Electropuncture diagnostics as a method for assessing the state of environmental pollution environment from the standpoint of ecological epidemiology

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SUMMARY

The article analyzes approaches to the use of one of the methods of electropunctural diagnostics - vegetative resonance test in assessing technogenic pollution of the environment from the standpoint of ecological epidemiology. The analysis of those changes in the state of human health, which are due to the presence in the environment of chemical and physical factors of anthropogenic origin. The possibility of using the vegetative resonance test for assessing human ecopathology, which was formed under the influence of unfavorable environmental factors, is shown.

Key words: technogenic pollution of the environment, chemical and physical factors, environmental epidemiology, electropuncture diagnostics, vegetative resonance test.

RESUME

The approaches to the use of electropunctural vegetative resonance test in the evaluation of technogenic pollution from the standpoint of environmental epidemiology were analyzed. An analysis of changes in the state of human health, which are caused by the presence in the environment of chemical and physical factors of anthropogenic origin is presented. The possibility of using electropunctural vegetative resonance test to assess human ecopathology, which forms under the influence of adverse environmental factors is shown.

Keywords: technogenic pollution, chemical and physical factors, environmental epidemiology, electroacupuncture diagnostics, vegetative resonance test.

Introduction

Ecology, being a fundamental science, studies, as you know, the relationship of living organisms with each other and with their environment. A retrospective assessment of the development of ecology shows that even at the first attempts to generalize the experience of the relationship of living organisms with nature, attention began to be paid to both the influence of the environment on humans and humans on the environment [1]. At the present time, ecology has turned into the science of human survival in his environment, has become not only a fundamental discipline, but also transformed into a number of applied areas that are focused on the practical aspects of preserving the nature of the Earth, health and life of people around the planet.

One of such interdisciplinary areas are ecological epidemiology, which studies the influence of natural and man-made environmental factors on the health and well-being of the population [2]. The tasks of ecological epidemiology include ecological and hygienic assessment of the quality of the environment, aimed at ensuring environmental safety and sanitary and epidemiological well-being of the population. The methodological features of environmental epidemiology include a set of methods for studying the health status of the adult and child population under the influence of external (chemical, physical, biological) factors of natural and anthropogenic origin. One of the main tasks of environmental epidemiology is to identify, identify, and qualitatively and quantitatively characterize that complex of existing adverse environmental factors,

aimed at assessing the medical and biological consequences for the health status of the population. For this purpose, bioindication and biotesting are used in ecological and hygienic research to determine the characteristics of a complex of factors present in the environment based on the reaction of a biological object that is most sensitive to them [3]. However, at present, the number of living known organisms is a huge number of species and, naturally, with different species sensitivity to the action of environmental factors, which makes the task of full-fledged biotesting in environmental quality control a very difficult problem [4]. In addition to this, if we talk about chemical factors, then at present, according to the International Register of Potentially Toxic Substances, more than 5 million chemicals are known. of which more than 50 thousand appear in one way or another in the world market. According to the World Health Organization, this list is annually replenished with more than a thousand new chemical compounds with unknown or not fully understood biological effects - xenobiotics, which, despite this circumstance, continue to be introduced into industry, agriculture and human life.

Reducing the risk of a possible adverse impact of anthropogenic factors on the environment and humans is carried out through the development of regulatory documents (safety standards). The main purpose of their creation is to regulate such conditions when, based on the situation in everyday life and at work, human health would be threatened with as little harm as possible and would ensure the preservation of the health of the present and future generations [5]. In the process of their improvement and development, these principles of hygienic regulation have undergone significant changes. In the 1920s and 30s. there was an opinion that it was unnecessary to establish clear values for the presence of chemicals in the environment, and simply should be as much as possible to reduce their content to the point of complete absence. And if you follow this concept of "zero pollution",

Subsequently, this concept of hygienic regulation was completely abandoned, due to its complete impossibility of practical implementation. Hygienic standards are currently a kind of compromise between those environmental conditions that would be ideal in terms of causing the least harm to human health and those that really exist. The current hygienic standards governing the values of the maximum permissible concentrations of chemicals and the maximum permissible levels of physical factors are constantly being adjusted upward.

In this regard, the role of environmental epidemiology in forecasting, identifying, real assessing, preventing and minimizing the effect of unfavorable environmental factors on public health is increasing. At present, there is no reason to deny the presence of ecologically caused human diseases or ecopathology, which to one degree or another are associated with the presence of unfavorable chemical and physical factors in the environment, and most often - their combined effect.

In recent years, biology and medicine have successfully implemented the latest achievements of traditional medicine, which are used in the field of diagnostics - the autonomic resonance test (ART) [6]. This objective method of instrumental diagnostics, in our opinion, can be successfully used in an indirect assessment of the state of the environment based on diagnostic indicators of human health for those functional and clinical manifestations that indicate a violation or

deviation from the normal functioning of various organs and systems of the body.

