Жамият ва инновациялар –
Общество и инновации –
Society and innovations
Journal home page:
https://inscience.uz/index.php/socinov/index

# Peculiarities of the clinical course of stroke in the vertebro-basillar system

**Munisa BAHADIROVA** [1], **Elbek MIRDJURAEV** [2], **Djahangir AKILOV**[3]

Tashkent Institute for Advanced Training of Doctors

**ARTICLE INFO**

***Article history:***
Received September 2020
Received in revised form
15 November 2020
Accepted 20 November 2020
Available online
15 December 2020

***Keywords:***
Stroke
Rehabilitation
Clinic changes
MRI
COPD

**ABSTRACT**

The relevance of CVD (Cerebrovascular Diseases), in particular strokes, is due to the high prevalence, disability and mortality.

The degree of medical, social, psychological rehabilitation of patients after Ischemic Stroke depends on the regression of the clinical picture and cerebral disintegration.

Objectives of the study: detection of the entire spectrum of clinical manifestations from examined patients, corresponding to damage to the structures of the brain supplied by the vessels of the Vertebrobasilar basin, the relationship with regression of the primary focus and the subtype of Ischemic Stroke, and determination of the presence of a statistically significant dependence of clinical manifestations on COPD.

To achieve the goal and solve the set tasks, 126 patients, 60 men and 66 women were examined in the recovery period of stroke in the in the vertebro-basillar system, at the age of 50-80. The Blindemark scale was used to assess the neurological status. To assess neuropsychological status, the Montreal Cognitive Assessment Scale, the Hospital Anxiety and Depression Scale, the Rankin scale were used, as well as for objectification of MRI data and Dopplerography.

Results of the study: In patients with Ischemic Stroke in the vertebro-basillar system, paresis and paralysis prevailed in the structure of clinical manifestations, 68 patients had them, which is 54%, 43.7% of patients had dysarthria, coordination disorders were observed in 48.4% of patients, 26.2% had vertigo, 24.6% had sensory impairments and 5.6% had neglect.

In patients with Ischemic Stroke in the vertebro-basillar system, a correlation was found between the scores of Renkin

[1] Candidate of Medical Sciences, Associate Professor, Tashkent Institute for Advanced Training of Doctors, Tashkent, Uzbekistan
[2] Doctor of Medical Sciences, Professor, Tashkent Institute for Advanced Training of Doctors, Tashkent, Uzbekistan
[3] Candidate of Medical Sciences, Assistant, Tashkent Institute for Advanced Training of Doctors, Tashkent, Uzbekistan

scale. Various pathogenetic subtypes of ischemic stroke in vertebro-basillar system were analyzed. They have a significant correlation between NIHSS scores at the time of hospitalization and at the end of rehabilitation. In patients with AT Ischemic Stroke in the vertebro-basillar system the incidence of oculomotor disorders is significantly lower. Based on the above mentioned, the following conclusions can be drawn:

1. A certain localization of the focus of ischemic stroke in the vertebra-basilar system is more likely to be characteristic of the corresponding stroke subtype.

2. The rate of reduction and reorganization of the focus does not depend on the stroke subtype, localization of the hearth, comorbidphone, rehabilitation methods and is proportional to the initial size of the heart attack site.

3. The degree of severity of COPD has a correlation with the blood flow indices of posterior cerebral arteries and vertebral arteries, as well as the asymmetry coefficient.



# Особенности клинического течения инсульта в вертебро-базиллярной системе

*Ключевые слова:*
Инсульт
Реабилитация
Клинические проявления
МРТ
ХОБЛ;

## АННОТАЦИЯ

Актуальность цереброваскулярных заболеваний, в частности инсультов, обусловлена высокой распространенностью, инвалидностью и смертностью.

Степень медико-социальной, психологической реабилитации пациентов после ишемического инсульта зависит от регресса клинической картины и церебральной дезинтеграции.

Задачи исследования: выявление всего спектра клинических проявлений у обследованных пациентов, соответствующих повреждению структур головного мозга, снабжаемых сосудами вертебробазилярного бассейна, взаимосвязи с регрессом первичного очага и подтипа ишемического инсульта. и определение наличия статистически значимой зависимости клинических проявлений от ХОБЛ.

