

THE FEATURES OF THE CLINICAL COURSE OF VERTEBROBASILAR INSUFFICIENCY WITH IMPAIRED CEREBRAL VENOUS BLOOD FLOW

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The paper presents the results of studies of the clinical and neurological status in patients with vertebrobasilar insufficiency (VBI) with impaired venous circulation in the brain. The obtained results allow concluding that clinical course of the disease in patients with VBI depends not only on basilar and vertebral artery lesions but also, largely, on impaired cerebral venous blood circulation.

Key words: vertebrobasilar insufficiency, cerebral venous dyscirculation, discirculatory encephalopathy

Introduction

Cerebrovascular diseases are one of the most important problems of modern neurology. According to statistics, more than 60 thousand cases of stroke are registered annually in Uzbekistan, and, unfortunately, the incidence rate is steadily increasing [1]. Blood flow disorders in the posterior circulation of the brain refer to severe and frequent manifestations of cerebrovascular pathology, high mortality rate, affecting people of working age, high disability among patients, distinguish the problem of brainstem localization in the group of socially significant [9].

Disorders of blood flow in the venous blood system of the brain play an important role in the development of cerebrovascular pathology. Various factors impeding the outflow of venous blood from the cranial cavity lead to blood overflow in the cerebral vascular bed and increased intracranial venous pressure [2,3], which leads to cerebral vascular [4,5].

The role of venous dyscirculation in the origin, course, and clinical definition of cerebral vascular pathology has long been underestimated and these disorders are often not recognized until now. In spite of this, there is no doubt that long-standing venous outflow disorder may be the cause of development of specific clinical syndromes, which eventually lead to deterioration of patient's daily performance and quality of life. The clinical picture of cerebral venous dyscirculation is variable and clinical and diagnostic methods are relatively limited. Therefore, it is difficult to detect pathology at

an early stage. The severity of the clinical picture in venous dyscirculation largely depends on untimely diagnosis of the process [6,7,8].

Purpose of the study

To study features of the clinical and neurological status in patients with vertebrobasilar insufficiency with impaired cerebral venous circulation

Methods and materials

We studied the clinical picture of 120 patients diagnosed with cerebrovascular disease (CVD) vertebrobasilar insufficiency. All patients were divided into two groups. The main group consisted of 80 patients (50 females and 30 males) diagnosed with CVD vertebrobasilar insufficiency with clinical symptoms of cerebral venous circulatory disorders. The mean age was 61 ± 5.87 years. A comparison group consisted of 40 patients (30 women and 10 men) with the diagnosis of CVD vertebrobasilar insufficiency without clinical signs of cerebral venous circulatory disorders. The mean age was 59.8 ± 5.7 years. The control group consisted of 15 healthy people (11 women and 4 men) without signs of cerebral venous circulatory disorders. The mean age was 55.0 ± 8.48 years.

Results and Discussion

Regarding the complaints, patients with vertebrobasilar insufficiency most often have a vertigo, which confirmed in our study. However, we did not find any intergroup differences. Vertigo occurred in 93.3% of the examined patients. Vertigo was of central character with a feeling of imbalance, a feeling of falling or being thrown aside. In the main group vertigo was observed in 92.5% of patients, whereas in the comparison group 95% of patients. By nature, vertigo in both groups was constant ("somewhere inside the head"), independent of body position or momentary and brief.

In the control group, the examinees reported rare episodes, which they assessed as dizziness, and were described by a feeling of dizziness and an incomprehensible sensation in the head, and they occurred in 20% of cases.

Not less frequently, patients complained of unsteadiness and staggering when walking, and imbalance when turning, which are characteristic of VBI. In all, unsteadiness of walking among the examined patients occurred in 72.5% of patients, with the main group (77.5%) significantly more frequently (Fisher's ϕ -criterion = 1.702; $p \leq 0.05$) than the comparative group (62.5%). In severe stages of CVD, falls were also noted in 3 patients of the main group. 28.8% of patients in the main group had complaints of coordination disorders in activities of daily living, whereas in the comparison group this figure was 20%.

Half (66.25% and 45% in the main and comparison groups, respectively) of the patients we examined complained of tinnitus and head noise and described it as a buzzing and whistling feeling in the ears, tearing in the ears, feeling of blockage of the ears. In addition to this, 41.3% of the patients in the main group and 30% of the patients in the comparison group, i.e. a total of 37.5% of the patients complained of a subjective hearing loss.

As we can see, the incidence of coordination disorders in daily activities was approximately the same in both groups of patients, while tinnitus was significantly more frequent in the main group than in the comparison group (Fisher's ϕ -criterion = 2.227; $p \leq 0.05$).