In accordance with the above, the purpose of this study was to analyze the capabilities of the ART method in the ecopathological assessment of unfavorable chemical and physical environmental factors based on the state of human health.

Possibilities of the vegetative resonance test in the diagnosis of health conditions human

With the help of the ART method, it seems possible to determine a person's reaction to the action of various environmental factors, the direction and severity of which can reflect both the normal level of functioning of the body systems and the state of their tension or exhaustion [6]. The ART method using test pointers allows:

- to carry out an express assessment of the state of organs and systems of the body;
- carry out topical diagnostics of pathological processes using organ drugs;
- carry out etiological diagnostics using nosodes;
- to assess the state of metabolism (anabolic and catabolic processes);
- determine the lack of trace elements;
- determine the types of loads (radioactive, electromagnetic) as a result of the action physical environmental factors;
- determine the target organ in the presence of any type of load;
- to determine the levels of toxicity under the action of chemicals, the nature and type toxic loads;
- to determine the presence and degree of malignancy of the process;
- assess the state of stress;
- to assess the adaptive reserves of the body;
- to determine the degree of blocked adaptation reserves.

Vegetative resonance test in the diagnosis of human health, due to ecological characteristics of the environment

In the analysis of human diseases, it is necessary to distinguish between ecologically conditioned or endemic diseases that are associated with the geochemical characteristics of a given area and are the result of chronic exposure to anthropogenic adverse environmental factors. Some human microelementosis, which are presented in table. 1, are due to a lack of some trace elements, an excess of others or the absence of the same element in optimal concentration [7, 8, 9]. Such diseases include: iodine deficiency in water and food, which causes endemic goiter, lack of selenium, leading to dilated cardiomyopathy (Keshan disease), and in combination with iodine deficiency can also cause damage to the musculoskeletal system (Keshan-Beck disease or Urovskaya disease). Against, An excess of another trace mineral in soil and food, such as molybdenum, can cause endemic molybdenum gout, characterized by chronic recurrent arthritis. The concentration of fluoride in water and food is characterized by an optimum concentration, since a deficiency of fluoride in humans leads to dental caries, and an excess leads to fluorosis.

In this regard, the assessment of the elemental status is an urgent task for the diagnosis of human microelementosis, and the most important is the early identification of emerging violations of elemental metabolism, which can be adequately implemented using ART [6]. So, the use of the ART method, against the background of other diagnostic capabilities, allows you to get a reliable picture of metabolic disorders of trace elements. Metabolic disorders have been identified with the help of ART testing

some microelements (Si, Zn, Cu, I, Fe) in subjects aged 25 to 55 years, which were compared with the assessment of the elemental status by the method of A.V. Skalny (atomic emission and mass spectrometry) [10]. Comparison of the percentage of coincidences of the revealed disorders of microelement metabolism in studies by the methods of ART and systemic diagnostics of mineral metabolism was 83.7%. The high correlation between ART methods and objective methods for studying elemental metabolism with a degree of reliability (75.4–83.3%) allows it to be recommended as a non-invasive diagnostic method for detecting violations of elemental metabolism in the human body [11].

Table 1

Ecologically caused (endemic) chronic human diseases caused by geochemical features of the environment (microelementosis)

Trace element	Disease
Iodine deficiency in water and food products	Endemic goiter, myxedema
Excess molybdenum content in water and food	Endemic molybdenum gout
Selenium deficiency in soil, food products	Endemic selenium deficiency cardiomyopathy (Keshan disease)
Selenium deficiency in soil, food products	Endemic osteopathy (Keshan-Beck disease or Urovskaya disease)
Fluoride deficiency in water and food products	Tooth decay
Excess fluoride in water and food products	Dental fluorosis

Vegetative resonance test in the diagnosis of human health in conditions of technogenic chemical pollution of the environment Chemical pollution of the environment with uncharacteristic substances of a chemical nature is considered one of the most widespread, large-scale and oldest types, the sources of which are industry, energy, transport, agriculture and human life [12]. All chemical products of human anthropogenic activity, which negatively affect the environment, are represented by inorganic (heavy metals) and organic substances, among which the most toxic are polycyclic aromatic hydrocarbons, in particular, benzo (a) pyrene (Table 2).

table 2

Chronic human diseases caused by environmental pollution chemical factors of technogenic origin

Chemical factor	Disease
Lead	Damage to the central nervous system and the hematopoietic system (saturnism, anemia)
Mercury	Damage to the central nervous system (Minimath disease)
Cadmium	Damage to the musculoskeletal system (itai-itai disease)
Benz (a) pyrene	Neoplasms

The influence of chemical pollution of the environment on the state of human health can add up to an ecologically caused pathology, which leads to the need for a preliminary assessment of the elemental status of the organism, followed by diagnostics of the presence of a load of toxic elements. Information about the role of individual toxicants in the emergence and development of various pathologies in a modern person is clearly insufficient, and therefore, new patterns of interelemental interactions are being investigated when they enter

the human body [13]. The effect of chemical elements on the body, in particular, heavy metals, is correlated with their concentration and time of action, taking into account the "Mertz rule" [13, 14]:

a) each element has an inherent safe exposure range that maintains optimal tissue concentrations and functions;

b) each element has its own toxic range when the safe level of its exposure is exceeded.

