Physiological substantiation of functional clinical diagnosis methods of electropunctural diagnostics

NS. Kirgizova
(Center for intelligent medical systems "IMEDIS", Moscow)

SUMMARY

Based on the definition and concept of the disease as a mobile process, the need to study the human condition at various stages of the pathological process is traced. The physiological substantiation of the possibility of studying the state of the autonomic nervous system as one of the important mechanisms for assessing the prenosological stage of the disease is given. For this purpose, it is proposed to investigate the state of the adaptive function by methods of electropunctural diagnostics.

Key words: prenosological stage of the pathological process,adaptive function of the autonomic nervous system, electropuncture diagnostics.

RESUME

Basing on definition and concept of disease as variable process the necessity to explore human condition at various stages of the pathological process is traced. Physiological rationale for the possibility of studying the state of the autonomic nervous system as an important mean in assessing prenosological stage of the disease is shown. For this purpose it is proposed to investigate the state of adaptation functions by methods of electropunctural diagnostics.

Keywords: prenosological stage of pathological process, adaptive function of the autonomic nervous system, electropunctural diagnostics.

According to WHO, health is a state of complete physical, mental and social well-being, not just the absence of disease. The general concept of health characterizes biological health as the perfection of self-regulation in the body and maximum adaptation to the environment, and mental health as a state of general mental comfort, providing an adequate behavioral response, social activity and working capacity. The state of human health is dynamic due to changes in the environment [2]. Therefore, health can be defined not as a state, but as a process. According to V.P. Kaznacheev [6, 7], health is the process of preserving and developing physiological, biological and mental functions, optimal labor and social activity with the maximum duration of an active creative life.

By definition I.P. Pavlova, illness is the existence of an organism in extreme conditions, i.e. violation of the interaction of the body and the environment, violation of the adaptation of the body to environmental conditions. According to S.P. Botkin [11], "the disease is not something special, independent, it represents the usual phenomena of life under conditions unfavorable for the body."

Thus, being one of the forms of life, disease is as changeable as life itself. A doctor has two professional duties: "the first duty of medicine is to maintain health, and the second is to cure diseases" (F. Bacon) [11].

The main question that arises before a doctor when he meets a patient is making a diagnosis - a short medical report on the nature of the disease and the patient's condition [13, 14].

Making a diagnosis is the most difficult task in the field of clinical medicine, because treatment, prognosis, and prevention depend on the diagnosis; it requires a lot of information, including subjective and objective data, and the results of laboratory tests.

In practical medicine, three types of diagnosis are most often used: preliminary, main (clinical) and final, which reflect certain stages of diagnosis [13].

The basis for the construction of a modern diagnosis is the nosological principle [15], which includes the name of a certain disease in accordance with the existing nomenclature. The basis for making a nosological diagnosis is an anatomical substrate in pathological conditions with reliably established morphological disorders, the essence of which is determined by clinical, laboratory, instrumental methods. The foundations of modern nosological diagnostics were laid in the eighteenth century in connection with the discovery of the cellular theory of the structure of living matter, the development of anatomy, physiology, including blood circulation, the use of optical instruments, etc. Thanks to this, the position expressed then by Burgav that "whoever diagnoses well, heals well" (qui bene diagnostic bene curat) received a universalspread, has become an aphorism [14].

But since the middle of the twentieth century, the methodology for making a diagnosis has undergone a significant revision. The peculiarities of the current stage imply the comprehension of new qualities of the course of the pathological process, the patient's condition, the organization of diagnostic and therapeutic processes. The reasons for the conditions for making a diagnosis are numerous, they can be divided into 4 categories according to Chernorutsky [13]:

1. Coming from the disease.
2. Outgoing from the patient.
3. Outgoing from a doctor.
4. Proceeding from the external environment and research conditions.

The conditions emanating from the disease consist in the peculiarities of the course of the pathological process in the conditions of modern society:

- the use of pharmaceuticals or other drugs that reduce the clinical picture of the disease;
- pharmacoresistance of patients as a result of frequent uncontrolled the use of analgesic, anti-inflammatory, antibiotic, hormonal and other agents;
- the development of a severe and lightning-fast course of the disease;
- development of a rare disease;
- the development of an atypical form of the disease, etc.