The second most frequent and significant complaint was headache. It was detected in 91.67% of patients. The patients in both the study and comparison groups were characterized by the occurrence of headache at night or in the morning, with a feeling of heaviness in the back of the head, with irradiation into the fronto-ocular region, and pressure from the inside on the eyeballs. As the intensity of the pain increased, the headache became expansive, diffuse and persistent. We examined the severity of the headache on the VAS scale (Tables 1.1-1.2)

Table 1.1 Structure of headaches according to the VAS scale

Symptom	Total		Main group		Comparison group	
	n	%	n	%	n	%
Headache	110	91,67	77	96,25	33	82,5
*Mild pain	2	1,67	0	0	2	6,06
*Moderate pain	64	53,33	40	51,95	24	72,73
*Severe pain	44	36,67	37	48,05	7	21,21

As we can see, headache was more frequent in the main group (Fisher's ϕ -criterion = 2.445; $p \leq 0.01$). In the comparison group, moderate headache was significantly more frequent than in the main group (Fisher's ϕ -criterion = 2.081; $p \leq 0.05$). However, severe headache occurred significantly more frequently in patients in the main group relative to the comparison group (Fisher's ϕ -criterion = 2.761; $p \leq 0.01$).

In the main group, headache occurred in 96.5% of patients. Headache in patients in the initial stages of CVD was more often bilateral in nature, predominantly localized in the frontoparietal (53.75%), or frontal regions (36.25%). In 36.23% of cases, the local headache transformed into diffuse headache. In more than half of the patients (52.5%), the headache was constant and was manifested by a feeling of heaviness in the head. A periodically, against the background of a weak and diffuse headache, an intense headache occurred, which the patients characterized as bursting (48,75%), pressing (13,75%), compressive (15%), pulsating (11,25%).

The analysis of the daily headache's time of occurrence showed that the patients in the main group had the most frequent pain in the first half of the day (73,75% of patients). In 56,25% of observations headache arose in the morning hours, after awakening, decreased after getting up from bed and disappeared by the middle of the day.

In the comparison group, headache occurred in 82.5% of the patients we examined. The main factors influencing headache in this case were psycho-emotional (32.5% of patients) or physical exertion associated with great muscular effort (47.5% of patients) work in a sitting position (35% of patients) or a long horizontal position. Not infrequently, the occurrence of headache was influenced by a sudden change in the weather. The headache was compressive (45%), pressing (22.5%), bursting (5%) and pulsating (10%). 60% of patients complained of a diffuse headache, with 47.5%

and 25% of patients having headaches localized in the parieto-occipital and occipital regions, respectively.

When analyzing the time of cephalgia occurrence, no definite pattern was detected in the comparison group. Headache occurred at different times of the day, but more often it occurred in the second half of the day, usually after work.

In the main group of patients, headache was significantly more frequent in the first half of the day (ϕ Fisher's criterion = 2.814; $p \leq 0.01$) and was more often accompanied by heaviness in the head (ϕ Fisher's criterion = 2.105; $p \leq 0.05$). At the same time, in the main group, pain was localized in the frontoparietal region (Fisher's ϕ -criterion = 5.488; $p \leq 0.01$) and in the comparison group in the occipital region (Fisher's ϕ -criterion = 4.321; $p \leq 0.01$). The nature of the pain described by patients in both groups also differed. For example, in the main group, patients were significantly more likely to describe pain as bursting (Fisher's ϕ -criterion = 5.653; $p \leq 0.01$), whereas in the comparison group, pain was more often of a compressive nature (Fisher's ϕ -criterion = 3.487; $p \leq 0.01$). The pressing type of the pain was more frequent in the comparison group, but the differences were insignificant (Fisher's ϕ -criterion = 1.181; $p = 0.11$).

Table 1.2 Average score on the VAS scale

	Main group	Comparison group	Control group
Headache (VAS) 0-10	6,50 ± 1,08	5,33 ± 1,21	2,2 ± 1,26

As we can see, the severity of cephalgic syndrome on the VAS scale was slightly higher in the main group and the comparison group (moderate pain), but was less pronounced in the control group (mild pain). Analysis of headache on the VAS scale, showed that the severity of headache in the main group was greater than in the comparison group ($t=4.86$; $p \leq 0.01$).

A characteristic feature of the main group was that headache in the examined patients was accompanied by additional characteristic "venous" complaints such as swelling of the face and eyelids in the morning hours in 68.75% of patients. At the same time, swelling was significantly more frequent in the main group (Fisher's ϕ -criterion = 1.968; $p \leq 0.05$). Distinctive complaints of patients were changes of vision in the form of "shadows" and "flickers" before eyes, "sand in eyes" symptom in 43,75%, "high pillow" symptom (23,75%). These complaints were most often disturbed in the first half of the day and subsided in the evening.