Для достижения цели и решения поставленных задач обследовано 126 пациентов, 60 мужчин и 66 женщин в восстановительном периоде инсульта в позвоночно-базиллярной системе в возрасте 50-80 лет. Для оценки неврологического статуса использовали шкалу Blindemark. Для оценки нейропсихологического статуса использовались Монреальская шкала когнитивной оценки, Госпитальная шкала тревожности и депрессии, шкала Рэнкина, а также для объективизации данных МРТ и допплерографии.

Результаты исследования: У больных с ишемическим инсультом в вертебро-базиллярной системе в структуре клинических проявлений преобладали парез и паралич, их имели 68 пациентов, что составляет 54%, у 43,7% пациентов наблюдалась дизартрия, нарушения координации наблюдались в 48,4% пациентов, 26,2% имели головокружение, 24,6% имели сенсорные нарушения и 5,6% имели пренебрежение.

У пациентов с ишемическим инсультом в вертебро-базиллярной системе обнаружена корреляция между баллами по шкале Ренкина. Проанализированы различные патогенетические подтипы ишемического инсульта в вертебро-базиллярной системе. У них есть значительная корреляция между оценками NIHSS на момент госпитализации и в конце реабилитации. У пациентов с АТ ишемическим инсультом в вертебро-базиллярной системе частота глазодвигательных нарушений значительно ниже. На основании вышеизложенного можно сделать следующие выводы:

1. Определенная локализация очага ишемического инсульта в позвоночно-базилярной системе, скорее, характерна для соответствующего подтипа инсульта.

2. Скорость уменьшения и перестройки очага не зависит от подтипа инсульта, локализации очага, сопутствующих заболеваний, методов реабилитации и пропорциональна исходному размеру очага инфаркта.

3. Степень тяжести ХОБЛ коррелирует с показателями кровотока задних мозговых артерий и позвоночных артерий, а также с коэффициентом асимметрии.

The problem of cerebrovascular diseases of the brain is still relevant, despite notable advances in understanding the pathogenesis, diagnosis and treatment [1, p. 1305-1315]. This is due to a number of reasons, and above all, the high prevalence of this pathology [2, p. 259-274].Worldwide, about 20 million strokes are recorded every year, within a year after IS - 33% die, 37% of patients become addicted and 9% suffer a second stroke [3, P. 122-126].

Both from the point of view of maintaining the quality of life and the cost of patients' treatment that underwent cerebral infarction, prevention of relapses are an important task [4, P.43-53].

Actually, all over the world, cerebral infarction is the first leading cause of neurological disorders. Despite the fact that in everyday speech a stroke is often called a cerebral hemorrhage, in reality, hemorrhages - the hemorrhagic type of stroke - account for only 20-25% of cases. IS account for 70-85% of cases, non-traumatic subarachnoid hemorrhages - 5% of cases [5, 11-20.].

One of the important aspects of this pathology is a high rate of disability and mortality from cerebrovascular diseases. In economically developed countries of Europe, IS ranks third among the causes of mortality after cardiovascular and cancer diseases. Annual mortality rates vary from 63 cases per 100,000 in Sweden to 274 per 100,000 in Russia [6, pp. 55-61.].

In Russia, the incidence and mortality from stroke remain among the highestone in the world, and a steady increase in CVD is observed [7, pp. 8-18]. More than 400,000 cases are registered annually in Russia [8, 397 p.].

In the acute and restorative stages, the clinical picture of the disease is determined by a combination of movement disorder, sensory, coordination disorders, disorders of higher cerebral and mental functions. These syndromes are manifestations of cerebral disintegration.The degree of medical, social and, often, psychological rehabilitation of patients who have undergone IS depends on its regression [9, pp. 3-18.].

Most of the mentioned syndromes are disorders of the sensorimotor complex. These are gross speech disorders in the syndromes of expressive and impressive aphasia, the destruction of a full-fledged movement stereotype in the syndromes of central paresis or Parkinsonism, and coordination disorders in ataxia [10, P.22-33].

