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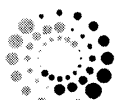
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## THE INDICATORS OF STIMULATION ELECTRONEUROMYOGRAPHY IN PATIENTS WITH DIABETIC POLYNEUROPATHY

**Abstract** The work is dedicated to researching of the effect of cocarnit on the functional state of the peripheral nerves based on the findings of stimulation electroneuromyography in multimodality treatment of diabetic polyneuropathy. The most positive influence on the amplitude of M-response of the nerves of the upper and lower extremities has been detected in case of use of cocarnit in comparison with the basic treatment.

**Key words:** peripheral nerves, diabetic polyneuropathy, cocarnit.

**Introduction.** The clinical manifestations of diabetic neuropathy (DPN) are very diverse and occur in practice of specialists in various profiles. It is known that diabetic polyneuropathy increases the danger of amputation by 1.7 times, the danger of feet deformation by 12 times, and the danger of feet ulcers by 39 times. A significant prevalence of this pathology determines the importance of practical and theoretical perspectives. The most informative method of diagnosing lesions of the peripheral nervous system in patients with DPN is electroneuromyography. It is registration of oscillations of electric potentials in skeletal muscles that allows to examine the state of peripheral lesions of neuromotor apparatus effectively. Thus, when using this method, lesions detection frequency of functions of peripheral nerves increases up to 70-90%.

**Objective:** prove the expediency of application of cocarnit (CDF) in treatment of patients with DPN, depending on the duration of diabetes by studying the functional state of peripheral nerves according to finding of stimulation electroneuromyography. Examine the indicators of stimulation electroneuromyography in patients with DPN, depending on the duration of diabetes mellitus before and after treatment.

**Materials and methods.** We explored 86 patients with type II diabetes mellitus who were hospitalized in Chernivtsi Regional Clinical Endocrinological Dispensary. Among the patients there were 36 women and 50 men; the age of the patients ranged from 36 to 65 years. Diabetes

mellitus (DM) of moderate severity was observed in 82 patients, 4 patients were in a critical state; 12 patients were in position to compensate for the disease, 74 patients had subcompensation. Patients were divided into 3 groups: Gr.1 - patients who had diabetes up to 1 year (29 patients);

Gr.2- patients with diabetes up to 10 years (30 patients); Gr.3 - patients with diabetes for over 10 years (27 patients). Additionally patients were divided into two subgroups. Subgroup I - patients who have received basic therapy that included Diet number 9, maninil to 5 mg twice daily or insulin (2/3 of daily dose in the morning and 1/3 of dose in the evening, the rate of 0.7 - 1.0 U / kg body weight), pentoxifylline intravenously 5 ml per 250 ml isotonic sodium chloride, vitamin B (42 patients). Subgroup II - patients that along with basic treatment received CDF (1 ampoule intramuscularly 1 time per day for two weeks) (44 patients). The control group consisted of 20 healthy individuals. The study of the functional state of peripheral nerves was performed by stimulation electroneuromyography (ENMG) on the apparatus Neuro-refraction-4 (Neurosoft, Russia).

**Results and their discussion.** Determine the amplitude of M-response of peripheral nerves of upper extremities through stimulation ENMG.

While assessing the dynamics of the M-response amplitude n. medianus it was found out that group 1 patients with diabetes duration up to 1 year M-response amplitude n. medianus tended

to decrease by 24.3% compared with the control. Amplitude decreases with increasing of disease duration. Thus, in the second group of patients, M- response amplitude decreased by 28.1%, and the patients who had diabetes for over 10 years showed decrease of M- response amplitude n. medianus by 32% compared to the control ( $p < 0.05$ ), indicating the axonal lesions of peripheral nerves. Patients of group 1 manifested increase of M- response amplitude after basic treatment by 7%; after additional prescription of CDF along with the basic therapy M-response amplitude n. medianus significantly increased by 20.5%. In the second group, M-response amplitude n. medianus almost did not change after basic treatment (by 0.82%); after additional prescription of CDF there was a tendency to increase by 17.1% ( $p > 0.05$ ). In the third group of patients, a slight increase in the amplitude of M-response by 3.4% ( $p > 0.05$ ) was noted after basic treatment; after the additional appointments of CDF M-response amplitude increased by 20.2% ( $p > 0.05$ ).

