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Title: Using SCENAR-therapy for treating hypertension crisis in pre-hospital period

Key words: SCENAR-therapy, hypertension crises, pre-hospital period

Annotation: The article shows the effectiveness and safety of SCENAR-therapy when used for uncomplicated hypertension crises in pre-hospital period (n=97), with gradual reliable cardiac rate fall, decrease of the parameters of arterial tension, and decreased frequency of complaints in 20 minutes after the manipulation. The effectiveness of SCENAR-therapy gives evidence of human body's existing powerful self-regulatory abilities to repair its damaged functions, and the use of this method is an alternative treatment for some cases in this category of patients.

USING SCENAR-THERAPY FOR TREATING HYPERTENSION CRISIS IN PRE-HOSPITAL PERIOD

Hypertension is one of the most widespread diseases and a major risk factor of cardiovascular diseases and death rate [3]. In European Russia hypertension rate is 35.4% for men, 42.5% for women, and 50-65% for individuals at the age of over 65 [4].

Among patients with hypertension, patients with hypertension crises are most prone to develop cardiovascular complications. This is connected with sudden drop in arterial tension (AT), which causes damages of self-regulatory functions in vital organs and provokes cerebral, cardiac, vascular, and renal damage reliably more often than permanently high AT. This is why the problem of effective treatment and prophylaxis of hypertensive crises (HC) is a most important matter in modern medical care. This problem can be solved not only through pharmaceutical means of treatment, but also by using non-pharmaceutical methods, which is safer. No anaphylaxis and other side effects typical for pharmaceutical means were stated, and it can be used both by the doctor and the patient.

According to P.K. Anokhin's theory, there is a functional system in the body which controls the level of AT [6]. One of the non-pharmaceutical therapeutic methods directed to correct pathological changes through startup of disabled functions' self-regulatory mechanism is the self-controlled energoneuroadaptive regulation (SCENAR-therapy). [5,7].

Research objectives

To study the effectiveness of using SCENAR-monotherapy in patients with uncomplicated hypertensive crises in pre-hospital period.

Materials and methods

The base of this article consists of the results of a clinical examination and treatment of 97 patients with uncomplicated hypertensive crises in pre-hospital period. The patients were selected using the technique of random sampling. Patients' average age was 60.2±1.3, among them 71 women (73%) and 26 men (27%).

HC were defined as all the cases of sudden rise of AT, accompanied by occurring or aggravation of clinical symptoms, and requiring a fast controllable decrease of AT as prophylaxis of target organs' damage. The diagnosis was stated based on typical complaints and individually significant rise of AT. In examined patients parameters of AT, signs of cerebral symptoms (headache, dizziness, head noises, photopsia), as well as the cardiac symptoms were not critical, which made it possible to perform treatment in pre-hospital period.

A special protocol was developed to evaluate hemodynamic indexes and clinical data. This protocol was filled in during the primary examination and later, during the further observations. The complaints were evaluated using a 3-grade scale of intensity, based on patients' subjective sensations: 1 point – the symptom is subtly manifested, 2 – points – moderate symptom, 3 points – significantly manifested symptom. The AT was measured using the method of Korotkov in lying or sitting position and was measured in mm Hg. Systolic, diastolic, pulse and mean arterial tension were taken under consideration. Cardiac rate (CR) was defined using the auscultatory method or by one-minute pulse palpation at the radial artery. A "double product" was defined – integral index indirectly evidencing of myocardial oxygen consumption. All the patients were treated with sessions of CSENAR-therapy – processing of neck and collar zone (7-10 minutes) and pericardium canal on the forearm from the wrist to the elbow in Fm/Var mode (3-5 minutes) [7]. Immediately after the manipulation, in 10 and 20 minutes, the patients' conditional dynamic and the effectiveness of the treatment were evaluated. The duration of the manipulation was 10 to 15 minutes. Thus the period of examination was 30 to 35 minutes. If there was no effect in 30 minutes after the manipulation, the crisis was treated with pharmaceutical methods.

Results and discussion

The dynamics of the most important hemodynamic indications in patients with HC after SCENAR-therapy is shown in Table 1.

As can be seen in Table 1, a highly reliable decrease ($d < 0.001$) of initial indications of AT, CR, and "double product" was achieved. In 20 minutes after the manipulation SYS dropped by 16.6%, DIA dropped 13.3, pulse tension dropped by 20.8%, mean arterial tension – 14.9%, CR – 6.3, the "double product" decreased by 21.9% compared to the initial level (100%).

