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**NEURO-OPHTHALMOLOGICAL SIGNS OF DISORDERS IN PATIENTS
DEPENDING ON THE STAGE OF OSTEOCHONDROSIS OF THE CERVICAL
SPINE**

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Abstract: American professor Mitchell D. at one time called osteochondrosis of the spine - "a demon in the back." Modern man, due to urbanization, suffers from the deterioration of environmental conditions due to improper diet and quality of nutrition, a sedentary lifestyle, all this affects the change in the structure of the spine (1, 5).

Keywords: environmental conditions, urbanization, cervical osteochondrosis.

According to WHO, more than 90% of the world's inhabitants suffer from osteochondrosis of the spine, older than 50 years. The latest literature data raise the question of an increase in the pathology in the spine, in particular, osteochondrosis among the young population (Kamchatov P.R. , 2016). In relation to all neurological diseases associated with the spine, the frequency of cervical osteochondrosis has an average limit of 11.5 . According to its anatomical and morphological structure, the cervical region is the most important conductor between the central and peripheral, autonomic nervous system. The most mobile and most vulnerable section is the cervical section (2, 6, 10). An equally important department is the system of the vertebrobasilar department, where there is a direct connection with the visual analyzers and conductors of the oculomotor nerves (3, 7, 13). Due to various reasons, excess weight, prolonged physical activity, impaired posture, due to a sedentary lifestyle; anomalies of the vertebral cartilage tissue in the discs, where degeneration can occur, in turn compresses the arteries and nerve fibers, thereby reducing the conduction of nerve impulses (4, 8, 12). Back in 1866 , Prof. Alamyuka E.V. considered the problem of glaucoma as a secretory neurosis resulting from infringement of the cervical sympathetic nodes (9, 11). In the same years, the Swiss ophthalmologist Gorner I.F. (1869), describes the famous syndrome (ptosis, miosis , enophthalmos). Accordingly, the connection of the cervical spine and eye symptoms is obvious. However, complex studies on the study of visual impairment in various syndromes of cervical osteochondrosis are insufficiently informative.

Target. To study the pathomechanism of the development of ophthalmic disorders depending on the criteria for cervical osteochondrosis.

Material and research methods. Patients undergoing inpatient and outpatient treatment of MK were subject to examination. Samara State Medical University , for the period 2020-2023, with a diagnosis of cervical osteochondrosis of the spine at the age of 25 to 45 years. The exclusion criteria were factors of increased blood pressure, instability (according to analyzes) of blood sugar and other concomitant diseases. Patients received treatment in the Department of Neurology, a total of 70 people, of whom there were 45 women and 25 men; for comparison, a group of healthy 20 people (volunteers) of identical age was taken. The incidence was mainly associated with labor activity and lifestyle, namely, the forced load on the cervical region for the period of work (computer), or the whole day of driving. Patients were classified according to stage level. Neurological

examination was carried out according to the traditional stage. Paraclinical research methods included MRI (CT) of the cervical spine, ultrasound of the main vessels of the head and neck, for complete differentiation with other pathologies. In addition, all patients were examined by an ophthalmologist for the level of visual acuity, visual field, examination using optical coherence tomography; measurement of intraocular pressure, study of the fundus, determination of the level of the anterior segment of the eye by biomicroscopy, refractometry, gnoscopy and visometry of the eye.

Thus, patients were examined for both neurological and ophthalmological status. Statistical data were processed on an individual computer according to standard Student's indicators.

