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Comprehensive Restorative Treatment of Vertebral Artery Syndrome

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A B S T R A C T
Interference therapy and magnetic therapy were used for severe hemodynamic disorders. In the presence of an active myofascial trigger point, ultrasound and percutaneous electroneurostimulation were used. The application of the developed comprehensive program of SPA rehabilitation treatment using physiotherapy, acupuncture and manual therapy is effective in relieving pain syndrome, eliminating biomechanical and cochleovestibular disorders, and consolidating the optimal motor stereotype.

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Cervicalgia, due to its high prevalence among young people of working age, is one of the urgent problems of modern medicine [1, 7]. Pain in the cervical-brachial region occurs in 30.2% of cases of all lesions of the musculoskeletal system [8]. The cause of cervical pain syndromes, along with dystrophic lesions of the spine, is a nonspecific myofascial pathology. The clinical manifestations of pathology are very diverse, but vertebral artery syndrome (SPA) comes to the fore, which significantly disrupts human performance and reduces the quality of his life. SPA occurs due to compression or spasm of the vertebral arteries. Compression of the vertebral artery may occur in the first segment before its entry into the canal of the transverse processes. Compression of the trunk of the vertebral artery by the stair muscles occurs here. Hypertonicity of the middle and long neck muscles, as well as their defiance in osteochondrosis, can form a tunnel compression mechanism of the artery. On the second segment in the channel of transverse processes. The most common variant of irritation of the sympathetic plexus around the vertebral artery is the development of unco-vertebral arthrosis, exostoses in the area of arthrosis, heading outward, cause mechanical irritation of the artery in a narrow bone channel. Such a mechanism is possible with overloads of individual joint pairs, as well as due to long-term subluxation. In rare cases, the arteries are deformed due to a herniated disc, sometimes breaking through the uncovertebral joint. In the third segment, at the exit point from the canal of the transverse processes, the vertebral artery is compressed with anomalies of the upper cervical vertebrae – above the upper edge of the Atlas arch, where the groove for the artery may be too deep or even turned into a bone canal. In addition, the vertebral artery can be compressed with tonic tension of the posterior inferior oblique muscle in lower oblique muscle syndrome. In such cases, mechanical pressure is exerted on the posterior wall of the artery in the area of the groove of the vertebral artery of the Atlas, where it is not covered by articular processes from behind. Pathological tension of this musculature is possible with hypermobility of the upper cervical PDS due to osteochondrosis [5]. Thus, the mechanism of compression-irritative and reflex syndromes is similar – a decrease in the lumen of the artery and its branches due to compression or angiospasm in the vertebrobasilar system with ischemia in the area of its vascularization. However, despite the large number of studies devoted to the diagnosis, prevention and treatment of this pathology, the problem cannot be considered completely solved, which dictates the need for further development of comprehensive SPA rehabilitation treatment. In recent years, the allergization of the population has been increasing, which dictates the need for wider use of non-

medicinal methods of exposure [2, 3]. The aim of the work was to develop a comprehensive SPA rehabilitation treatment using physiotherapy, acupuncture and manual therapy. Materials and methods The work was carried out on the basis of the Republican Clinical Hospital. 66 patients with SPA were examined and treated: 24 men (35.7%) and 32 women (64.3%) from 18 to 59 years old, the majority of patients were aged 30-50 years – 76.7%, that is, the most able-bodied period of life. From among the patients, 2 groups were identified, comparable in gender, age and clinical manifestations of the disease: the main group of 52 people and the control group of 14 people. The clinical and instrumental examination included clinical, neuro-orthopedic, X-ray, ultrasonographic methods, including ultrasound. Sonographic examination of the spine was performed with a convexic sensor, frequency 5-10 MHz. At the same time, the degree of dystrophic changes in the intervertebral discs and hypermobility in the cervical spine were determined [4]. The treatment of patients in the control group was carried out using conventional therapies (nonsteroidal anti-inflammatory drugs, chondroprotectors, physiotherapy, massage, physical therapy). In the treatment of the main group, a developed program of rehabilitation treatment using physiotherapy, acupuncture, manual therapy and therapeutic gymnastics was used. Thus, electrophoresis of anesthetics, pulse currents: DDT, SMT, alternating low-frequency electromagnetic field were used to relieve pain syndrome. UHF therapy was used in the acute and subacute stages of the disease, and paraffin-ozokeritotherapy was used in the long–term chronic process. Infrared radiation was used due to its anti-inflammatory and analgesic effects. In addition, laser radiation normalizes impaired microcirculation, activates trophic processes in the focus of inflammation, reduces tissue edema, stimulates regeneration processes in nervous tissue, having a beneficial effect on the restoration of excitability, and helps slow down further degeneration of cartilage tissue. To stimulate regenerative processes in the tissues of the spinal-motor segment, ultraphonophoresis with hydrocortisone was used, and in case of vascular disorders, phonophoresis with euphyllin or gangleron was used.

