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Research Article

Efficiency of Application of Interference Therapy in Complex with Pyrimidine Nucleotides in Patients with Vertebrogenic Radiculopathy

SG Huseynova*, SS Imamverdiyeva, EE Mustafayeva, MY Mammadova and KN Yusifova

Research Institute of Medical Rehabilitation, Baku, Azerbaijan

***Corresponding Author:** SG Huseynova, Head of the Clinical and Neurophysiological Laboratory, Research Institute of Medical Rehabilitation, Baku, Azerbaijan.

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Abstract

Clinical-neurophysiological bases of the combined use of Nucleo CMP forte preparation and interference therapy in the complex treatment of patients with vertebrogenic radiculopathies were studied. The beneficial effect of this therapeutic complex on the clinical course of the disease, more pronounced analgesic effect and regression of clinical manifestations, as well as improvement of quality of life indicators were proved. It has been established that the therapeutic effect of the complex application of Nucleo CMP forte and interference therapy lies in the improvement in the afferent and efferent links of the neuromotor apparatus, as well as the functional state of the spinal alpha-motoneurons associated with the acceleration of the regenerative processes. Activation of regenerative processes can also be associated with the restoration of certain morphological elements of the nervous system under the action of Nucleo CMP forte, as well as the normalization of the synthesis of complex lipids involved in cellular metabolism and synthesis of substances for the structural restoration of peripheral nerves. Carrying out neurotropic pharmacotherapy in combination with physiotherapy helps optimize therapeutic tactics in patients with vertebrogenic radiculopathies and is aimed at improving the quality of treatment, reducing the using of number of non-steroidal anti-inflammatory drugs and the frequency of relapse of the disease, and improving the quality of life of patients.

Keywords: Interference Therapy; Pyrimidine Nucleotides; Nucleo CMP Forte; Vertebrogenic Radiculopathy; Electroneuromyography

Introduction

Vertebrogenic pain syndromes take one of the leading positions all over the world both for prevalence rate and disability period caused by this problem. The most common type of vertebrogenic pain syndromes is a disk syndrome, characterized by pain, motor and vegetative disturbances, arising out of spinal nerve root lesion. The main factors contributing to this problem are degenerative dystrophic pathology of spinal column - osteochondrosis of intervertebral disc, spondyloarthrosis deformans, diskal hernia, also traumas, inflammation of vertebral column and surrounding spinal roots of tissues. Different factors contribute to the development of degenerative and dystrophic diseases of spinal column: genetic predisposition with dysraphic lines in the structure of vertebrae, physical stress on spinal column (weight lifting, abrupt movement, being in an unfavourable position for a long period of time, etc.), intoxication, metabolic disturbance of vertebrae with osteoporosis (hormonal spondylopathy), etc. Under the impact of these factors a number of pathogenetic conflicts appear in the segment of damaged disc (radicular-disc, vascular-disc, medullar-disc, venous-disc, cerebrospinal fluid-disc, vegetative-disc), which cause development of neurological symptoms of degenerative dystrophic pathologies of spinal column [1-5].

The main source of pain is a pathological painful impulsation originating from nerve roots and spinal ganglions, intervertebral discs, vertebrae, pachymeninx, also from joint capsules, ligamentum, fascia and muscles. Pathological changes caused by degenerative dystrophic processes first contribute to the development of reflexive changes in spasmodic muscles, reducing of excitability threshold of afferent element and formation of a pain trigger which result in deeper changes of peripheral nerve, their demyelination and axonopathy by applying a vicious loop for control of pain. The following factors also contribute to the development or

aggravation of vertebrogenic radiculopathy: overcooling, physical overstressing, stress situation, microtrauma, etc.