We investigated the indicators of M-response amplitude n. ulnaris (m. abductor digiti minimi) before and after the conducted treatment in diabetic patients with DPN. In group 1 patients with diabetes up to 1 year, decrease in M-response amplitude n. ulnaris by 18.1% was noted compared to the control ( $p > 0.05$ ). Amplitude decreases with increasing of disease duration. Thus, in the second group of patients M-response amplitude decreased by 26.3% ( $p > 0.05$ ), and patients with diabetes over 10 years showed likely decrease in the M-response amplitude n. medianus by 29.2% compared with the control. Thus, even in patients with diabetes up to 1 year decrease in the amplitude of M-response was noted, indicating a predominantly axonal lesion of peripheral nerves. M-response amplitude decreases depending on the duration of diabetes.

When conducting ENMG research in the dynamics it was found out that group 1 patients had an increase in the amplitude of M-response after basic treatment by 1.57% (i.e. amplitude almost did not change); after the additional prescription of CDF it increased by 13.4% ( $p > 0.05$ ). In patients with diabetes up to 10 years a slight increase by 6.8% in the amplitude of M-response after basic treatment was noted; after the additional prescription of CDF it rose 23.5% ( $p < 0.05$ ). In the third group of patients after basic treatment there was a tendency to increase the

amplitude of M- response by 6.1%; after additional appointments of CDF it increased by 17.0% ( $p > 0.05$ ). Thus, patients of all three groups manifested decrease in the amplitude of M-response, which depended on the duration of diabetes. After basic treatment, M-response amplitude n. ulnaris almost did not change in group 1 and tended to increase in the second and third groups of patients ( $p > 0.05$ ). Patients of the first and the second groups who along with the basic treatment received CDF had significant increase of the amplitude of M- response n. ulnaris compared with patients before treatment. In the third group of patients who received CDF, a tendency to increase the amplitude of the M-response was observed ( $p > 0.05$ ).

We determined indicators of M-response amplitude n. tibialis (m. abductor hallucis). In group 1 patients with diabetes up to 1 year decrease in M-response amplitude n. tibialis by 21.5% was noted compared to the control ( $p < 0.05$ ). Amplitude decreases with increasing of disease duration. Thus, in the second group of patients the amplitude of M -response decreased by 38.6% ( $p < 0.05$ ) and in patients with diabetes over 10 years a likely decrease in the amplitude M-response n. tibialis by 54.0% was noted compared with the control.

Thus, even the patients with duration of diabetes up to 1 year had decrease in the amplitude of M-response n. tibialis, which indicates axonal lesions of peripheral nerves. M-response amplitude decreases depending on the duration of diabetes.

Patients of group 1 had an increase in the amplitude of M- response n. tibialis after basic treatment by 2.6% ( $p > 0.05$ ); after the additional prescription of CDF it increased by 20.7% ( $p < 0.05$ ). In the second group a slight increase by 9.6% ( $p > 0.05$ ) in the amplitude of M -response was noted after basic treatment; after additional appointments of CDF it was by 34.0% ( $p < 0.05$ ). Patients with diabetes over 10 years only manifested a tendency to increase the amplitude of M- response after basic treatment by 6.8%; after additional appointments of CDF it increased by 36.1% ( $p > 0.05$ ). Thus, after basic treatment in all three groups, a significant increase of the amplitude of M-response n. tibialis was observed. Patients of the first and the second groups, who along with the basic treatment received CDF, had an increase of the amplitude of M-response n.

tibialis.

We estimated the dynamics of amplitude of M-response n. peroneus (m. extensor digitorum brevis). The results of the study show that patients from group 1 with diabetes up to 1 year had a decrease in the amplitude of M-response by 33.5% ( $p > 0.05$ ) compared with the control. Amplitude decreases with increasing of disease duration. Thus, in the second group of patients, the amplitude of M-response significantly decreased by 42.9%, and in patients with diabetes duration of more than 10 years a decrease in the amplitude M-response n. peroneus by 46.0% was noted compared to control ( $p < 0.05$ ). In group 1 patients after basic treatment had a slight increase in the amplitude of M-response n. peroneus by 3.1% ( $p > 0.05$ ); after the additional prescription of CDF – by 28.1% ( $p < 0.05$ ). In the second group a slight increase by 7.98% ( $p > 0.05$ ) in the amplitude of M-response after basic treatment was noted; after the additional prescription of CDF – by 30.7% ( $p < 0.05$ ). Patients with diabetes duration of more than 10 years manifested a marginal increase of the amplitude of M-response after basic treatment by 3.4% ( $p > 0.05$ ); after the addition of CDF- by 20.2% ( $p > 0.05$ ). Thus, patients of the first and the second groups, who in addition to background of the basic treatment received CDF, had a considerable increase in the amplitude of M-response n. peroneus.