Other characteristic complaints of venous origin, such as dilation of the head vein network, dilation of subcutaneous veins in the neck and face, were also found in the main group. Also, 21.25% of the patients noted painful sensations upon eye movement, which were accompanied by sclerae injection or conjunctival cyanosis. When analyzing complaints such as a feeling of having grain of sand in the eyes, painfulness during eye movements, and "high pillow" symptoms, they were also significantly more frequent in the main group ($p \leq 0.01$). When examining the patient, we could also determine that facial pastiness was significantly more frequent in the main group (Fisher's ϕ -criterion = 1.807; $p \leq 0.05$). Such signs as local cyanosis of the lips and external jugular vein swelling were also slightly more frequent in the main group, but the difference was statistically insignificant ($p = 0.1$).

Focal neurological symptomatology in venous encephalopathy has an impermanent nature and is mainly determined in severe disorders. The clinical and neurological examination revealed small focal symptoms typical for disseminated brain lesions in almost all patients. However, discoordination and vestibular-cerebellum syndrome were in the foreground. Visual, auditory, and cognitive impairments were slightly less common.

The frequency of focal neurological symptoms in the patients is described in Table 1.3.

Table 1.3 Frequency of focal neurological symptoms in patients

Symptom	Total		Main group		Comparison group	
	n	%	n	%	n	%
Nystagmus	70	58,3	51	63,75	19	47,5
Weakening of the act of convergence	64	53,3	49	61,25	15	37,5
Painfulness of the trigeminal Valleix points	40	33,33	35	43,75	5	12,5
Hypoesthesia in the area of innervation of ophthalmic nerve	33	27,5	29	36,25	4	10
CP of facial nerve	86	71,66	62	77,5	24	60
CP of hypoglossal nerve	70	58,3	46	57,5	24	60
Increase of muscle tone	21	17,5	13	16,25	8	20
Paresis	20	16,67	13	16,25	7	17,5
Anisoreflexia	92	76,67	67	83,75	25	62,5
Pathologic reflexes	28	23,33	18	22,5	10	25
Palmomental reflex	71	59,17	51	63,75	20	50
Finger to nose test dysmetria	87	72,5	60	75	27	67,5
Heel to shin test dysmetria	34	28,33	26	32,5	8	20
Gait disturbance	87	72,5	60	75	27	67,5
Positive Romberg's sign	116	96,67	79	98,75	37	92,5
Cognitive impairments	92	76,67	69	86,25	23	57,5
Horner's syndrome	11	9,17	9	11,25	2	5

In 63.75% of patients in the main group, there was a nystagmus that was characterized as a horizontal ascending nystagmus or a fine-spread horizontal nystagmus. In the comparison group, a little less than half of the patients had nystagmus in the extreme leads. Slightly more than half of the patients (53.3%) exhibited weakening of the convergence act and signs of Horner's syndrome in 9.17% of the patients.

Painfulness of the trigeminal Valleix points were detected in 43.75% of the main group and 12.5% of the comparison group. Hypoesthesia in the zone of innervation of the first branch of the trigeminal nerve was detected in 36.25% of patients in the main group.

Signs of central palsy of the facial nerve were found in 77.5% of patients in the main group and 62.5% of comparison group. Slightly more than a quarter of the patients in the study group had

disorders of the bulbar nerves group in the form of decreased palatine and pharyngeal reflexes, tongue deviation and dysarthria.

Pyramidal symptoms in the form of paresis or changes in muscle tone were rare in the examined patients - about 29% of patients in the main group and 20% of patients in the comparison group.

Pyramidal symptomatology was most often represented by anisoreflexia (83.75% and 62.5% in the main and comparison groups, respectively), and pathologic reflexes in the main group - in 22.5% of patients, and in the comparison group - in 25% of patients. Palmomental reflex in the main group were found in 63.75% of patients, while in the comparison group - in half of the patients.

Considering that the criterion for inclusion in the study, was the presence of symptoms of vertebrobasilar insufficiency, cerebellar disorders were predominant among the neurological syndromes of our studied patients. During the Romberg's test, balance disorders were detected in 98.75% of patients in the main group and 92.5% in the comparative group. Gait disorders were found in 75% and 67.5% of cases, respectively. Coordination pathology when performing the finger-to-nose test was manifested most frequently by misses and slightly less frequently by intention tremor and was detected in 70% of patients in the main group, and slightly less in comparison group patients (67.5%) cases, with heel-to-shin test in 32.5% and 20%, respectively.