In all these cases, there is a disorder of both the sensory and movement components of the functional system that provides voluntary movements. This functional system has a cortical representation, a complex system of afferentation with various types of sensitivity (musculo-articular, visual, auditory), multiple systems of effector connections - pyramidal, extra pyramidal, cerebellar, cortico-reticular [11, pp. 4-6.].

The clinical manifestations of VertebrobasilarIschemia cannot always be adequately interpreted by the patients themselves and / or their relatives and medical staff. According to the Stroke Registry of the city of Perugia, Italy, within the first 6 hours after the onset of the disease, 60.8% of all patients with stroke were hospitalized in specialized centers for the treatment of stroke and only 35.5% of patients with vertebrobasilar vascular syndromes [12, P. 405- 411].

Ischemia in the vertebrobasilar basin can be clinically manifested by a wide range of symptoms, depending on the lesion of certain brain structures. According to the New England Medical Center Posterior Circulation Registry (NEMC-PCR), USA, which includes 407 patients with IS in VI (63% of men and 37% of women, average age 60.5 years old ), most often patients complained of dizziness (47% of cases), unilateral weakness of limbs (41% of cases), dysarthria (31% of cases), headache (28% of cases), nausea and vomiting (27% of cases) [13, P. 389-398.].The most frequently detected signs in these patients during clinical examination were unilateral limb weakness (38% of cases), walking ataxia (31% of cases), unilateral limb ataxia (30% of cases), dysarthria (28% of cases), and nystagmus (24%). cases). Impairment of consciousness was observed in 5% of cases [14, P. 346-351.].

According to Ischemic posterior circulation stroke in the state of Qatar registry (IPCSQ), including 116 patients with IS in VI (85% men and 15% women, average age 53 years old), dizziness occurred in 75% of patients with IS in VI, ataxia in 65% of patients, dysarthria in 64% of patients, nausea and vomiting in 60% of patients, unilateral limb weakness in 49% of patients, nystagmus in 48% of patients, and conscious disturbances in 18% of patients [15, P]. 1004-1009.]. It should be noted that most of the symptoms described above are non-specific for ischemia in VI, especially if they occur in isolation [16, P. 45-53]. The severity of the neurological deficit in a patient with acute ischemia in VI cannot always be fully reflected using generally accepted stroke scales. According to Inoa and coauthors out of 372 patients with strokes in VI, 71% had 4 or less points on the NIHSS scale (National Institutes of Health Stroke Scale), which is a contraindication to thrombolytic therapy during the therapy window [17, P. 251- 255.].

Research by P.C. Chung and coauthors revealed that in patients with heart attacks in the VIat admission, the average score on the NIHSS scale was 5.8. At the same time, it was shown that if patients with IS in VI have more than 9 points on the NIHSS scale at admission, the odds ratio (OR) of an unfavorable functional outcome (5 or 6 points on the Rankin scale) by the end of treatment is 19.65 (95% ДИ from 9.43 to 40.94), after 3 months - 13.52 (95% ДИ from 6.34 to 28.86) [18, P. 510-517.].

The use of the Barthel Index (a score for daily activities and the ability to care for oneself) also does not always give a correct assessment. According to the Kansas City Stroke Study, the Barthel Index scale has a "ceiling effect" in patients with minimal consequences of stroke (most patients receive high scores) and in mild strokes the scale is not sensitive enough [19, P. 1840-1843].

In spite of the large amount of descriptive data on clinical manifestations of acute ischemia in the VI, classical clinical syndromes corresponding to circulatory disorders in certain vessels are rarely encountered in routine practice [20, P. 989-998; 21;22, P. 72-76].

Usually, patients have a combination of symptoms, some of which are non-specific [23, P. 80-87;24, P. 45-53].

The aim of the research was to study the clinical manifestations of patients with syndrome-stroke in the invertebral-basillary system.

To achieve the goal of the study and solve the set tasks for the period 2017–2020, 126 patients (60 men and 66 women) were examined in the rehabilitation period of cerebral IS in VI at the age of 50-80 years old (61.2 ± 6.2).

