Laboratory diagnosis of peripheral autonomic failure of various origins

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Primary forms of peripheral vegetative insufficiency are relatively rare. This group includes peripheral vegetative insufficiency associated with damage to segmental vegetative structures: sympathetic and parasympathetic nuclei, nodes, peripheral pre- and postganglionic fibers. In the clinical picture of the disease, there are signs of a decrease in the function of the autonomic nervous system, which manifests as cardiovascular, respiratory, genitourinary, gastrointestinal and some other disorders. Since the symptoms are non-specific, autoimmune forms of peripheral vegetative insufficiency are difficult to diagnose. The equipment and methods used in clinical laboratories do not provide reliable diagnostics. Therefore, the identification of new significant diagnostic markers of the diseases, including autoantibodies to acetylcholinesterase, α3-nicotinic acetylcholine receptor and β2-adrenergic receptors, the development on their basis of modern test systems and the introduction of these systems in the practice of neurological medical centers is an important task.

Keywords: autoimmune diseases, autonomic nervous system, western blot, ELISA, GnRH, α3-nAChR.

The damage to the autonomic (vegetative) nervous system forms a wide range of clinical manifestations in the form of impaired activity of the cardiovascular system, urogenital dysfunction, gastrointestinal motility disorders, and accommodation disturbances, excessive sweating, accompanied by general weakness and fatigue. The aetiology of peripheral autonomic failure is not known. The role of infections in the development of peripheral vegetative insufficiency (PVN) is very moderate. First of all, various endogenous — endocrine, systemic and metabolic diseases should be considered the causes of the dysfunction of the autonomic nervous system (ANS). Among secondary forms of autonomic dysfunction, the leading one is peripheral vegetative insufficiency in diabetes mellitus. With amyloidosis in 80 % of cases, symptoms of peripheral vegetative insufficiency are detected.

The diseases in which the symptoms of peripheral vegetative insufficiency are observed are quite fully reflected in its aetiological classification, and the symptoms of peripheral vegetative insufficiency significantly aggravate the course of the underlying disease.

Primary forms of peripheral vegetative insufficiency are relatively rare. This group includes peripheral vegetative insufficiency associated with autoimmune ganglionitis, which is found in humans and animals. Clinical manifestations of peripheral vegetative insufficiency, as a rule, are polysystemic and often quite non-specific. But there are also "monosymptomatic" cases. For example, disorders of the motility of the gastrointestinal tract (up to repeated unreasonable surgical interventions) associated with autoimmune damage to the molecular structures of the autonomic nervous system are often perceived by clinicians as irritable bowel syndrome or intestinal obstruction, and postural tachycardia due to autoimmune ganglionitis is clinically interpreted as a heart rhythm disorder associated with organic lesion of the conduction system of the heart. In the pathogenesis of peripheral vegetative insufficiency, the main part belongs to violation of the autonomic (sympathetic either parasympathetic) innervation of organs and tissues, due to organic damage to segmental vegetative structures: sympathetic and parasympathetic nuclei, nodes, peripheral pre- and postganglionic fibers. The mortality in patients with peripheral vegetative insufficiency of autoimmune genesis depends on untimely diagnosis and the wrong choice of treatment. The exacerbations of the disease are usually associated with insufficient immunosuppressive therapy. The equipment and methods used in clinical diagnostic laboratories do not provide reliable diagnostics and reliable estimates of the effectiveness of the treatment process. Therefore, the identification of new diagnostic and pathogenetically significant markers of peripheral vegetative insufficiency, the development on their basis of modern test systems and the introduction of these systems in the practice of neurological medical centers is an important task, the implementation of which requires combining the potential of innovative methods of fundamental science and the experience of clinical neurologists in conducting modern translational research [1; 2]. The standard determination of the titer of antibodies to α3-nAChR by the radioligand method, conducted at the Mayo Clinic (USA) since 2005, showed its diagnostic significance in patients with autonomous autoimmune gangliopathy. There is a direct correlation between the titer of autoantibodies to α3-nAChR and the severity of dysautonomy in the experiment and in patients with this kind of pathology [3; 4]. Antibody titer to α3-nAChR is high in cases of pandysautonomy and significantly lower in syndromes of selective dysautonomy [3]. However, the detection of an increase in the titer of antibodies to α3-nAChR only in 30-50 % of patients with autonomous autoimmune neuropathy does not allow to exclude the role in the development of this disease of antibodies to other autonomic ganglia antigens. In the experiment and clinic, dysautonomy is formed in the presence of antibodies to acetylcholinesterase and β2-adrenergic receptors (β2-AR) [5; 6]. There is no accurate data on the prevalence of primary forms of peripheral autonomic failure, but it is known that they are relatively infrequent. In the clinical picture of peripheral autonomic insufficiency, there are signs of a violation (decrease) in the function of the autonomic nervous system, which is manifested by cardiovascular, respiratory, genitourinary, gastrointestinal and some other disorders, which can be observed in various combinations of pathological signs and can be of varying severity. The clinical manifestations of peripheral vegetative insufficiency are polysystemic and often non-specific. Gastrointestinal motility disorders associated with autoimmune damage to the autonomic nervous system molecular structures are difficult to diagnose.

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