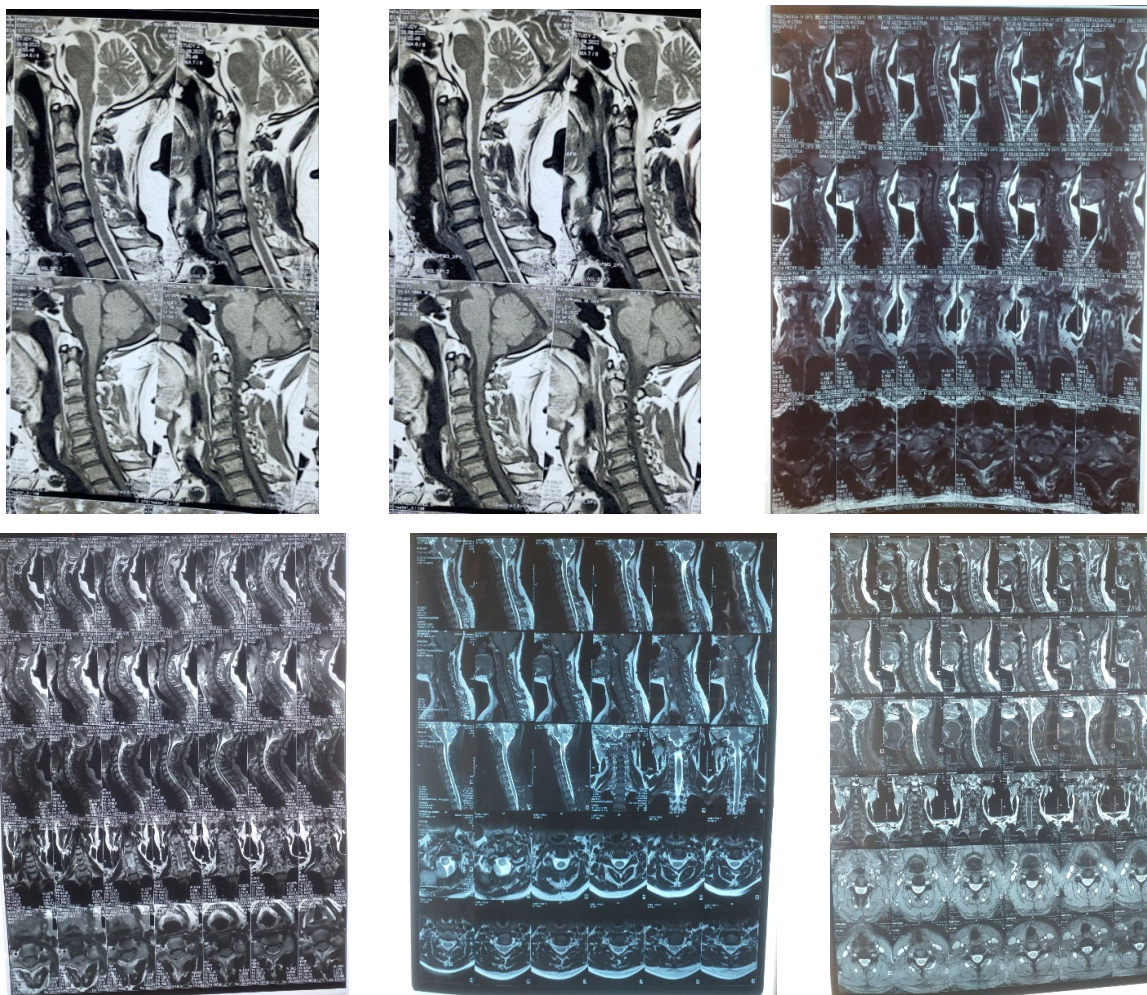
Research results. In the analysis of clinical and neurological data, patients, based on symptoms and using classification, are divided into the degree of impairment of the cervical vertebrae. Common neurological syndromes were headache and 100% dizziness in the dominant form, neck pain was similar in all patients, and pain in the cervical region increased with any movement of the head with rotation to the shoulder or chest. The first stage included patients who experienced neck pain, headache and dizziness, only periodically with severe overwork (10 patients). The second stage includes patients who constantly experience pain in the neck, facial numbness; independently reduce pain (relaxing massage, changing the posture of the head and neck) failed (22 patients). In the third stage, neck pain is stable with aching pain in the occipital region, in addition, patients experience dizziness when changing position, walking (28 patients). In the fourth stage, patients have a fear of sudden movements due to this, limited movements in the cervical region, constrained according to external data, the configuration of the neck is changed (10 patients). At stages III and IV, dizziness in patients with a sharp change in the position of the head showed an increase in the symptom, periodically accompanied by nausea, vomiting. These signs are confirmed by the authors (Zhulev I.M. et al. 2008), who associate these signs with a special position of the oblique muscle of the head during the movement of the head with the simultaneous functioning of the vertebral artery and the large occipital nerve. In these same patients, there is an atactic syndrome in 35% of cases; tinnitus, aggravated by lying down (that is, before bedtime, which makes it difficult to fall asleep, and accordingly increases anxiety and depression).