Conditions emanating from the patient:

- significant influence of external circumstances on the psycho-emotional background patient;
- violation or lack of contact with the patient;
- untimely appeal for medical help;
- lack of nutritional provision of the patient;
- allergic and immunodeficiency states of the patient, etc.

Features coming from the doctor:

- poor collection of anamnesis, insufficient comprehension of it and its use in diagnosis;
- unreliability of an objective examination of the patient and incorrect interpretation of its results;
- insufficient and untimely laboratory and instrumental research, misuse of the results of this research;
- inadequate generalization of the patient's examination data, their inept use in relation to the characteristics of the course of the disease.

Features emanating from external circumstances and research conditions:

- defects in the organization of medical care;
- lack of proper diagnostic equipment and tools, etc. Thus, in each specific case of treatment, it becomes necessary to solve the problem of individual determination of the patient's condition, the degree of formation of the pathological process, a set of necessary diagnostic and therapeutic measures. The success of a physician's medical practice is largely determined by clinical thinking. Clinical thinking is a specific mental, conscious and subconscious activity of a doctor, which makes it possible to most effectively use the data of science, logic and experience to solve diagnostic and therapeutic problems in relation to a particular patient. The main forms of clinical thinking are carried out through analysis and synthesis. As the many years of experience of the most successful practicing doctors show, the assessment of the patient's condition is a process,

It is necessary to remember about a more extended classification of diagnoses by nature and content [14]:

1. Symptomatic.
2. Functional.
3. Anatomical.
4. Etiological.
5. Pathogenetic.
6. Nosological.

6. Diagnosis of the future - prognosis.

At the present stage, clinical diagnostics is a full-fledged subjective conclusion obtained in the course of differential diagnostics, which is an objective relative truth, which, as knowledge accumulates, approaches the absolute truth, never reaching the absolute value of the latter. Thus, the diagnosis is always determined by a certain

the degree of reliability, which in the process of monitoring the patient is continuously increasing. Thus, being a process, clinical diagnostics implies the presence of a research subject, which in each specific case should be selected in the most optimal way to obtain complete, reliable and relevant information about the patient's condition in changing environmental conditions.

One of the earliest and most actively involved systems in the process of adaptation of the organism to new conditions of existence is the autonomic nervous system (ANS) [1, 3, 6, 7]. Vegetative regulation is carried out at different levels. The activity of the nuclei of the anterior group of the hypothalamus causes the body's reactions aimed at restoring and maintaining its reserves, the so-called trophotropic functions, realized due to the predominant activity of the parasympathetic nervous system, that is, the acetylcholine system, as well as histamine and serotonin. The activity of the posterior group nuclei provides ergotropic functions, which are determined by the level of catecholamines and their precursors and are implemented by the sympathetic part of the ANS.

Segmental regulation is carried out at the level of the spinal nodes and structures of the brainstem, which ensures the level of normal life. In the suprasegmental level of non-vegetative regulation, there are no morphological and functional features characteristic of the ANS, and it is impossible to identify specific vegetative centers. The hypothalamus provides coordination of autonomic, behavioral and emotional responses [37]. The initial link of inclusion can be both higher autonomic centers and peripheral target organs. At the same time, the level of violations has a certain effect on the external manifestations of the autonomic reaction. One of the theories describing the process of existence of an organism in conditions of interaction with damaging agents of the external environment is the theory of homotoxicosis [17]. From the standpoint of homotoxicology, the disease is viewed as a biologically expedient process of protecting the body from exogenous and endogenous homotoxins or an attempt to compensate for the damage caused by them, i.e. an attempt by the body to bring itself into a state of biological balance.

Based on this, the presented symptoms can serve as visible manifestations of the body's defense reactions aimed at neutralizing and eliminating homotoxins. Impact factors can be physical, chemical, biological, mental. In relation to the body, they can be of exogenous or endogenous origin.