Table 1.
The dynamics of the most important hemodynamic indications in patients with HC after SCENAR-therapy (M±m)

Time	SYS, mm Hg	DIA, mm Hg	Pulse AT, mm Hg	Mean At, mm Hg	CR, beats per minute	"Double product", c.u.
Background	180.7±2.2	101.4±1.2	79.3±1.8	133.1±1.4	81.4±1.1	147.8±2.9
After the manipulation	166.2±2.3*	94.7±0.9*	67.2±1.4*	121.6±1.4*	80.3±0.9	135.1±2.5*
In 10 minutes	158.9±2.5*	91.5±1.2*	67.4±1.9*	118.4±1.6*	78.1±0.8	124.7±2.1*
In 20 minutes	150.7±2.1*	87.9±1.7*	62.8±1.6*	113.3±1.4*	67.3±0.6*	116.1±1.8*

Note: * - d< 0.001 compared with the initial value

Immediately after the SCENAR-manipulation a decrease in frequency of complaints form headaches, heartaches, head noises, photopsia, nausea, vomiting and dizziness was stated. Frequency of cases of facial hyperemia also dropped in 10 minutes. The frequency of heartaches, photopsia, nausea, and vomiting decreased to the greatest degree in 20 minutes after the manipulation.

Figure 1.

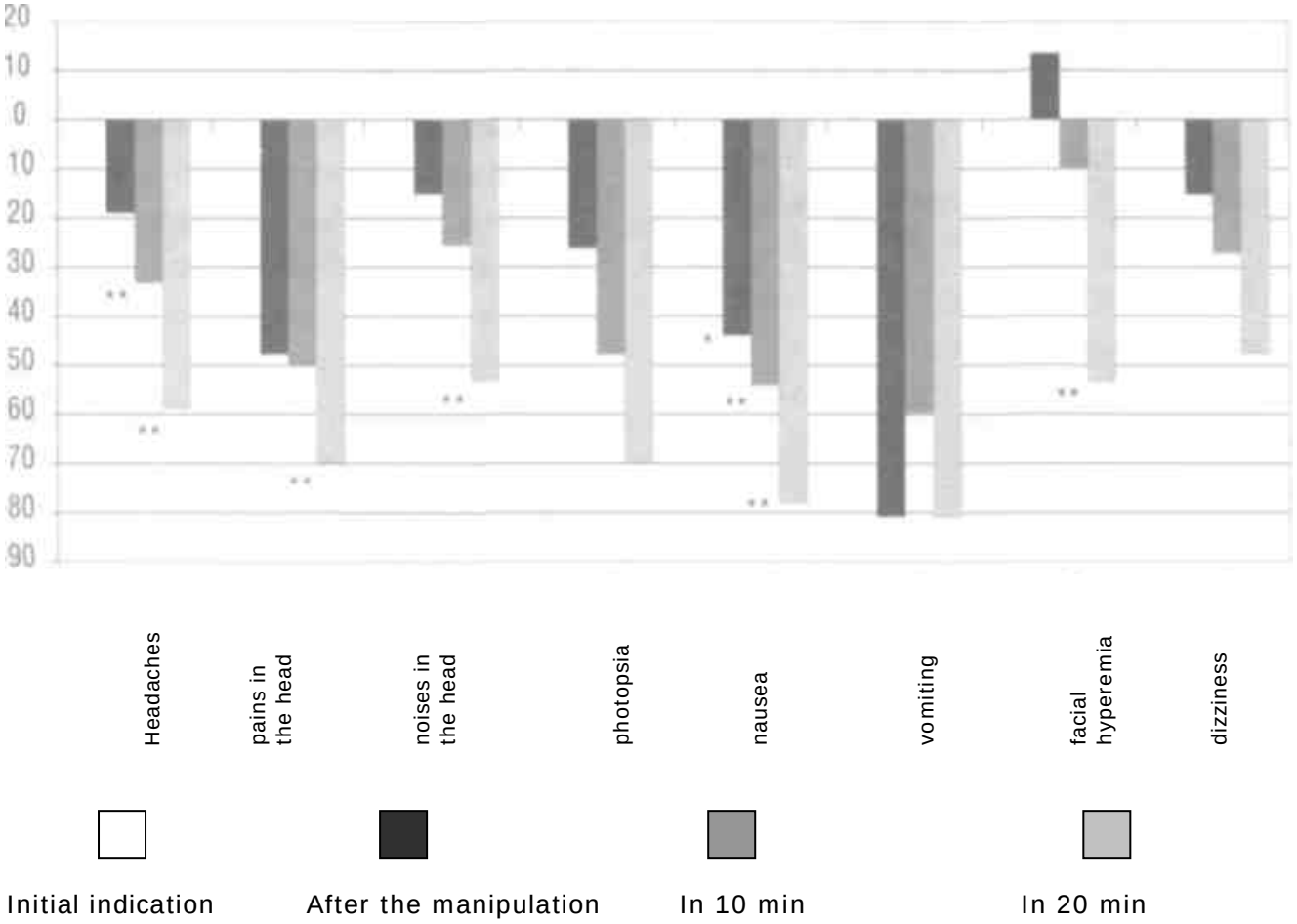

Figure 1. Dynamics of complaints' frequency (%) in patients with HC after SCENAR-therapy. Initial level of indications = 100%.