The first conditional group of heavy metals according to the degree of hazard (toxicity) includes lead, mercury and cadmium, the excess of which in water, food and air causes a number of pathological manifestations in humans. Lead pollution of the environment causes damage to the central nervous system and the hematopoietic system in humans, leading to anemia [15]. At one time, mercury occupied the first place among toxic elements, but then it gave way to lead. Acute or chronic poisoning with organic mercury compounds, and mainly methylmercury, causes damage to the central nervous system in humans (Minimat's disease), impaired motor functions, and in severe cases can result in paralysis

[sixteen]. An increased content of cadmium in drinking water or food can cause this called itai-itai disease, accompanied in humans by changes in the bones, which leads to numerous fractures [17]. Among the polycyclic aromatic hydrocarbons found in soil, water, and air, benzo (a) pyrene is the most famous, which is recognized as a carcinogen and is an indicator for this group of xenobiotics [18].

One of the positive aspects of the ART method is the possibility of preclinical detection of certain disorders that occur in the state of certain organs or organ systems under the action of toxicants and lead to the occurrence of diseases. In conditions when the toxic damage has not yet occurred, the prognostic analysis of the development of a particular pathology in humans makes it possible to identify the ecopathological component caused by the influence of chemical environmental factors. Determination of toxicity levels under the action of chemicals, as well as the nature and type of toxic loads, together with an assessment reflecting the state of stress or depletion of various body systems, will allow the development of measures and means to prevent this adverse effect.

Vegetative resonance test in the diagnosis of human health in conditions of environmental pollution by physical factors of technogenic origin

Physical factors in the environment of modern man are represented by radioactive (ionizing) and non-ionizing electromagnetic fields and radiation (Table 3), the level of which is currently significantly higher than the natural background of the Earth [5, 19–21]. In modern conditions, all people of the Earth, regardless of their place of residence and work activity, to one degree or another, are exposed to the effects of ionizing and non-ionizing radiation, which, when the permissible level is exceeded, leads, in combination with other ecopathological factors, to the development of diseases [2, 5, 19].

With the advent of nuclear power and nuclear weapons, the level of radiation in the environment has increased significantly compared to the natural background. Especially the influence of radioactive radiation began to affect itself after the accident in 1986 at the Chernobyl nuclear power plant, as a result of which the total radiation background of the Earth increased [19, 22]. Exposure to ionizing

radiation (X-ray examination, radionuclides in water, air and food) is, as a rule, chronic in nature, and at doses exceeding permissible, the risk of malignant neoplasms and genetic consequences increases. The possibilities of the ART method in the ecopathological assessment of a given physical factor make it possible to determine the presence of an organism burden, and testing is always included in the diagnostic algorithm for the presence of oncological disease [6].

Non-ionizing electromagnetic fields and radiation, due to lower energy characteristics, have a significantly less adverse effect than ionizing ones [20, 21]. However, the electromagnetic component in the environment, especially in large cities, is much more pronounced and has recently become of certain interest for sanitary and hygienic services and environmental protection services. Epidemiological studies carried out in recent years in many countries have shown that when exposed to electromagnetic fields and radiation, along with the development of autonomic dysfunctions, an increase in the risk of developing oncological diseases increases. A group of experts from the International Agency for Research on Cancer (IARC) from around the world, affiliated with the World Health Organization, After analyzing the results of many years of research, she first assigned low-frequency electromagnetic fields [24] to the group of carcinogens, and after a few years - radio-frequency electromagnetic radiation [25]. Testing by the ART method of electromagnetic load is one of the examination methods, especially in cases where the nosological diagnosis is either unknown or complicated by concomitant pathology.

Table 3

Chronic human diseases caused by physical environmental factors man-made environment

Physical factor	Disease
Radioactive (ionizing) radiation: X-ray and γ-radiation; incorporated radionuclides.	Malignant neoplasms genetic disorders
Electromagnetic (non-ionizing) fields and radiation: electromagnetic low-frequency fields; electromagnetic radio frequency radiation.	Vegetative dysfunction, malignant neoplasms

conclusions

Human ecopathology is formed from the total impact of negative environmental factors, mainly chemical and physical, which determine the real load on the human body. The ART method, being objective and non-invasive, allows for a quick qualitative and quantitative assessment of the state of human health, with the ability to differentiate the types of loads with specific detailing of each of them. Such a more in-depth analysis of human diseases makes it possible to assess the role and contribution to the degree of pollution of each of the chemical and physical factors of the environment and to determine the ways of normalization and adjustment in accordance with the requirements of the environmental standards.

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