The impact of these pathological factors on the body causes regulatory disturbances (pathological processes). In this case, the body goes through at least two phases of the process of interaction with toxins. The first is characterized by the successful release of homotoxins either by excretory organs specifically designed for this purpose, or through sluice formations formed in the process of vital necessity. The second phase is characterized by the depletion of the resources of the excretory systems, the accumulation of toxins in the tissues of the body, their integration into the cell and the existence of the body under conditions of chronic intoxication. The role and activity of the ANS in the process

homotoxicosis undergo significant fluctuations. In the first phase of the activity and consistency of the excretory systems, the role of autonomic innervation is especially great. Due to the activation of adaptive mechanisms, the tone of the sympathetic section increases, leading to a tension of resources to stimulate protective, excretory, and restorative functions. The result of such activation is the achievement of an adaptive result useful for the organism, and then a return to the parameters of the functioning of its systems that are optimal for the organism [1]. In the second phase of the homotoxicosis process, the activity of sympathetic vegetative activity is significantly reduced. Only in the initial stages of the second phase, the activation of the adaptive function can lead to the process of achieving a positive result. In the subsequent stages of the second phase, sympathetic activation does not achieve a positive result, it becomes inappropriate due to the potential threat of removing protective barriers and the spread of assimilated homotoxins and their own modified cells. Thus, in the second phase, the most optimal acceptor of the result is a decrease in sympathetic activation. At the same time, adaptive resources are significantly reduced, excretory and restorative mechanisms are blocked, against the background of which the role of parasympathetic tone as a marker of functional suspended animation increases. in the second phase, the most optimal acceptor of the result is a decrease in sympathetic activation. At the same time, adaptive resources are significantly reduced, excretory and restorative mechanisms are blocked, against the background of which the role of parasympathetic tone as a marker of functional suspended animation increases. in the second phase, the most optimal acceptor of the result is a decrease in sympathetic activation. At the same time, adaptive resources are significantly reduced, excretory and restorative mechanisms are blocked, against the background of which the role of parasympathetic tone as a marker of functional suspended animation increases.

Taking into account the peculiarities of the recovery processes as a mobile system, we can talk about the need to actively use the body's resources in the first phase of the homotoxicosis process.

Thus, the role of diagnostics of the state of the adaptive function of the autonomic nervous system is increasing in order to determine its resources and the possibility of restoring health by methods of non-drug therapy.

In the context of studying the functional activity of adaptation processes, the need to operate with the concept of "functional diagnosis" increases. Functional diagnosis in modern medical theory is considered as an integral part of clinical diagnosis, in order to assess the recovery and rehabilitation capabilities of the patient. In functional medicine, functional diagnosis is a competent definition of mobile processes that characterize the phases of active work of excretory, restorative and other optimizing processes occurring at preclinical stages [7–10]. Work in the preclinical stages of the pathological process implies the absence of the possibility of using the classical methods of making a clinical diagnosis. There is a need to determine a substrate suitable for study, quantitative assessment,

As a possible numerical processing of the data obtained as a result of the study of the galvanic skin reaction in the process of computerized segmental bioelectronic functional diagnostics (device "IMEDISEXPERT", manufactured by LLC "CIMS" IMEDIS ", Moscow, Registration certificate No. FSR 2010/08232 dated July 09 2010) [4, 5].

Galvanic skin reaction is a phenomenon of electrical conduction

current by living tissues, which manifests itself in the form of a change in the potential difference between two areas of the skin.

The recorded reactions of skin potentials are in the form of biphasic oscillations. It is assumed that the negative phase is mainly associated with the activation of sympathetic endings in the skin, while the positive phase is associated with increased sweating in the skin. The general response is a complex reaction regulated at different levels of the central nervous system, in the autonomic centers, the hypothalamus with the participation of the limbic-reticular complex.

Galvanic skin response is recorded on the skin areas with sweat glands [3, 5]. Human skin has two types of glands: apocrine and eccrine. The eccrine glands are involved in the process of thermoregulation and emotional reaction. Eccrine glands are distributed practically over the entire surface of the body, with the exception of some areas, for example, the red border of the lips. Their density ranges from 600 per cm^2 on the palms, soles, face, in the armpits and up to 60 cm^2 on the back. The sweating centers are located in the spinal cord, and the higher centers are located in the medulla oblongata and diencephalon. The cerebral cortex has a regulating effect on sweating.

Both eccrine and apocrine sweat glands are innervated by postganglionic sympathetic fibers. For eccrine sweat glands, the main neurotransmitter is acetylcholine, and for apocrine sweat glands, catecholamines (adrenaline and norepinephrine). The innervation of the sweat glands of different parts of the body comes from different segments of the spinal cord. Face - T2-T4, arms T2-T8, torso - T4T12, legs - T10-L2.

Sweating in the palms and feet reacts primarily to emotional stimuli, while sweating in the armpits is also activated by thermoregulatory factors and emotions. It is assumed that the hypothalamus has a separate center that regulates sweating in the palms and feet. Unlike the main center of thermoregulation, this center is activated by signals emanating only from the cerebral cortex and not responding to changes in body temperature.

