

NEW TECHNOLOGIES OF PSYCHOEMOTIONAL STABILIZATION IN CARDIOVASCULAR DISEASES AND ANXIETY-DEPRESSIVE DISORDERS

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INTRODUCTION

Coronary artery disease (CAD), hypertension (HT) – psychosomatic diseases¹ – and anxiety-depressive disorders (ADD)² are characterized by a high level of psychoemotional exertion, which increases significantly when they are combined. Moreover, inadequate psychological reactivity of patients with CAD, HT and ADD significantly worsens the course of the diseases³. Marking psychoemotional exertion and determining its intensity is a serious problem⁴. In addition, CAD, HT⁵ and ADD themselves are very serious stress⁶, which significantly worsens the condition of such patients⁷. ADD is associated with increased risk of primary and secondary cardiovascular events⁸.

¹ Hare DL, Toukhsati SR, Johansson P. Depression and cardiovascular disease: a clinical review. *Eur. Heart J.* 2014;35(21):1365-1372. DOI:10.1093/eurheartj/eh4462

² Shao M, Lin X, Jiang D. Depression and cardiovascular disease: shared molecular mechanisms and clinical implications. *Psychiatry Res.* 2020;285:112802. DOI:10.1016/j.psychres.2020.112802

³ Bica T, Castelló R, Toussaint LL. Depression as a risk factor of organic diseases: an international integrative review. *J Nurs Scholarsh.* 2017;49(4):389-399. DOI:10.1111/jnu.12303

⁴ Toshiaki K, Yusuke T., Kosuke I. Depression Onset After a Spouse's Cardiovascular Event. *JAMA Network Open.* April 12, 2024;7(4):e244602:1-13. doi:10.1001/jamanetworkopen.2024.4602

⁵ Nemeroff CB, Goldschmidt-Clermont PJ. Heartache and heartbreak—the link between depression and cardiovascular disease. *Nat Rev Cardiol.* 2012;9(9):526-539. DOI:10.1038/nrcardio.2012.91

⁶ Lilja G, Nilsson G, Nielsen N. Anxiety and depression among out-of-hospital cardiac arrest survivors. *Resuscitation.* 2015;97:68-75. DOI:10.1016/j.resuscitation.2015.09.389

⁷ Lichtman JH, Froelicher ES, Blumenthal JA. American Heart Association Statistics Committee of the Council on Epidemiology and Prevention and the Council on Cardiovascular and Stroke Nursing. Depression as a risk factor for poor prognosis among patients with acute coronary syndrome: systematic review and recommendations: a scientific statement from the American Heart Association. *Circulation.* 2014;129(12):1350-1369. DOI:10.1161/CIR.0000000000000019

⁸ Larsen KK, Christensen B, Søndergaard J. Depressive symptoms and risk of new cardiovascular events or death in patients with myocardial infarction: a population-based longitudinal study examining health behaviors and health care interventions. *PLoS One.* 2013;8(9):e74393. DOI:10.1371/journal.pone.0074393

Correction of CAD, HT and ADD consists in the basic recovery of the somatic and psychological integrity of the patient⁹. In their treatment and prevention, stabilization and restoration of the psychoemotional sphere are as important as pharmacological¹⁰ and surgical correction¹¹.

Taking into account the possible side effects of pharmacological correction in CAD, HT and ADD¹², the role of non-pharmacological methods is increasing. Such effective methods are specially developed landscape image kinesiotherapy (LIK)¹³ and holographic modeling (HM)¹⁴.

Determination of types of psychological reactivity and the level of psycho-emotional exertion in patients with CAD, HT and ADD in the process of correction. To establish the effectiveness of LIK and GM as methods of non-pharmacological correction to lowering the level of psychoemotional exertion in these patients. Determine the possibility of reducing the intensity of pharmacological treatment in patients with CAD, HT and ADD when using LIK and HM.