Conservative treatment, including medicines and physiotherapeutic means is targeted at reducing of a pain syndrome, edema and root compression, also improving feeding of nerve tissues and nerve conduction. However, due to the complexity of pathogenesis of discogenic radiculopathies and development of structural changes in compressed roots (by the type of axonopathy and myelinopathy), traditionally applied types of conservative therapy are not always effective. Lasting pain and residual effects are observed which are expressed in sensory, vegetative and motor disorders. At present time there are many active components which affect the level of peripheral nerves and roots contributing to their physiological regeneration. The use of physiological pyrimidine nucleotides is becoming a more important therapeutic method in the treatment of peripheral nerve system (PNS) diseases. Recent studies have demonstrated apparent increase in the demand for pyrimidine nucleotides in the injuries of peripheral nerves [6]. It was also proved, that the use of uridine triphosphate and cytidine monophosphate nucleotides significantly accelerates regeneration of nerve tracts after traumatic destruction of tissues [7,8], affects nucleic acid synthesis in medullary sheath, also energy producing metabolic pathways. Nerve cells cannot synthesize these nucleotides, as they do not possess the relevant enzyme reserve. Therefore, in particular during high demand periods these cells depend on ectogenous delivery of pyrimidine nucleotides.

Clinical studies have demonstrated, that the use of Nucleo CMP forte which is one of the preparations containing pyrimidine nucleotides does not have any side effects and contraindications and its following economic advantages have been proven: the use of Nucleo CMP forte in patients with PNS pathologies allows to reduce the use of analgetic means and nonsteroidal anti-inflammatory drugs, also reduce the period of disability. The literature contains information on the use of preparations containing pyrimidine nucleotides in the treatment of patients with degenerative-dystrophic pathology of spinal column. Clinical studies have shown [6,9], that the use of pyrimidine nucleotides in patients with degenerative dystrophic changes of spinal column, also in lumbal and cervical syndromes positively effects a pain syndrome and other signs of a disease. Pyrimidine nucleotides are also applied in the neurosurgery.

Physical treatment methods play a significant role in the treatment of PNS diseases. These include in particular treatment by impulse current [1,10,11], such as interference therapy (IT), which easily enter the body with the least resistance without irritating skin receptors and unpleasant feeling during procedure. Their irritating effect develops deep in the tissues, where low frequency current generates as a result of interference. The effect of IT is based on short-term changes of ion environment of tissues, in particular in cell membranes and other semi conductive membranes, which excite the cells and increase their specific activity. This excitement covers the nerves and muscle fibers during the influence of maximum current amplitude, induces rhythmical motor excitement of muscle fibers and proprioceptors. The main treatment effect of IT is expressed in the improvement of peripheral blood circulation. Interference therapy also bears trophic and regenerative effects, analgesic endpoint, which is conditioned by peripheral blocking of transmission of pain impulsing and suppression of impulse activity of nonmedullated C-fibers and vegetative ganglions. Analgetic action of IT also results from blood circulation improvement, elimination of hypoxia and reducing of tissue oedema. These processes form the basis of current stimulation of peripheral nerve regeneration and improvement of functional state of muscles.

The described properties of the active components of Nucleo CMP forte and IT which act at the level of peripheral nerves and contribute to physiological regeneration of these structures allow to apply them in combination for treatment of patients suffering from vertebrogenic radiculopathy (VR). Combined use of pyrimidine nucleotides and physiotherapeutical method is aimed at correction of the main symptoms of disease, elimination of pain and recovery of the functions of nerves.

To that end, the main purpose of the study vas a clinical neurophysiological substantiation of combined use of Nucleo CMP forte and IT in the complex treatment of patients with vertebrogenic radiculopathy.

Materials and Methods of the Study

60 patients suffering from VR were under observation, where VR developed in the setting of osteochondrosis of spinal column. The criteria for inclusion of patients in the study: age up to 70, radicular syndrome with compression one or several roots, osteochondrosis of spinal column, confirmed MRT (protrusion or hernia), mild or severe level of clinical signs, absence of diabetes and atherosclerosis of the vessels of lower extremities. The criteria for exclusion of patients from the study: age above 70 years, presence of spinal syndromes in the setting of osteochondrosis of spinal column, diabetes and atherosclerosis of the vessels of lower extremities.