Note: * - α< 0.01, ** - α< 0.005 – compared with the initial value (the significance point was defined using the method of Mann-Whitney).

After the SCENAR-manipulation intensity of the symptoms measured in points started to decrease. In 20 minutes after the manipulation, a highly reliable decrease of intensity of all symptoms was achieved. Headaches, heartaches, noises in the head, photopsia, nausea and vomiting had the most significant decrease (Table 2).

Table 2. Dynamics of symptom intensity (in points) in patients with HC after SCENAR-therapy (M±m).

Complaints	Time of measuring			
	Initial value	After manipulation	In 10 minutes	In 20 minutes
Headaches	2.25±0.08	1.24±0.09**	0.91±0.08**	0.48±0.07**
Heartaches	1.78±0.13	1.83±0.15	0.63±0.11**	0.30±0.07**
Noises in the head	1.73*0.11	1.10±0.09**	0.83±0.09**	0.48±0.008**
Photopsia	1.87±0.14	1.96±0.14**	0.65±0.14**	0.34±0.12**
Nausea	1.42±0.09	0.68±0.09**	0.58±0.10**	0.24±0.007**
Vomiting	2.20±0.33	0.40±0.36**	0.60±0.36*	0.20±0.18**
Facial hyperemia	1.25±0.16	1.18*0.12	0.85±0.11	0.48±0.12**
Dizziness	1.83*0.09	1.21±0.10	0.93±0.09**	0.65±0.09**

Note: * - d< 0.01, ** - d< 0.001 compared with initial level

The high effectiveness of SCENAR-treatment requires some explanations. The real-life experience with this device evidences that in contrast to other physiotherapeutic methods patients can feel its effect for a long period with no signs of adaptation to excitation. SCENAR generates a high-amplitude short signal as a damped sinusoid. Its frequency is usually 60 or 90 HZ (15-350). The electric current density with a small electrode surface is 5-50 mA/cm^2. This exceeds the density of sinusoidal modulated currents by 50 – 500 times. When it touches the body, the voltage can reach 200-500 V. Real-time signal variability is achieved through two processes: formation of double layer volume and the effect of the action of current impulse.

Electrochemical reactions occur between the electrode's metal part and the skin with its electrolytic layer. The formation of electrolytic layer is an individual and local process and gives us evidence of a biotechnological feedback. Other important property of SCENAR-impulse is the phenomenon of "sounding skin" provoked by the device. This effect is referred to the high intensity of the electric field which exceeds 10^6 V/m in the moment of impulse action. This causes skin drawing and pushing off. It is necessary to note that apart from the electric action, the skin experiences a permanent mechanical effect of some kind. It is not only a mechanical influence, but an active intervention into various electric processes: the density of electrodes' contact, formation of a double-layer volume, the effect of the metal part itself, and others. Taking under consideration the mentioned properties of the impulse as a signal, we can see that the device allows us to connect to it various technical additions: swept frequency, change of impulse's shape, pulse wave form, impulse strings [1].

The signal needs a certain location to be entered so that it becomes targeted to implement the information in the living organism. It is necessary to create some context so that the processes of disclosure of information in the body become necessary for the needs of lungs, heart, liver etc. It also can be a signal not only for a material object, but for a startup of a chain of events, i.e., a correct functioning of organs' system – recovering of their functions. It is necessary to remind again of P.K. Anokhin's theory of functional systems.

To implement a positive end-result, a cyclic process is necessary in the general scheme of the functional system. If damaged, the system would not work

properly. What happens in pathological processes in each specific case? – afference diminution as a result of change or disappearance of receptors' function; as a result – lack of information of the ambient environment and inside processes?; disorders in energy exchange between the body and the ambience? We believe that SCEANR can act as a system-formational factor – receptor. SCENAR-signal probably recovers the process's cyclicism when entered into the body: receptors (cutaneous organs or dermal-internal organs) – return afference – nerve centre – work components – end result.

Thus, doctors have an affordable physiotherapeutic device, which uniquely includes almost all kinds of electro-therapy with generation of polyparametric signal. The effective use of SCENAR in pre-hospital period gives evidence of prospective of its widespread use in emergency cases.

Conclusions.

1. SCENAR-therapy is an effective and safe therapeutic method for cases of uncomplicated hypertensive crises in pre-hospital period.
2. Use of SCENAR-therapy causes a gradual reliable decrease of AT parameters and heart-rate fall by the 20th minute pursuant the manipulation.
3. SCENAR-action causes decrease in frequency and intensity of hypertonic patients' complaints.
4. The effectiveness of SCENAR-therapy in treatment of uncomplicated HC evidences of body's high self-regulatory abilities.
5. Use of this method can often be an alternative to the pharmaceutical treatment in this category of patients.

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