**Conclusions.** 1. Reduction of the amplitude of the M-response of nerves of upper and lower extremities is observed in the majority of patients of I, II groups and all patients of III group.

2. Under the influence of basic treatment M-response amplitude increases insignificantly. After the addition of Cocarnit a considerable

increase in the amplitude of M-response in patients I and II groups was noted.

Thus, as a result of instrumental studies it has been found out that even patients with diabetes at an early stage manifest significant changes of neuromotor peripheral apparatus. They are shown by a decrease in the amplitude of M-response. The severity and nature of these changes characterize the severity of the pathological process. This demonstrates a high diagnostic value of ENMG and the need to include it in a complex examination of patients with DPN. Severity detected is largely determined by the initial state of the neuromotor system depending on the duration and severity of diabetes. All this suggests the need for medical activities at an earlier stage of disease, before the development of severe structural changes in the peripheral nerves.

Further research in this area will significantly improve the treatment of patients with diabetes complicated by polyneuropathy, taking into account the duration of the underlying disease.

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## CONTENT:

Yasnikovska S.M. Peculiarities of pregnancy progress in women with corrected isthmic-cervical incompetence	3
Shkolnikov V.S., Zalevskiy L.L., Zalevska I.V. Structural organization of the cerebellum of 17-18 week human fetuses during intrauterine development	5
Khmara T.V., Okrim I.I., Biriuk I.G., Komar T.V., Khmara A.B. The specialization degree of wood-destroying basidial fungi on trees in samur-davachi lowland forests of azerbaijan	10
Tkachenko P.V. Clinical-morphological prognostic characteristics of prostate cancer	14
Sasina O.S. Psychohygienic aspects of training of disabled adolescents with pathology of the vision (literature review)	19
Banul B.Yu. Development of paramesonephric ducts and their derivatives at the end of embryonic period of human ontogenesis	23
Niankovskiy S.L., Gorodylovska M.I. Heterogeneity of esophagitis in schoolchildren	26
Yevtushenko I.Y., Padalitsa M.A., Goryainova G.V. Age features of cervical arch and height of human renal calyces in mature and elderly ages	32
Vepruk Y., Rohovyy Y., Tovkach Y., Rykhlo I. Characteristic of aluminum salts influence on indexes of ion regulative renal function in mature and immature rats against the background of the pineal gland hyperfunction	35
Zakharchuk O.I., Kryvchanska M.I. Chronoregulating and rhythm-stabilizing role of melatonin in seasonal structure of circadian rhythms of non-specific immunity indices with aging	38
Kachko G.O., Omelchenko E.M., Pedan L.R., Polka O.O. Characteristics of congenital pathology with inherited and multifactorial nature in children of Kyiv region	41
Kosilova S.Y. Metabolic disorders in women depending on menopause duration	44
Kotelban A.V., Godovanets O.I., Burdeniuk I.P. Peculiarities of administration of antiseptic drugs in children suffering from chronic catarrhal gingivitis under conditions of diabetes mellitus	47
Reshetilova N.B., Navarchuk N.M., Popeliuk O.-M.V., Glubochenko O.V., Kulish N.M. Topographic peculiarities of the anterior cerebral vesicle on the 4th week of the embryonic period	51
Fik V.B., Paltov Y.V., Lohash M.V., Kryvko Y.Y. Peculiarities of morphological manifestation of the periodontal tissue in experimental animals against the ground of a short-term effect of opioid analgesic	54
Khomenko V.G. Renal tissue fibrinolysis against the ground of stress and xenobiotics	59
Dudenko V.G., Vdovychenko V.Yu., Kurinnoy V.V. Spatial topography of the diaphragm in the sagittal plane in women	61
Avdieyev Oлександр, Dziubak Sergii Epidemiological analysis of dental diseases among individuals exposed to unfavourable psychoemotional surroundings	65
Andriets M. M., Andriets V.I. Psychological aspects of physical culture and sport	68
Malanchuk L.M., Kryvytska G.O. Renal tissue fibrinolysis against the ground of stress and xenobiotics	71
Bambuliak A.V., Galagdina A.A., Boychuk O.M. Diagnostics of the frontal sinus development with adjacent structures in the prenatal period of human ontogenesis	73
Kryvetskiy V.V., Narsiya V.I., Kryvetskiy I.V. Blood supply of the cervical region of the vertebral column during the fetal period and in newborns	76
Pavlovych L.B., Bilous I.I. The indicators of stimulation electroneuromyography in patients with diabetic polyneuropathy	80