There are two types of reactions: phasic and tonic.

Phase is the response of the central nervous system to a short situational stimulus, which is called a reaction to novelty.

Over time, there is an addiction to the stimulus. This time is determined by the type of nervous activity and functional state.

A tonic response is a slow change in adaptation that characterizes a long-term steady state of some tension maintained in the ANS. The tonic reaction begins to turn on from 3 minutes of the stimulus action. In the tissues, the release of intercellular fluid is formed with the phenomena of some excess hydration of the underlying tissue layers. The speed of propagation of current conduction in the upper extremities is 154.9 cm / s, in the lower extremities - 71.6 cm / s. Thus, the basis for the occurrence of biofunctional reactions cannot be based only on metabolic processes, especially the function of sweat glands, since their excretory processes are too inert in comparison with

current conduction rate.

The response of living tissues to the conduction of current is a total biological response that characterizes the functional state of a large number of organs and tissues of the body. Morphological, biophysical, biochemical studies made it possible to develop a theory of skin potentials [5], according to which the appearance of an electric potential occurs due to an ionic sodium current in the zone of cell membranes at the border of various tissues.

It is understood that under the action of an electric potential from an external source, electric current through electrolytes is realized in the form of transfer (transport) of ions of different signs, corresponding to the sign of the potential on the electrode.

The method for the study of segmental bioelectronic diagnostics (SBPD) is based on the Feret method [5], which includes the study of ECP against the background of an external stimulus in the form of an electric current.

Thus, the biofunctional response is formed due to:

- perspiration regulated by the sympathetic nervous system, hypothalamus and limbic-reticular formation;
- intercellular fluid that reacts after some prolonged external influence as a response of the vascular system in the form of “squeezing out” a certain amount of liquid, which provides the possibility of ion flows;
- directly ionic fluxes formed due to polarization dipoles in tissues, mainly in the area of cell membranes.

It can be assumed that the phasic stage of the biofunctional response is a process of precession of regulatory systems in response to an unusual stimulus, while the tonic stage reflects the process of final tuning of regulatory systems in the proposed conditions.

In order to study both phasic and tonic reactions, we proposed a method for conducting a series of studies of SBPD. First, the SBS procedure is carried out, then the functional load is carried out for at least 20 minutes, after which the SBS procedure is repeated. The obtained data are examined for calculating the integral coefficient of instability (ICN) for each procedure, then ICN1 and ICN2 are compared in order to determine the vector of the result deviation. The results of the first study characterize the phasic response of the adaptive function. The results of the second study characterize the phase of adaptation tonic tension. Phase voltage indicators characterize autonomic reactivity. The parameters of tonic tension characterize the consistency of the vegetative support of activity. The saved adaptation function of the ANS is characterized by the parameters of the IQI, which lie in the corridor of normal values for both IQI 1 and IQN 2. In the process of analyzing the data obtained as a result of SBPD, the level of formation of the autonomic response is also investigated. The most informative data can be obtained from the segmental level of the autonomic response. With signs of a transition to the suprasegmental level, generalization of the autonomic response occurs, which indicates a non-optimal stereotype of response using the overwhelming majority of optimizing mechanisms with The most informative data can be obtained from the segmental level of the autonomic response. With signs of a transition to the suprasegmental level, generalization of the autonomic response occurs, which indicates a non-optimal stereotype of response using the overwhelming majority of optimizing mechanisms with The most informative data can be obtained from the segmental level of the autonomic response. With signs of a transition to the suprasegmental level, generalization of the autonomic response occurs, which indicates a non-optimal stereotype of response using the overwhelming majority of optimizing mechanisms with

further pronounced depletion of the adaptive function.

conclusions

The conducted study of SBPD allows us to propose a methodology as the main one for studying the activity and consistency of the adaptive function. The results obtained, with the calculation of the IQN, can be the basis for substantiating a functional diagnosis, which is the basis for:

- characteristics of the patient in the prenosological stage of the pathological process;
- selection of treatment and rehabilitation programs;
- monitoring of patients during treatment and recovery processes;
- predicting the outcome of a case.

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Author's address

Kirgizova N.S.

LLC "CIMS" IMEDIS "(Moscow)

kirgizova_07@mail.ru

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