According to the protocols, all patients underwent general clinical and neurological examination, MPT of lumbar vertebra (to confirm presence of disc hernia, to identify its size and localization, also to identify compression of roots and dural sack). To assess the efficiency of conducted treatment, the following rating scales and study methods were used: 1) assessment of the degree of manifestation of pain syndrome by visual and analogue scale (VAS); 2) assessment of the dynamics of pain syndrome by calculation of Pain Index [12]; 3) assessment of life quality by the questionnaire "Change of life quality as a result of disease" [13]; 4) questionnaire for patients suffering from pain in the lumbar area and lower extremities [14].

Alongside with the described methods, electroneuromyographic (ENMG) studies were also conducted to find out the followings: 1) conduction velocity of impulses on motor fibers (CVIeff) of fibular nerve and tibial nerve, also M-response parameters (amplitude, area, latency, duration); 2) conduction velocity of impulses on sensory fibers (CVIaff) and parameters of nerve action potential; 3) registration of monosynaptic H-reflex with salens muscle (SM).

All patients were divided into two groups. Patients in the first group (40 patients) received IT in complex with i/m injection of Nucleo CMP forte for 15 days, then took capsules of the same preparation orally (1capsule twice in a day) for 1 month. Patients of the second group (20 persons) received only IT from the device Superkayn (Japan) paravertebrally at the waist section of spinal column, the relevant lower extremity for 15 days. All clinical and paraclinical studies were conducted before treatment, on the 15th day of the treatment and at the end of the treatment.

Results and Discussions

60 patients suffering from VR with the duration of disease of 1 - 3 weeks, aged from 29 to 56 were under observation. In all observed patients nerve root syndrome was seen in the form of a monoradicular syndrome - in 45 patients (L5 root - in 21 patients, S1 root - in 24 patients) and biradicular syndrome - in 15 patients (L5 and S1 roots). In 25 patients nerve root syndrome was right-sided and in 29 patients - left-sided. In 6 patients it was two-sided.

The analysis of the results of conducted visualized studies have shown presence of spinal disc hernia in 24 patients and spinal disc protrusion in 34 patients. More frequent disc hernia were identified at the level L4 - L5 (in 14 (23,3%) patients), less frequent at L5 - S1 (in 6 (10%) patients). Simultaneous presence of hernia at both levels (L4 - L5 and L5 - S1) was seen in 4 patients (6,7%). Patients with protrusions were classified in the following way depending on the level of lesion: at the level L4 - L5 - 10 (16,7%), L5 - S1 - 14 (23,3%) and simultaneously at the levels L4 - L5 and L5 - S1 - 10 (16,7%) patients.

The main symptoms in the observed patients were pain in the lumbar and lumbosacral area, in the majority of cases pain was extending into lower extremities. Severe pain syndrome was observed in 10 patients (16,7%), moderate - in 38 (63,3%) and mild pain syndrome in 12 (20%) patients.

Disorder of the biomechanics of spinal column statics was frequently observed. The change of spinal column configuration was expressed by straightening of lumbar lordosis (36%), hyperlordosis (3%), scoliosis (57,5% of patients). Straining of psoas muscle was identified in 69,7% of patients. In the majority of patients (88,7%) restriction of movement was observed on the waist in spinal column, mainly when leaning forward and turning to the sides.

Hypotrophy and hypotony of shin muscles were observed in 57,5% of patients. Root-type sensory disorders as a rule, were seen in the injured side. Various types of paresthesia were seen in 17 patients. All patients had symptoms of straining, evidence of which was dependent on pain syndrome intensity. Pain syndrome intensity on a visual analogue scale was 4,65 ± 0, 3 sм and was characterized by moderate pain syndrome. Pain index calculated upon the scale [12], before the treatment raised (18,5 ± 2,5) and was dependent upon duration of pain syndrome, its localization and influence on labor activity of patients.