Distribution of patients by gender and age groups

| Groups | Group I | | Group II | | Total | |
|---|---|---|---|---|---|---|
| Number of Patients | 62 (49,2%) | | 64 (50,8%) | | 126 (100%) | |
| Average age | 59,8±5,8 | | 62,4±5,4 | | 61,2±6,2 | |
| Sex | M | F | M | F | M | F |
| Number of Patients | 29 (46,8%) | 33 (53,2%) | 31 (48,4%) | 33 (51,6%) | 60 (47,6%) | 66 (52,4%) |
| Average age | 57,9±4,7 | 61,1±4,1 | 61,2±3,7 | 63,6±3,9 | 59,6±5,6 | 62,8±7,1 |

For assessment of neurological status in the early and late rehabilitation periods we used the V. Lindmark scale (score evaluation of movement disorders (active and passive), muscle tone, sensitivity, walking, balance, social skills).

The Lindmark scale includes 7 subscales that characterize various parameters of the movement system, sensitivity and coordination: subscale A - performance of active movements in the arm and leg, B - performance of fast variable movements, C - general mobility of the patient, D - balance parameters, E - state superficial and deep sensitivity, F - the strength of pain in the joints and G - mobility in them.

Each dimension is scored and has a different maximum for each dimension. The score is maximum in case of normal function (a healthy subject can score a maximum of 446 points) and is equal to zero in the case of the greatest severity of impairments. The degree of decrease in the integral indicator correlates with the severity of the functional consequences of AICC (Acute Impairment of Cerebral Circulation [25, P. 1-40] (Appendix 3).

To assess the neuropsychological status of patients, we used the following scales in the early and late rehabilitation periods: the Montreal Cognitive Assessment Scale (MoCA) and the Hospital Anxiety and Depression Scale (HADS).

The time for MoCA was about 10 minutes for each patient. The maximum points - 30, 26 points and more were considered a normal indicator (Appendix 4).

The time for self-filling the form of the HADS scale by the patient, after instructing, was also about 5-10 minutes. The classic form of the HADS scale for cognitively safe patients includes odd-numbered anxiety subscale questions, even-numbered depression subscale questions, odd and even-numbered scores were calculated separately, giving two scores for each subscale.Each patient was asked separately to prevent data corruption. The point score was interpreted according to the following criteria: 0-7 points "normal" (no reliably expressed symptoms of anxiety and depression), 8-10 points, "sub clinically expressed anxiety / depression", 11 points and higher "clinically expressed anxiety / depression". [26, p. 91].

Regardless of the time spent on hospitalization, the number of NIHSS points on admission (mean score $6.8 \pm 2.3$) was significantly higher in patients who were admitted to the clinic directly via the EMS (average score $4.8 \pm 1.8$; $p = 0.029$). However, the NIHSS level at discharge in these patients (average score $2.8 \pm 2.4$ for patients admitted to the emergency room and $2.4 \pm 2.1$ for patients admitted to self-referral) did not differ significantly ($p = 0.52$). Comparison of the above-mentionedpatients in terms of the number of points on the Rankin scale at admission (average score $3.8 \pm 1.1$ for patients hospitalized via the EMS and $3.4 \pm 0.9$ for patients hospitalized by self-referral) and at discharge ($2.2 \pm 1.4$ and $1.8 \pm 1.1$ points, respectively) did not show significant differences ($p > 0.11$).

All 126 patients underwent brain MRI image to confirm the diagnosis. According to the data of neuroimaging (MRI) methods, in the analyzed sample, infarctions in the occipital lobes were detected in 51 patients (40.5% of the total number of patients), infarctions in the cerebellar hemispheres in 37 patients (29.4%), in the pons of the brain in 32 patients (25.4%), in the thalamus in 22 patients (17.5%), in the mediobasal regions of the temporal lobes in 13 patients (10.3%), 9 patients (7.1% each) had heart attacks in the lower medial regions parietal lobes, cerebellar vermis and medulla oblongata, 7 people in the midbrain (5.6%). At the same time, in some patients, involvement of two or more structures of the brain supplied from the vertebrobasilar basin was observed (Table 3.3).