We compared the focal symptomatology in both groups and determined that the most common were cerebellar-discoordination disorders in the form of staggering in the Romberg's posture, with a slight predominance in the main group (Fisher's ϕ -criterion = 1.708; $p \leq 0.05$), coordination probes and gait disturbances with a statistical slight predominance in the main group ($p > 0.1$). Nystagmus was also significantly more frequent in the main group, (ϕ Fisher's criterion = 1.697; $p \leq 0.05$), as was impaired convergence (ϕ Fisher's criterion = 2.212; $p \leq 0.05$). Patients in the main group also had more frequent cranial nerves pathology in the form of painful trigeminal points (Fisher's ϕ -criterion = 3.732; $p \leq 0.01$) and 1 facial nerve central palsy (Fisher's ϕ -criterion = 1.968; $p \leq 0.05$). Dissociation of tendon reflexes also predominated in the main group (Fisher's ϕ -criterion = 2.521; $p \leq 0.01$), as did Palmomental reflex, but without a statistically significant difference (Fisher's ϕ -criterion = 1.439; $p = 0.07$).

The involvement of the vertebrobasilar system, especially its venous part, was evidenced by the presence of de Klein's symptom in 77.5% of the examined patients. In the main group, the incidence of this syndrome was 82.5%, whereas in the comparison group it was found in 67.5% of patients.

We quantified the severity of symptoms of vertebrobasilar insufficiency. For this purpose we used a special assessment scale for vertebrobasilar insufficiency (Hoffenberth, 1990), the results of which are presented in Table 1.4

Table 1.4 Scale of vertebralbasilar deficiency (Hoffenberth, 1990)

	Main group	Comparison group	Control group
Scale Subjective Symptoms	8,63 ± 0,84	7,87 ± 0,88	1,6 ± 0,73
Scale Objective symptoms	6,6 ± 1,11	4,4 ± 0,87	0,53 ± 0,63
Total Sum	15,23 ± 1,81	12,27 ± 1,61	2,6 ± 1,18

In patients in the main group, the total sum of subjective and objective symptom scores on the above scale was 15.23 ± 1.81 , with an average of 6.6 ± 1.10 for objective scores and 8.63 ± 0.84 for subjective symptoms. In the comparison group, the sum of objective and subjective symptoms on the scale was 12.27 ± 1.61 , with a mean of 7.87 ± 0.88 for the sum of subjective symptoms and 4.4 ± 0.87 for objective symptoms.

The scale revealed some features of intergroup differences. As the table shows, the total sum of symptoms in the main group was statistically greater than in the comparison group ($t=3.47$; $p<0.01$). Examining subjective and objective symptoms separately, we found that the mean score of objective symptoms repeated the trend of the sum of the scores and was significantly higher in the main group ($t=4.52$; $p<0.01$), while the difference between subjective symptoms was statistically unreliable ($t=1.89$; $p>0.06$), indicating the similarity of complaints in IBS patients both without signs of cerebral venous insufficiency and with the presence of cerebral venous discirculation, but on examination in patients with cerebral venous discirculation, objective condition is more severe.

Conclusions

1. In case of cerebral venous discirculation the most frequent clinical manifestation is headache, which has a number of characteristic features that allow distinguishing it from other types of headache. Headache was detected in almost all patients and was one of the most common in VBI. In the main group it occurred in 96,5% of cases, in the comparison group - in 82,5% of cases.
2. Other characteristic complaints of venous origin were also found in the main group, such as dilation of the head vein network, dilation of subcutaneous veins in the neck and face. When examining the patient, we could also determine that facial pastiness was significantly more common in the main group. Also, 21.25% of the patients noted painful sensations when moving the eyes, which were accompanied by sclerae injection or conjunctival cyanosis. When analyzing such "venous" complaints as a feeling of grain of sand in the eyes, painfulness during eye movements and "high pillow" symptoms, they were also significantly more frequent in the main group ($p\leq 0.01$).
3. In the main group, vertigo was observed in 92.5% of patients, whereas in the comparison group, 95%. Vertigo was central type with a feeling of unsteadiness, a feeling of falling or being tossed aside.
4. Clinical and neurological examination revealed small focal symptoms typical for disseminated brain lesions in almost all patients, with predominant severity of neurological symptoms in the main group.
5. Quantitative assessment of the severity of symptoms of vertebro-basilar insufficiency, using a special Scale of vertebralbasilar deficiency (Hoffenberth, 1990), revealed higher rates of subjective and especially objective symptoms in the main group.

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