1. The Test Self-identification System and Self-assessment of the Level of Psychoemotional Exertion

50 patients (men aged 41.9 ± 1.2 years) with stable exertional angina pectoris II-III FC, stage II hypertension and somatoform disorders receiving standard treatment, holographic modeling and landscape image kinesiotherapy were performed for 14 days. Cardiohemodynamics, ischemic activity and psychoemotional were studied. 24-hour monitoring of ECG and arterial blood pressure, coronary ventriculography, bicycle test, echocardiography, specially developed "Test Self-identification System" and "Self-assessment of the Level of Psychoemotional Exertion" were used for verification.

⁹ McDowell CP, Dishman RK, Vancampfort D, et al. Physical activity and generalized anxiety disorder: results from The Irish Longitudinal Study on Ageing (TILDA). *Int J Epidemiol.* 2018;47(5):1443-1453. DOI:10.1093/ije/dyy141

¹⁰ Goldstein CM, Gathright EC, Garcia S. Relationship between depression and medication adherence in cardiovascular disease: the perfect challenge for the integrated care team. *Patient Prefer Adherence.* 2017;11:547-559. DOI:10.2147/PPA.S127277

¹¹ Matthew E. Lapa, MD; Gretchen M. Swabe, MS; Bruce L. Rollman et al. MD Assessment of Depression and Adherence to Guideline-Directed Medical Therapies Following Percutaneous Coronary Intervention. *JAMA Network Open.* December 12, 2022;5(12):e2246317:1-11. DOI:10.1001/jamanetworkopen.2022.46317

¹² Qato DM, Ozenberger K, Olfson M. Prevalence of prescription medications with depression as a potential adverse effect among adults in the United States. *JAMA.* 2018;319(22):2289-2298.

¹³ . Sisetskiy A. P. REHABILITATION IN ARTERIAL HYPERTENSION, CORONARY ARTERY DISEASE AND SOMATOFORM DISORDERS IN WAR. International scientific conference "New trends and unsolved issues in medicine" July 29-30, 2022. Riga, Latvia: "Baltija Publishing", 2022. 324 P. P.167-170 DOI <https://doi.org/10.30525/978-9934-26-226-5-43>

¹⁴ Sisetskiy A.P. CAD patients with hypertension and somatoform disorders rehabilitation strategies. *Wiadomości Lekarskie.* V. LXXIV, ISS. 3 P.2. March 2021. S.805

To determine the psychoemotional state of the patient, the initial testing was carried out using a basic geometric figure, the perception of which is characterized by a high level of neurophysiological activity – a square.

The Test Self-identification System (TESS) consists of squares grouped into two blocks, each of which contains horizontal and vertical rows. The horizontal row consists of six basic squares, the vertical row consists of seven, each of which includes large outer and smaller inner squares of different structures in polar colors – black and white [Figure1].

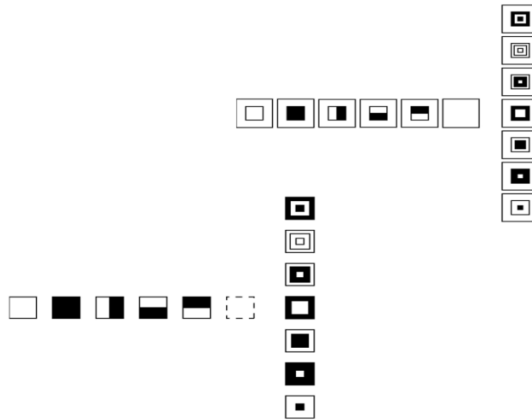


Figure 1. Test Self-identification System

The patient chooses the most liked square and the least liked square in the horizontal and vertical rows of the first and then the second blocks. Moreover, the patient first chooses from the first block, starting from the horizontal row, the square he liked the most and the square he liked the least, then repeats the same operation with the second block. Choosing a square with a white center is seen as a synchronized, positive, harmonious perception of oneself. Choosing a square with a black center is like an unsynchronized, negative, inharmonious perception. Choosing a square with a black and white center is a contradictory, uncertain self-perception. The patient is tested twice to control changes in his psychoemotional state in dynamics.