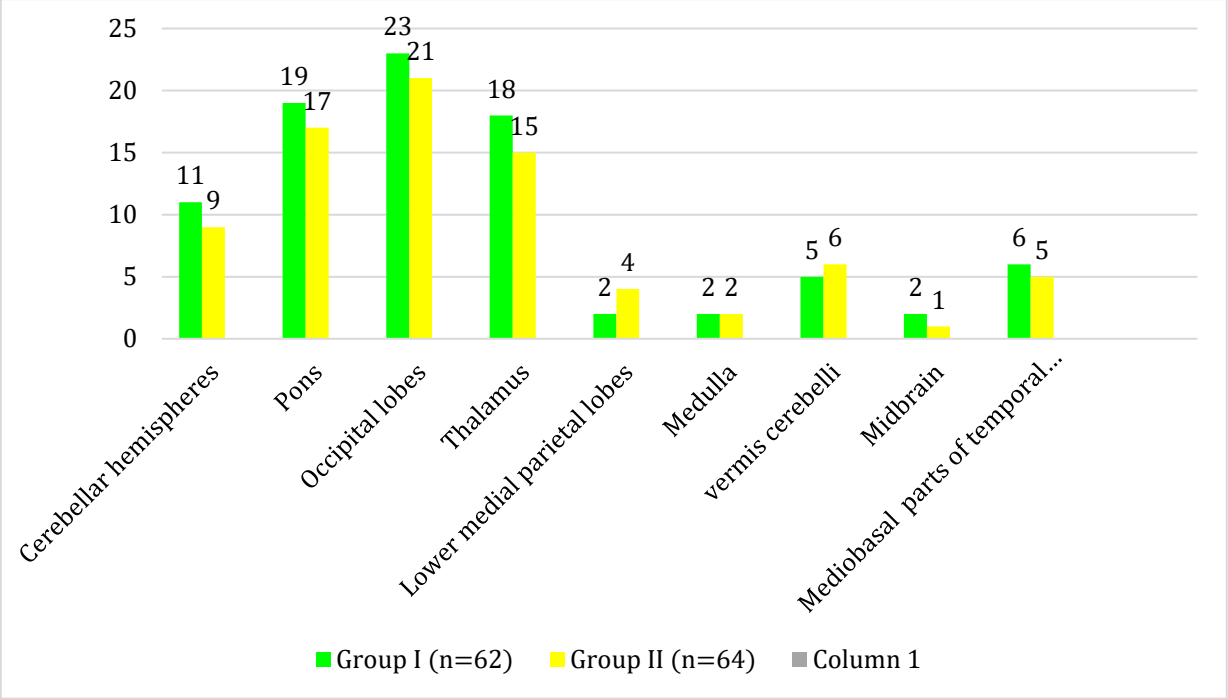
Among men, infarctions in the occipital lobes were detected in 26 patients (43.3% of all men), in the cerebellar hemispheres in 23 patients (38.3%), in the pons of the brain in 14 patients (23.3%), in the thalamus in 7 patients (11.7%), in the mediobasal parts of the temporal lobes in 8 patients (13.3%), in the lower medial parts of the parietal lobes in 5 patients (8.3%), in the cerebellar vermis in 4 patients (6.7%) ), in the medulla oblongata in 5 patients (8.3%), in the midbrain in 4 patients (6.7%).

Among women, infarctions in the occipital lobes were detected in 23 patients (34.8% of all women), in the cerebellar hemispheres in 10 patients (15.2%), in the pons of the brain in 18 patients (27.3%), in the thalamus in 17 patients (25.8%), in the mediobasal parts of the temporal lobes in 5 patients (7.6%), in the cerebellar vermis in 4 patients (6.1%), 2 patients (3%) each had infarctions in the lower medial parts of the parietal lobes, in the medulla oblongata and midbrain (table 3.3).