The described neurological disorders significantly affected patients' quality of life (Table 1). According to the questionnaire [14], life quality (LQ) was reduced in the patients who experienced restrictions in a daily life in connection with pain in "weight lifting", "walking", "sitting", "standing", "hiking", "social life". Integral indicator of LQ was 21,4 ± 0,8 points on average and correlated with pain syndrome intensity.

Conducted treatment contributed to reduction of pain syndrome intensity and regress of neurological symptoms. Pain syndrome intensity reduced in both groups: in the first group from 4,65 ± 0,3см to 1,9 ± 0,35 sм ($p < 0,001$), in the second group from 4,70 ± 0,35 sm to 2,75 ± 0,41 sm. More significant regress of pain syndrome was observed in the first group of patients, which was expressed by significant reduction of pain index in this group both after the first (from 18,4 ± 1,5 points to 9,4 ± 0,9 points) and second (from 9,4 ± 0,9 to 5,25 ± 0,8 points) steps of treatment. Besides, pain irradiation area, duration was restricted, which contributed to improvement of patients' labor activity. Pain reduction also

contributed to reducing of static and dynamic disorders, scoliosis, muscle rigidity, increased range of motion on the waist of spinal column, improved walking, reduction of hypesthesia area. It should be stated, that described changes were more significant in the first group of patients, in particular after second step of treatment. The expressiveness of Lasegue Sign was reduced. After the treatment pain onset angle was 65, 9 ± 2,1° in the first group and -74,5 ± 1,9° in the second group.

Groups	1st group (p = 40)			2nd group (p = 20)	
Steps of treatment / Indicators	Before treatment	After the 1st step	After the 2nd step	Before treatment	After treatment
1. Pain intensity	1,2 ± 0,1	0,66 ± 0,08	0,34 ± -,07*	0,9 ± 0,15	0,6 ± 0,11
2. Self-care	1,58 ± 0,05	1,18 ± 0,11*	0,83 ± 0,10***	1,8 ± 0,10	1,3 ± 0,11
3. Weight lifting	3,05 ± 0,10	2,55 ± 0,11	2,14 ± 0,17*	2,7 ± 0,15	2,2 ± 0,17
4. Walking	2,25 ± 0,13	1,61 ± 0,11*	1,0 ± 0,10**	2,1 ± 0,15	1,6 ± 0,2
5. Sitting	2,63 ± 0,13	1,82 ± 0,13*	1,07 ± 0,14*	1,8 ± 0,2	1,3 ± 0,17
6. Standing	2,80 ± 0,11	2,21 ± 0,11*	1,59 ± 0,14***	2,5 ± 0,15	1,9 ± 0,17
7. Sleeping	0,38 ± 0,08	0,18 ± 0,08	0,21 ± 0,10	0,3 ± 0,05	0,3 ± 0,06
8. Sexual life	2,88 ± 0,13	2,47 ± 0,17	2,09 ± 0,22	2,7 ± 0,15	2,1 ± 0,17
9. Social life	2,58 ± 0,08	2,08 ± 0,11	1,34 ± 0,14***	2,0 ± 0,1	1,6 ± 0,17
10. Travelling	2,65 ± 0,10	1,92 ± 0,13	1,28 ± 0,14***	2,0 ± 0,15	1,6 ± 0,17
LQ index	21,40 ± 0,80	16,16 ± 0,87***	11,07 ± 1,10***	17,6 ± 1,48	13,6 ± 1,37*

Table 1: The dynamics of life quality indicators of patients as a result of treatment.

Note: 1. p- number of examined patients; 2. p- significance of differences; *- significance of differences is estimated in relation to initial condition: *- p < 0,05; **- p < 0,01; ***- p < 0,001.

Pain syndrome regress contributed to the improvement of LQ in observed patients. More significant positive dynamics was seen in the indicators of daily life activities and physical activity of patients. As we see from table 1, highly reliable dynamics of LQ indicators was observed in the first group of patients, mainly after the second step of the treatment. Integral indicator of LQ significantly reduced by the end of the treatment course: from 21,40 ± 0,80 points to 11,07 ± 1,10 points (p < 0,001) in the first group of patients and from 17,6 ± 1,48 points to 13,6 ± 1,37 points (p < 0,05) - in the second group of patients.