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In the presence of hypermobility, periosteal acupuncture was used. The procedures were performed after 1-2 days, the course of treatment was 10-12 procedures. The implementation of the technique consisted in the fact that with an acupuncture needle, passing through the soft tissues of the dorsolateral surface of the neck, they reach the periosteum in the area of the spinous and transverse processes of the interested vertebral-motor segment. Stimulation was performed by twisting or tapping the needle handle. Irritation in the periosteum area was performed 5-7 times for 1-2 minutes during the session. The duration of the session is 20-30 minutes. There are 10-12 procedures per course [6].

Manual therapy was applied to all patients of the main group, soft-tissue techniques were used, which include myofascial release, post-isometric muscle relaxation, muscle-energy and craniosacral techniques. Postisometric relaxation is an alternative to manipulation and, thanks to a gentle, sparing regime, allowed the therapeutic effect to begin at the stage of pronounced clinical manifestations of the disease. Correction of the developed changes in the locomotor system was carried out with the help of therapeutic gymnastics. In patients with severe pain syndrome, exercises were initially used to stretch the spine, and after reducing or eliminating pain, exercises were used to strengthen the muscles supporting the spine. In case of instability at the stage of progression, isometric exercises were used, followed by exercises aimed at strengthening the muscular corset. To eliminate pathobiomechanical disorders, sensorimotor activation exercises are additionally used. The results of the study and their discussion SPA was combined with other vertebroneurological manifestations (cervical and cervicobrachial). Moderate biomechanical disorders of the spine, limitation of the volume of active movements in the cervical spine with predominance of flexion restriction were revealed in all patients. Palpatory examination showed moderate muscle soreness, increased muscle tone. Often, an increase in the tone of the short extensors of the head was combined with an increase in the tone of aponeurosis and paresthesia in the occipital region due to damage to the occipital nerve. There is a slight smoothness of cervical lordosis and hyperlordosis in almost half of the patients. Palpation revealed myofascial trigger points mainly in the short occipital muscles, more often in the lower oblique muscles of the head, with manual testing – functional blocks in the craniocervical region. All patients had headaches of varying severity, cochleovestibular disorders were common, and ocular, pharyngeal, laryngeal and hypothalamic syndromes were found in almost half

of the cases. The headaches were paroxysmal in nature, rarely permanent, often hemicranic in type. Headache irradiation is characteristic: starting in the cervical region, occipital region, it spreads to the forehead, eye, ear, temple ("helmet removal" test). The scalp is often painful, even with a light touch, combing the hair. There is a clear connection between headache and head movements, prolonged work in a tilt, and an uncomfortable position of the head during sleep. When turning or tilting the head, pain often appeared, "crunching" in the neck, a burning sensation, often spreading to the shoulder girdle, cochleovestibular disorders, dizziness of a systemic nature, noise, ringing in the ears, hearing loss, especially during an attack on the headache side. Ocular symptoms were usually combined with pain in the eye socket, which worsened when the eyes turned. There were visual disturbances: a veil, fog in front of the eyes, "flies", narrowing of the fields of vision. Some patients had paresthesia in the pharynx in the form of tingling, burning or a feeling of a foreign body, prompting coughing. At the height of the paroxysm, the voice may become hoarse or aphonia develops. Pharyngeal-laryngeal and hypothalamic syndromes are less common than others. Some patients had trigeminal vegetalgia – pain in the teeth and tongue, in the hard palate, often with paresthesia, hyperemia and pasty skin on half of the face and head.