Self-assessment of the Level of Psychoemotional Exertion (SLPE) includes seven bimodal vertical scales. The first of them, fragmented into ten segments, corresponds to certain negative emotional states – anxiety, death fear, aggressiveness, depression, loneliness, suicide and disharmony – and is composed of ten fragments, the lowest of which represents to the minimum level of psychoemotional stress (one point according to the ten-point system), and the upper one – the maximum – ten points. The second

one, whole, serves for the unconscious fixation of opposite to the negative emotions of the first scale positive states – serenity, will to live, empathy, unity, joy, upgrowth, sense of beauty [Figure 2].

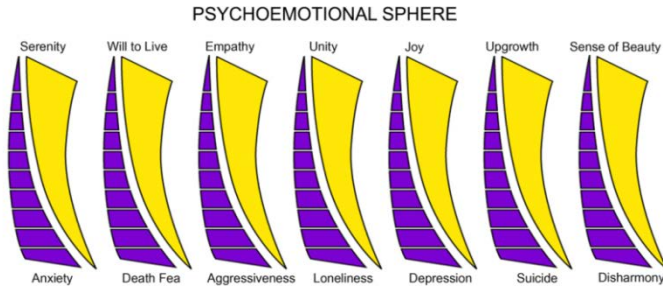


Figure 2. Self-assessment of the Psychoemotional Exertion Level

2. Types of reactivity of patients with coronary artery disease, hypertension and anxiety-depressive disorders

Taking into account cardiohemodynamic indicators, four types of reactivity of patients with coronary artery disease, HT and ADD are defined: I. Adequate. II. Hyperactive paid: 1) positive; 2) negative. III. Paradoxical. IV. Chaotic [Figure 3,4] .

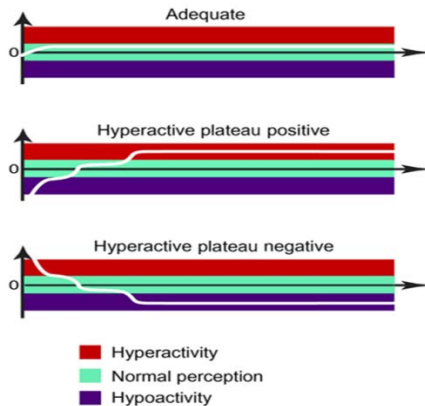


Figure 3. Types of reactivity of patients with coronary artery disease, hypertension and anxiety-depressive disorders

In each of the types, a blocked option was determined – spontaneous or conditioned termination of an emotional reaction or its change to the opposite. Before correction, 83% of patients had type II, 12% – type III, 5% – type IV, after correction: 75% – type I, 20% – type II, 5% – type III.