Electroneuromyography studies conducted prior to the treatment revealed non-intense changes of the main indicators depending on the lesion of the roots (Tables 2 and 3). In the patients with monoradicular syndromes of the roots L5 and S1, significant changes were not observed in the indicators of ENMQ (latency, amplitude, M-response area, conduction velocity) during examination of fibular nerve. In these circumstances extension of M-response latency and CVIeff reduction were observed in the examination of tibial nerve. Alongside with the described changes, extension of nerve potential latency and reduction of amplitude were also observed in the patients with injured S1 root in the examination of sensitive fibers of sural nerve (Table 4).

Roots Indices Nerves	L_V root				S_1 root			
	M-response (amplitude, mV)		CVI_{eff}, (m/s)		M-response (amplitude, mV)		CVI_{eff}, (m/s)	
Therapeutic stages	Nerves							
	n. peroneus, n = 20	*n. tibialis* n = 20	*n. peroneus* n = 20	*n. tibialis* n = 20	*n. peroneus* n = 26	*n. tibialis* n = 27	*n. peroneus* n = 26	*n. tibialis* n = 27
Control	5,1 ± 1,0	5,8 ± 1,9	48,3 ± 1,9	48,5 ± 1,6				
Before treatment	5,8 ± 0,8	9,0 ± 1,1	49,8 ± 1,0	43,6 ± 1,1	7,0 ± 0,8	9,3 ± 0,8	52,0 ± 0,9	44,9 ± 0,5
	6,2 ± 0,9	8,4 ± 1,4	50,9 ± 1,8	44,6 ± 1,2	7,3 ± 0,8	8,0 ± 0,9	54,1 ± 1,6	46,8 ± 0,7
After the I stage	6,0 ± 0,8	10,3 ± 1,5	50,8 ± 1,4	45,5 ± 0,9	7,0 ± 0,9	9,0 ± 0,8	54,4 ± 1,2*	45,7 ± 0,5
	8,1 ± 1,3	10,2 ± 1,8	51,5 ± 1,3	46,1 ± 1,3	7,9 ± 0,9	9,6 ± 1,1	53,8 ± 0,9	47,8 ± 0,8
After the II stage	5,6 ± 0,7	8,9 ± 1,6	53,5 ± 1,5*	46,7 ± 1,3*	6,6 ± 0,9	8,9 ± 1,1	53,8 ± 1,0*	47,8 ± 0,5**
	7,0 ± 1,1	9,1 ± 1,6	53,0 ± 2,4	44,9 ± 2,2	7,7 ± 1,0	9,4 ± 1,2	55,4 ± 1,3	46,7 ± 1,2

Table 2: Dynamics ENMQ Indices along the efferent fibres (1st group).

Note: 1. On numerator - indices of injured partitions; on denominator - indices of intact partitions; 2. n -number of examined patients; 3. p - precision index; * - precision indices calculated in comparison with the indices before the treatment : *- p < 0,05; **- p < 0,01.

Roots Indices Nerves	L_V root				S_1 root			
	M-response (amplitude, mV)		CVI_{eff}, (m/s)		M-response (amplitude, mV)		CVI_{eff}, (m/s)	
Therapeutic stages	**Nerves**							
	n. peroneus **n = 16**	***n. tibialis*** **n = 17**	***n. peroneus*** **n = 17**	***n. tibialis*** **n = 17**	***n. peroneus*** **n = 26**	***n. tibialis*** **n = 11**	***n. peroneus*** **n = 26**	***n. tibialis*** **n = 11**
Control	5,1 ± 1,0	5,8 ± 1,9	48,3 ± 1,9	48,5 ± 1,6				
Before treatment	7,5 ± 1,1 9,6 ± 0,9	10,4 ± 0,9 12,1 ± 1,4	52,2 ± 1,0 51,9 ± 1,1	45,9 ± 0,7 47,1 ± 1,4	7,9 ± 1,0 7,6 ± 1,0	10,3 ± 0,9 8,7 ± 1,2	51,5 ± 0,7 52,4 ± 1,0	45,9 ± 1,0 47,7 ± 1,5
After treatment	9,1 ± 1,3 9,6 ± 1,0	11,0 ± 1,0 13,4 ± 1,2	53,6 ± 1,1 53,4 ± 1,2	48,4 ± 1,1* 49,8 ± 1,0	9,3 ± 1,0 7,7 ± 0,8	10,0 ± 1,0 11,3 ± 0,9	54,6 ± 1,0* 54,0 ± 1,2	46,0 ± 1,4 48,3 ± 2,5

