associated pathological reflexes and formed adequate muscular neck support, as well as reduced pain. Ultimately, this led to autonomic nervous system, cerebrospinal fluid, and cerebral circulation stabilization, followed by blood pressure normalization.

The developed treatment program contributed to local microcirculation improvement and tissue regeneration, and promoted neck muscles relaxation. The prolonged antihypertensive effect persisted for a long time while the overall treatment length has been reduced in comparison to the control group.

Introduction. Arterial hypertension is a pathology that leads to lifespan and life quality decrease, as well as disabilities resulting from complications such as strokes and heart attacks. Even a small increase in blood pressure (BP) poses a significant health risk. An increase in systolic blood pressure by every 20 mm Hg, or diastolic blood pressure by 10 mm Hg doubles cardiovascular disease risk in persons aged from 40 to 70 years [5,6].

60% of cardiovascular complications are observed with a moderate increase in diastolic pressure (DBP) above 95 mm Hg in patients with hypertension. Timely and adequate hypertension treatment is justified as a measure reducing cardiovascular complications [1]. Such therapy results in strokes, heart attacks, and chronic heart failure frequency decrease. The reaction to antihypertensive drugs, however, changes with age and individual

intolerance development, so dose selection becomes more complicated as the dose needs to be adjusted. Drug-resistant hypertension forms can develop [2].

Hypertension resistant forms development is more often observed in patients with kidney and spine pathology. Hypertension is closely associated with impaired cerebral circulation and cerebrospinal fluid dynamics, which provoke complications and exacerbate the disease.

Cervical spine pathology association with drug-resistant hypertension development has been previously reported. Vertebral musculoskeletal compression of neck vessels is observed in 60% of patients with hypertension, and may be a manifestation of a persistent degenerative process in the cervical region. There is a clear need to assess its role in hypertension development, especially in relation to its drug-resistant forms.

Aim

The aim of the study was to optimize a complex therapy program for arterial hypertension that takes into account cerebrospinal fluid dynamics, autonomic nervous system state, adequate muscle relaxation, disease etiology and pathogenesis.

Materials and methods. The study was performed in the clinical hospital "City hospital №8" in Zaporizhzhya (Ukraine) during 2018-2020 in 39 hypertensive men with cervical spine pathology. Patients were monitored for 3 to 6 months. They were divided into the control (n=19) and main (n=20) groups identical in age and weight. Their mean age was 54.3 ± 4.2 years. Body mass index (BMI) ranged from 21.35 kg/m2 to 33.2 kg/m2 in the control group, and from 22 41 kg/m2 to 33.12 kg/m2 in the main group. Both groups of men had the same disease course and hypertension pharmacotherapy program. Using X-ray examination, cervical and thoracic region spine pathology was diagnosed in 9 persons from the first group, and in 10 patients from the second group, and cervical region spine pathology - in 11 persons from the first group, and in 9 patients from the second group. All patients manifested headaches triggered by hypertensive crisis, weather changes, and stress, which can be interpreted as liquor hypertension manifestations. The control group patients have been receiving standard drug therapy, and the main group patients have been receiving it in combination with physiotherapy. Non-pharmacological methods aimed at vegetative nervous system state correction included "LEIT" device (which produces low-frequency modulated electric current), rehabilitation gymnastics (dosed soft spine stretching on a special device which helps to relieve stress and tension), massage, breathing exercises, vertebral joint gymnastics with post isometric relaxation elements were used in addition to standard therapy in the main group.

Ultrasonic and X-ray computer diagnostics, "Cardiolab+" equipment ("KAI Medica", Ukraine) with veloergometer were used for cardiovascular indices measurement. "MEDIBASE 1-54 ABPM-04" was used for 24-hours blood pressure monitoring. Electroencephalography and Doppler ultrasound with duplex scanning were used for brain state evaluation. Spine motor function and its functional disorders were studied using 3D computer diagnostics IDIAGM360 device (Switzerland, AGR-Quality Seal certificate)

Results and their discussion

Blood pressure increase aggravated by cervical and thoracic spine pathology, as well as pathological reflexes leading to further haemodynamic and cerebrospinal fluid circulation compromise, and drug-resistant hypertension development were studied. Cerebral and cerebrospinal fluid circulation issues were recorded in almost all patients during the main vessels Doppler examination.

Severe cephalgia was noted to complicate the disease course. The "LEIT" device low-frequency modulated current influence was applied to reflexogenic zones to counter it. As this influence is side-effect free and emulates physiological nerve impulses (produces neuron activity-like pulses in the frequency range of 8 - 140 Hz) as much as possible, it results in profound analgesic, anti-edematous, and anti-inflammatory effects. Low-frequency electrical impulses also have neuroadaptive properties. Their influence allows eliminating conditioned pathological reflexes therefore simplifying physiotherapists and occupational therapists work. Electrostimulation use in combination with medical exercise helps to normalize lymph circulation and to reduce intracranial pressure. These effects were observed during EEG and Doppler with duplex scanning use.

Also, a special soft spine stretching technique using a dedicated device was applied in the main patients' group as a conservative non-surgical treatment. It was shown to relieve both stress and tension. This technique also included massage, breathing exercises, and vertebral joint gymnastics with postisometric relaxation elements. Arthral gymnastics were used to improve gradual movements development.

Pain syndrome and its dynamics evaluation in the hypertension syndrome treatment were assessed on a numeric pain scale (NPS). Heart rate variability analysis was performed to assess autonomic nervous system state dynamics at all treatment stages.

LEIT use in combination with an exercise complex led to disappearance of the dull headache, of the head "expansion" feeling (cerebrospinal fluid hypertension manifestation) and of the "flies" in front of the eyes", and to sight improvement in the main group in comparison with the control.

Lightness, vigor, and normalized sleep were observed in the main patients' group, and were accompanied by antihypertensive drugs dose decrease. In the 4 cases out of 20, pharmacotherapy could be completely discarded.

Conclusion. The developed treatment program significantly reduces the treatment duration, promotes muscle relaxation, improves tissue microcirculation, stimulates local trophism and regeneration improvement. The contraindications for low-frequency electrostimulation use are almost absent.

This complex technique application expediency is determined on the basis of clinical research. The low-frequency electric impulses use in combination with medical exercise complex and massage contributed to antihypertensive drugs dose reduction, muscle spasm and pain elimination, promoted cerebrospinal fluid circulation and autonomic nervous system balance stabilization, while maintaining adequate blood pressure levels in the main group in comparison with the control.

The studied technique allows reducing the treatment duration and obtaining significant long-term therapeutic effect in hypertension, improving quality of life and preventing serious complications.

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