As a result of a clinical and instrumental examination, patients were divided into groups, according to the clinical manifestations of the disease, as follows: cervicocranialgia was detected in 37 (57.2%) patients, cervicalgia - in 21 (32.1%), and cervicobrachialgia – in 8 (10.7%). The distribution of patients is presented in the table, from which it can be seen that the groups are comparable in terms of the main clinical syndromes, with cervicocranialgia and cervicalgia being the most common, which accounted for 89.3% of cases (Table 1).

During X-ray examination of the cervical spine, dystrophic changes were mainly detected in the CV-CVI (51%) and CIV-CV (42%) segments, one or two levels of lesion were more common. The following changes were most often detected: marginal bone growths, including uncovertebral osteoarthritis, subchondral osteosclerosis, biomechanical disorders in the form of changes in the configuration of the spine in one or more segments. During functional spondylography, hypermobility of the cervical segments was detected at the level of CII-CIII – 25%, CII-CIV – 24%, CIV-CV – 27%, and less often – CV-CVI – 19.2% and CVI-CVII – 6.7%.

Table 1. Distribution of patients by clinical manifestations of the disease

Clinical	**The main group n = 52**	**The control group n = 14**	**Total n = 66**
syndrome	37 (57,2%)	6 (42,8%)	43 (57,2%)
Cervicocranialgia	21 (32,1%)	5 (35,7%)	26 (32,1%)
Cervicalgia	8 (10,7%)	3 (21,5%	11 (10,7%)

Table 2. Results of treatment effectiveness

Effectiveness	**The main group n = 52**	**The control group n = 14**
Significant improvement	37 (68,9%)	4 (27,3%)
Improvement	10 (20,0%)	5 (36,4%)
Minor improvement	5 (11,1%)	4 (27,3%)
Without effect	0	1 (9,0%)

Sonographic signs of dystrophic changes in the cervical spine were detected in 75.2%, mainly at the lower cervical level: CII-CII – 5.7%, CII-CIV – 14.6%; CIV-CV – 25.3%, CV-CVI – 32.3%; CVI-CVII – 22.1%. Signs of intervertebral disc protrusions were determined in 12 people, of whom at the level of XIII-CIV – in three, CIV-CV – in five, CV-CVI – in four subjects. Instability of the cervical spine was detected in the segment CII-CIII – in 23.2%, CIII-CIV – in 24.1%; CIV-CV – in 26.8%; CV-CVI – in 18.8%; CVI-CVII – in 7.1% of patients, which correlated with the data of functional radiography.

With vascular ultrasound of the vertebrobasilar system using functional tests, SPA was diagnosed in 24 (42.8%), both functional and organic, and functional factors prevailed in patients younger than 35 years old.

Dynamic clinical and instrumental examination, which was performed on all patients at the end of the course of treatment, allowed us to judge the effectiveness of therapeutic measures, which was assessed as significant improvement, improvement, minor improvement, no effect or deterioration. A significant improvement was considered to be the absence of subjective symptoms of the disease – relief of pain syndrome and cochleovestibular disorders, an increase in the volume of movements in the cervical spine; an improvement when there was a decrease in the severity of some subjective symptoms or their disappearance; A slight improvement was a decrease in pronounced complaints of patients while maintaining objective signs of the disease and without effect, when subjective and objective signs of the disease persisted (Table 2).

During a catamnestic examination, it was found that in the main group remission was 328.3±64.3 days, and in the control group – 242.8±53.4.

Conclusions: The application of the developed comprehensive program of SPA rehabilitation treatment using physiotherapy, acupuncture and manual therapy is effective in relieving pain syndrome, eliminating biomechanical and cochleovestibular disorders, fixing the optimal motor stereotype, contributes to an increase in remission time, which is confirmed by data from a dynamic clinical and instrumental examination of 66 patients.

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