Table 3: Dynamics ENMQ Indices along the efferent fibres (2nd group).

Note: 1. On numerator - indices of injured partitions; on denominator - indices of intact partitions; 2. n -number of examined patients; 3. p - precision index; * - precision indices calculated in comparison with the indices before the treatment : * - $p < 0,05$.

Roots Indices	L_V root		S_1 root	
Therapeutic stages	**amplitude, cV**	**CVI_{aff}, m/s**	**amplitude, cV**	**CVI_{aff}, m/s**
Control	21,9 ± 8,5	45,8 ± 6,3		
1st group	n = 14	n = 14	n = 23	n = 23
Before treatment	16,4 ± 1,5 15,2 ± 2,2	52,1 ± 2,0 51,4 ± 2,6	17,2 ± 1,4 20,3 ± 2,0	53,0 ± 1,5 52,7 ± 1,6
After the I stage	16,2 ± 2,4 16,5 ± 2,0	58,1 ± 3,3* 56,4 ± 2,2	18,6 ± 1,6 20,3 ± 2,2	58,7 ± 1,7* 59,0 ± 1,8*
After the II stage	17,6 ± 2,7 16,9 ± 2,9	57,1 ± 3,4* 53,4 ± 4,4	21,6 ± 2,1* 22,6 ± 4,1	57,1 ± 1,4* 58,0 ± 1,4*
2nd group	n = 12	n = 12	n = 10	n = 8
Before treatment	20,8 ± 3,8 20,2 ± 2,9	57,3 ± 3,4 55,3 ± 1,9	20,0 ± 1,9 14,8 ± 1,1	62,8 ± 4,2 57,8 ± 2,4
After treatment	25,1 ± 5,2 23,4 ± 4,3	60,8 ± 2,9 66,3 ± 4,9*	24,4 ± 5,5 18,9 ± 4,8	58,6 ± 2,7 64,1 ± 5,5

Table 4: Dynamics of ENMG Indices along the afferent fibres on n. suralis.

Note: 1. On numerator - indices of injured partitions; on denominator - indices of intact partitions; 2. n -number of examined patients; 3. p - precision index; * - precision indices calculated in comparison with the indices before the treatment : * - $p < 0,05$.

Examination of monosynaptic H-reflex conducted in observed patients before the treatment revealed extended latency of H-reflex and reduction of its amplitude. It should be noted, that these disorders were more expressed in the patients with monoradicular syndrome of S1 root, which is evidence of disorder in the reflex arc of H-reflex. Besides, there was a statistically significant decrease of Hmax/Mmax indicators in the patients with the injury of L5 and S1 roots. Repeated ENMQ studies showed a positive dynamics in the studied indicators under the influence of conducted treatment (Figure 1). As a result of conducted treatment significant changes were not observed in the indicators of M-response duration and amplitude. In the first group of patients with the injury of L5 root

a reliable increase of CVIeff on motor fibers of tibial and fibular nerves ($p < 0,05$) was observed only after the second step of the treatment. In this group increase of CVIeff on motor fibers of fibular nerve was from 52,0 ± 0,9 м/с to 54,4 ± 1,2м/с ($p < 0,05$) in the patients with the injury of S1 root after the first step of treatment. In the patients receiving IT in complex with Nucleo CMP forte a reliable increase was observed in CVIeff on motor tissues of fibular and tibial nerves ($p < 0,05$ and $p < 0,01$) by the end of the second step of the treatment and in the patients of the second group significant changes of CVI were not observed.