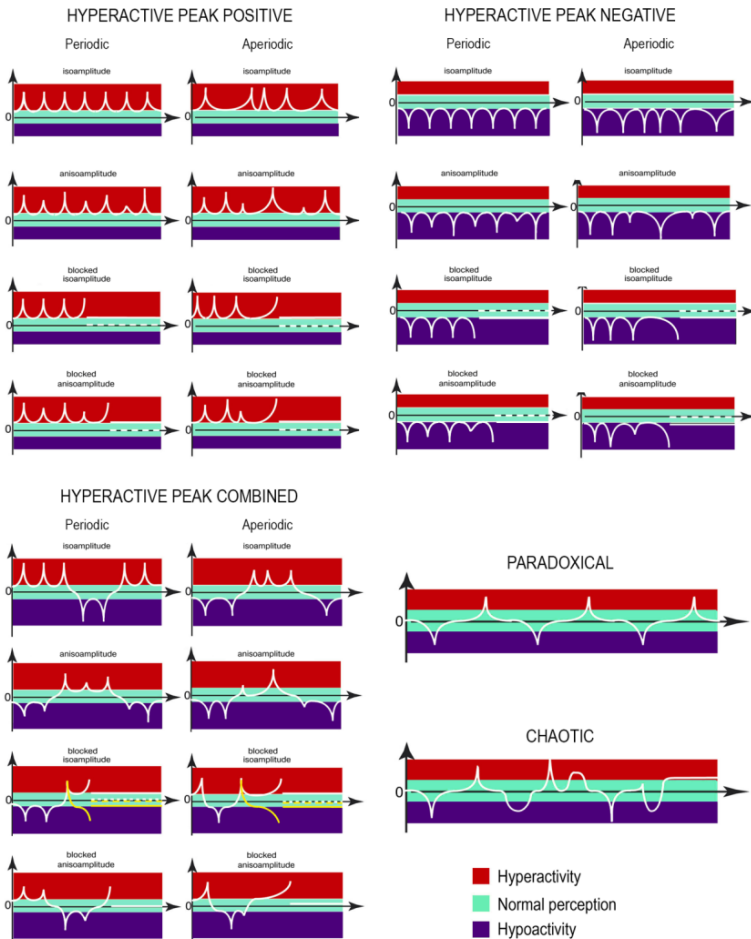


Figure 4. Types of reactivity of patients with coronary artery disease, hypertension and anxiety-depressive disorders

3. Landscape image kinesiotherapy of patients with coronary artery disease, hypertension and anxiety-depressive disorders

The patient walks and at the same times fixes positive images of nature in his memory, which he later reproduces at home. Then – a complex of individually selected static and dynamic relaxation and breathing exercises, which he modifies in the most acceptable way for himself, and the exercises are performed with visualization in the inner field of vision of pre-selected positive images of nature, taking into account cardiohemodynamic parameters.

The 1st stage. Walking at a moderate rate with an increase in heart rate by no more than 15 per 1 min., systolic blood pressure – no more than 20 mm Hg, diastolic – no more than 10 mm Hg and simultaneous fixation of positive images of the surrounding nature, reproduced later at home.

The 2nd stage. A set of individually selected static and dynamic relaxation and breathing exercises taking into account the hemodynamic parameters determined for the 1st stage. Exercises are performed with visualization in the inner field of view of pre-selected positive images of nature.

The 3d stage. Graphic and kinesthetic visualization of one's own state. In the inner field of view, the patient creates an integrative image, combining images of color (visual analyzer), sound (auditory analyzer), movement (proprioceptive analyzer), smell (olfactory analyzer) and taste (taste analyzer). Transforms it into a positive image and reflects arbitrary movements in natural conditions, and then – at home.

4. Holographic modeling of patients with coronary artery disease, hypertension and anxiety-depressive disorders

The patient visualizes an integrative image (hologram) of his internal state [Picture1] using all groups of analyzers – visual, auditory, tactile, gustatory, olfactory, tactile and proprioceptive – with further kinesthetic fixation, the results of which are taken into account when providing recommendations to the patient regarding his optimization physical and mental activity.

There is a real structuring by the patient of his internal psychological space based on a specific scale of his own psychoemotional state with a specific individual tool – an image of his own state. At the same time, the most adequate assessment of one's condition in the disease is achieved – an indispensable condition for effective rehabilitation and treatment. Characteristic deep personal graphic and kinesthetic self-identification in the case of a violation of the state of the organism with a minimal risk of negative effects of psychological intervention.

Psychological stability is achieved by kinesthetic (synchronized with breathing movements) and graphic (free associative drawing, corrective text) display of unconscious psychotraumatic factors in order to create an adequate positive image of one's own condition.



Picture 1. Patient P. Final integrative image of internal state

5. Results after landscape image kinesiotherapy and holographic modelling of patients with coronary artery disease, hypertension and anxiety-depressive disorders

Before using of LIK and HM during standart treatment there were no significant changes in the psychoemotional state and cardiohemodynamics.