According to the nature of the headache, basically all patients described it as pulsating, intense. In 52% of cases, localization of headache in the cervical-occipital region, in rare cases in 16% of the area of frontotemporal pain, mainly in the region of the orbit, in 40% of cases, in 80% of cases, pain in the scalp (hyperpathia) was noted. The duration of pain in time was from several hours from 2 to 8-9 hours, which was most often perceived as signs of migraine (accordingly, appropriate treatment was received, where there was no improvement dynamics). Thus, the pain syndrome of the patients was of a chronic nature, the pain syndrome was associated with static or dynamic loads, with periodic incoming visual impairments, such as "misting", "flashes" in the eyes. During the control of the volume of activity of movement in the neck, smoothness of the cervical lord was revealed in 38%, and increased in 63% of cases. In 70% of cases, asymmetry of the forearms, myofascial pain points at the level of the rectus muscles of the head were noted. All these signs for the most part indicated (muscle-tonic) a sign of a spondylogenic type of changes. Which required additional diagnostic methods.

Thus, according to ultrasound data, there were various indicators of changes in blood flow (intracranial and vertebral), especially in terms of the level of the posterior cerebral artery. Indicators for LBF are clearly reduced, but asymmetrically, with a predominance of one of the sides of the vertebral artery; at the same time, the vascular blood flow in the arteries had a flow moving in layers, without changing the blood flow

velocity. The asymmetry described above is associated with a decrease in CSC in the affected vertebral artery, which, under these conditions, is regarded as compensatory-adapted.

Indicators of neuroimaging of the cervical spine, first of all, confirmed the presence of altered processes in the vertebrae. Change in the axis of the spine in the plane. C-shape, confirms the violation associated with the biochemical in the cervical region. The deformity of the vertebrae had the form of osteochondrosis, where osteophytes were located in the region of the lower neck, (in 69.9% the level of C_{IV}-C_V); wedge-shaped deformity also occurred. In almost 100% of cases, altered signals in the lower direction, intervertebral discs, with the presence of protrusions (C_I-C_{III}). Protrusions in 80% in the region C_{IV}-C_{VI}. In 38.5%, thickening of the longitudinal ligaments was different, which in parallel gave a narrowing of the spinal canal. Perhaps this is a coincidence, more often a narrow intervertebral foramen was found on the right side. Indicators of spondylarthrosis were noted by nature, and the greatest change was at the level of atlanto-axial contact, which, again, is associated with a motor-dynamic disorder. Thus, the leading role in the pathogenesis of cervical spondylogenic changes is played by the mechanisms of intense, constant load on the cervical region, which in turn leads to deformation of the vertebrae, discs, and hemodynamic disturbances in the form of characteristic neurological symptoms.



The aim of the work was to study ophthalmic changes against the background of cervical osteochondrosis. Accordingly, the second stage of the study (after the evidence base of our patients, according to the main diagnosis), was the need for consultation and diagnosis by an ophthalmologist.