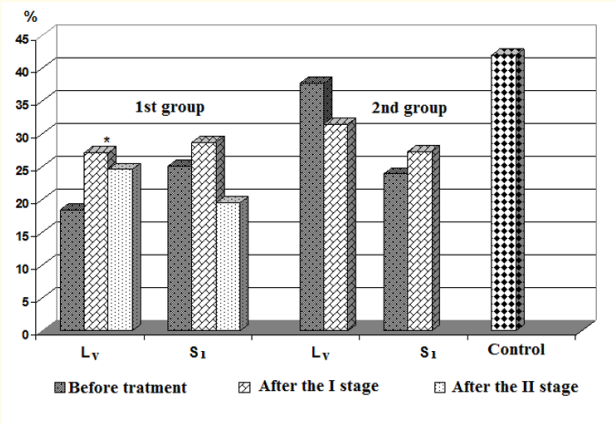

Figure 1: Dynamics of Hmax/Mmax indicators under the treatment.

Conducted complex treatment positively affected afferent element of the neuromotor system. Reliable increase of CVI on afferent fibers of sural nerve ($p < 0,05$) in the patients with injured L5 and S1 roots was an evidence of this. As it is evident from the table 4, the influence of IT on conductive function of sensitive sural nerve was not significant.

The dynamics of the indicators of monosynaptic H-reflex under the influence of conducted treatment bears a particular interest. As it is seen in the figures 1, significant positive dynamics of these indicators were observed in the patients which received Nucleo CMP forte in complex with IT. In this group of patients H-reflex and M-potential amplitude ($p < 0,05$), also Hmax/Mmax ($p < 0,05$) ratio increased. The results are evidences of positive changes in the afferent and efferent elements of neuromotor system, also in the functional condition of spinal alpha-motor neurons under the influence of conducted treatment.

Clinical and neurophysiological assessment of the results of treatment after the first step of treatment has revealed positive changes in the first group of patients after the first step of the treatment in 84,3% of circumstances and after the second step of the treatment - in 85,6% of circumstances. In the second group of patients positive changes after the treatment were observed in 75% of the patients.

Conclusion

Thus, the use of Nucleo CMP forte in complex with IT in patients suffering from VR positively effects on the clinical symptoms of the disease, has more apparent analgesic effect and contributes to the regress of clinical signs and improvement of LQ, which is evidenced by the positive dynamics of the main clinical indicators and data of applied clinical scales and tests. Received information allows to identify some characteristics of action mechanism of applied treatment method. The identified dynamics of neurophysiological indicators shows, that complex use of Nucleo CMP forte and IT is based on the improvement of afferent and efferent elements of neuromotor system, also functional improvement of spinal alpha-motor neurons which is associated with acceleration of regenerative processes. As it known, Nucleo CMP forte and IT have a stimulating effect on neuro regenerative processes [10]. Study results have shown, that their complex use in patients suffering from VR has contributed to the acceleration and improvement of regenerative processes in the myelin sheath and axons of peripheral nerves. We may also assume, that activation of regenerative processes is associated with the recovery of several morphological elements of the nervous system under the influence of Nucleo CMP forte, also with the normalization of complex lipids involved in cell metabolism and synthesis of substances for structural restoration of peripheral nerves. In this connection, we may assume, that the use of neurotropic pharmacotherapy in complex with physiotherapy contributes to the optimization of treatment tactics in VR patients and is aimed at improving the quality of the treatment, reducing the quantity of used non-steroid anti-inflammatory preparations, frequency of relapse of disease and improving QL in patients. The use of Nucleo CMP forte at all steps of complex therapy of VR patients is substantiated.

Conflict of Interest

We declared there is no financial interest or any conflict of interest.

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