Self-assessment of psychoemotional state before LIK and HM: very bad – 18%, bad – 74%, satisfactory – 8%. After 14 days of LIK and HM: bad – 6%, satisfactory – 24%, good – 57%, excellent -13%. Indices of psychoemotional stress before and after LIK and HM, respectively: anxiety 8.7 – 2.2, aggressiveness 4.7 – 1.3, death fear 8.7 – 2.2, loneliness 5.8 – 2.3, depression 4.9 – 1.5, suicide 3.5 – 1.1, disharmony 9.6 – 2.4. Self-assessment of the state according to TESS: choosing a square with a black center – 86 – 23%%, with a white center – 9 – 77% %.

After 14 days of LIK and HM an improvement in cardiohemodynamics was noted: the heart and stroke indices increased, the minute volume of blood circulation increased, and the stress phase of the right ventricle decreased ($P < .05$). Systolic blood pressure decreased from 173 ± 1 to 132 ± 1 mm Hg ($P < .05$), diastolic – from 104 ± 1 to 83 ± 1 mm Hg ($P < .05$). The frequency and duration of ischemic episodes decreased in 77% of patients. 67% of patients significantly reduced doses of β -adrenergic blockers and calcium channel blockers while maintaining stable cardiohemodynamic parameters. Reduced dose of antidepressants in 40%, tranquilizers were discontinued in 54% of patients with CAD, HT and ADD.

CONCLUSION

Four types of reactivity of patients with CAD, HT and ADD are defined: I. Adequate. II. Hyperactive paid: 1) positive; 2) negative. II. Hyperactive peak: 1) positive; 2) negative; 3) combined. 2. III. Paradoxical. IV. This is important in the optimal rehabilitation of its patients.

In the process of correction of such patients SLPE and TESS allow to determine and control their level of psychoemotional exertion and its individual changes in dynamics. Self-assessment of psychoemotional state after 14 days of LIK and HM significantly improved: before LIK and HM – very bad – 18%, bad – 74%, satisfactory – 8%, after – bad – 6%, satisfactory – 24%, good – 57%, excellent -13%. Indices of psychoemotional stress before and after LIK and HM decreased significantly, respectively: anxiety 8.7 – 2.2, aggressiveness 4.7 – 1.3, death fear 8.7 – 2.2, loneliness 5.8 – 2.3, depression 4.9 – 1.5, suicide 3.5 – 1.1, disharmony 9.6 – 2.4.

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The doses of cardio group preparation in 67% of patients significantly reduced while maintaining stable cardiohemodynamic parameters. Also decreased the doses of antidepressants in 40% of patients. Tranquilizers were discontinued in 54% of patients with CAD, HT and ADD.

Landscape image kinesiotherapy and holographic modeling significantly reduce psychoemotional exertion, improving psychological state of CAD, HT and ADD patients with improvement of their cardiohemodynamics when reducing the intensity of pharmacological correction.

SUMMARY

Cardiovascular diseases, in particular coronary artery disease and hypertension, are characterized by a high level of psychoemotional exertion, especially uncontrolled in combination with anxiety-depressive disorders. Inadequate psychological reactivity of such patients significantly worsens the course of the diseases. Marking psychoemotional tension, determining and correction its intensity is a serious problem.

The purpose of the study was visualization, determination and reduction of psychoemotional exertion in coronary artery disease, hypertension, anxiety-depressive disorders patients and control of their correction process using specially developed methods of landscape image kinesiotherapy and holographic modeling.

In patients with coronary artery disease, hypertension and anxiety-depressive disorders receiving standard treatment, holographic modeling and landscape image kinesiotherapy were performed. Cardiohemodynamics, ischemic activity, psycho-emotional exertion were studied. 24-hour monitoring of ECG and arterial blood pressure, coronary ventriculography, bicycle test, echocardiography, specially developed "Test Selfidentification System" and "Self-assessment of the Level of Psychoemotional Exertion" were used for verification.

Four types of patients psychological reactivity were identified – adequate, hyperactive peak, paradoxical, chaotic. Psychoemotional state of patients with coronary artery disease, hypertension and anxiety-depressive disorders has improved significantly after the holographic modeling and landscape image kinesiotherapy. Indices of psychoemotional exertion were decreased. Cardiohemo-dynamics improved. The intensity of pharmacological correction has significantly decreased.

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