The result of the analysis of ophthalmic signs was as follows. In patients in stages I and II of cervical osteochondrosis, where there is a difficulty in the blood flow of small-caliber vessels (due to vasospasm), at the level of the paravertebral arteries and internal

carotid arteries, an accompanying background of sympathicopathy : patients' complaints of periodic "flicker" in the form of sparks or colored spots ; sometimes a sharp darkening in the eyes, or the appearance of running "flies" before the eyes. When examined by an ophthalmologist, it was revealed only in patients with stage II , initial changes in the fundus. In the same groups (I and stage II) there were changes in the type of retinopathy , in the form of narrowing of the arteries (reversible) while maintaining the elasticity of the vessel wall itself; in the form of a moderate expansion of the veins; in almost 80% of cases, angiospasm of the vessels is irreversible. In patients with stage II , in 3 cases, a symptom of arteriovenous decussation of the first degree was found. Stenor-like tortuosity of blood vessels was noted in 55%. In stage III patients , the complaints were identical to those of stage I and II , in addition, several patients noted photopsy . Due to compression, not only small, but also large main vessels (extravasal compression), respectively, angioretinopathy is noted . So, angiospasm of blood vessels is pronounced, due to the narrowing of the arteries, in 100% of cases; All patients had significant plethora of veins. Changes in the retina of the eye due to background ischemia, where sclerosis of the vascular wall was noted, against the background of an already dystrophic process. These data are confirmed by previous studies (Lunev D.K., Veritsagin N.V. 2022). The blood flow of the vessels, during an ophthalmological examination, has discontinuity, which is manifested by swelling of the retina or thickening of the vessel wall, similar to individual " beads" on the thread. Such a pattern was noted in 35% of cases. characteristic arterio-venous decussation, which occurred in a low percentage in stage II patients , in this group increased in the number of patients up to 60%, which most likely requires additional research, and is associated with sclerosis of the arterial wall. In such cases, swelling and thickening of the retina are evident. Stage IV level should be considered as a chronic cerebrovascular accident, taking into account the length of the disease and the characteristics of changes in the cervical spine. In this regard, signs of a sharp decrease in vision, loss of visual fields join the complaints. Having in the presence of compression of vessels of all calibers, in the fundus of patients, increased angiospasm, angioretinopathy , and in 2 cases, neuroopticopathy was detected . The data coincide with the indicators of literary sources, in particular with the work of Russian scientists (Tarasova L.N. 2007). In half of the cases, all patients of this group, initial signs of neovascularization were found , edema of the optic nerve, with a change in color and shading of the picture.

At the same time, sources of scientific analyzes by other authors (Evroneisky) note sclerotic atrophies in patients with stage IV of cervical osteochondrosis with a contour shade of pseudoglaucomatous displacement, a characteristic progression of the process.

In the end, I would like to note that in patients under 30 years of age (3 patients work in the banking system (2) and one patient works as a teacher of computer programming), all three were included in groups I and II stage, diseases of osteochondrosis of the cervical spine. In 2001, the Association of American Optometricians (AOA) recommended that the classification of visual impairments use the term computer vision syndrome (CCS), in which there are signs described above (eye pain, blurred vision, pain in the neck, dizziness). Accordingly, such patients need an additional and separate examination to solve the problem of comorbidity or combined, both a computer load on the eyes and circulatory disorders due to infringement in the area of the cervical spine, such a dual role is associated with a more accelerated progression of visual impairment.

Conclusion

1. pathological process in the cervical spine (osteochondrosis , spondosis) changes the structure of the vertebral discs, deforms the vertebrae, which leads to compression of the nerve limbs, compression of vessels from small to large caliber, as a result, visual

disturbances, in the form of sharpness, field of vision , angioretinopathy .

2. Visual impairment depends on the degree of cervical osteochondrosis, level III and Stage IV , which is characterized by chronic circulatory disorders, usually manifested by a unilateral process depending on the sides of the vertebral artery; in the form of myopia.

3. Particular attention should be paid to patients who directly work at the computer, since the combined load (neck dysfunction and vision (CHD) at the same time) leads to early clinical ophthalmological disorders in the microcirculatory system.

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