In the studied patients, only in 42 cases (33.3%) it was possible to reveal complete or partial classical clinical syndromes corresponding to circulatory disorders in certain vessels of the vertebrobasilar basin (VBB)

At the same time, paramedian pontine syndrome occurred in 9 cases (23.7%), ventral pontine syndrome - in 8 cases (21.1%), lateral thalamic (thalamogeniculatory) syndrome - in 8 cases (21.1%), posterior lower cerebellar artery (lateral medullary syndrome) - in 5 cases (13.2%), anterior inferior cerebellar artery syndrome - in 4 cases (10.5%), superior cerebellar artery syndrome - in 4 cases (10.5%), lateral pontine syndrome - in 2 cases (5.3%) and anterolateral thalamic (tuber thalamic) syndrome - in 2 cases (5.3%).

Figure 3.8. Involvement of brain structures in patients with IS in




**VBB with their division into groups**

Based on the above mentioned, an important task was to identify in the studied patients the entire spectrum of clinical manifestations corresponding to the lesion of the brain structures supplied by the blood vessels of VBB and to determine the presence of a statistically significant dependence of clinical manifestations on COPD.

In one patient, as a rule, several clinical symptoms of stroke were determined, both subjective, found during the consideration of complaints and interviewing the patient, and objective, identified by a doctor during a clinical neurological examination.At the same time, certain subjective sensations of patients could not always be objectified during functional tests (for example, a patient complaining of dizziness or feeling unsteadiness, unsteadiness when walking, could stand satisfactorily in the complicated Romberg test and, conversely, was detected in the patient in tests ataxia was not always associated with complaints of impaired coordination).

It was important for us to identify the widest and most complete list of both subjective and objective clinical manifestations of stroke in VBB that were present in the studied patients and to determine their dependence on COPD.

In the studied patients with IS in VBB, paresis and paralysis of the limbs (hemiparesis and hemiplegia, tetra paresis, monoparesis) prevailed in the structure of clinical manifestations, 68 patients had them, which amounted to 54% of all cases, 55 patients (43.7%) had dysarthria. When conducting coordination tests, ataxia was detected in 61 patients (48.4%), including hemiataxy - in 27 patients (22.2%).45 people (35.7%) complained of a subjective feeling of unsteadiness, instability in an upright position, imbalance, 33 people (26.2%) - a feeling of rotational dizziness (vertigo), 2 people (1.6%) - a feeling no rotational dizziness. Nystagmus was detected in 45 patients (35.7%), in 38 patients (30.2%) - depression of consciousness of one degree or another (from stunning to coma), in 31 patients (24.6%) - sensory disturbances (hypesthesia, paresthesia, dysesthesia).There were 26 cases (20.6% each) of hemianopsia and paresis of the oculomotor muscles. 19 people (15.1%) complained of diplopia, 17 patients (13.5%) had autonomic disorders (nausea, vomiting, sweating, palpitations), 14 patients (11.1%) complained of headache.

In 12 cases (9.5% each) there was confusion, dysphagia and visual agnosy, in 7 cases (5.6% each) - aphasia, dysphonia and ignoring syndrome (neglect), in 4 cases (3.2% each) - amnesia, respiratory disorders and syncope episodes.There were also 2 cases (1.6% each) of epic attacks in the disease's debut, visual hallucinations, nonspecific binocular vision disorders, positive visual phenomena (photopsies), and a feeling of marked generalized (general) weakness (Fig. 3.9).

In patients of group I, among the clinical manifestations of IS in VBB, ataxia prevailed, which occurred in 35 patients (56.5%), including hemi ataxia, which occurred in 20 patients (31.3%). Paresis and paralysis of the limbs were detected in 31 patients (50%).

Complaints about a subjective feeling of unsteadiness, instability in an upright position, and imbalance occurred in 25 patients (40.3%). Dysarthria also occurred in 25 cases (40.3%). Nystagmus was detected in 22 cases (35.5%), rotational dizziness (vertigo) - in 20 cases (32.3%), depression of consciousness - in 21 cases (33.9%). Symptoms such as hemianopsia and ophthalmoparesis occurred each in 14 cases (22.6%).Sensory disorders were detected in 12 patients (19.4%), autonomic disorders - in 8 patients (12.9%), diplopia - in 8 patients (12.9%), dysphagia - in 7 patients (11.3%) , aphasia and headache - 6 patients each (9.7% each), dysphonia - 7 patients (11.3%), confusion and visual agnosia - 4 patients each (6.5% each), respiratory failure - 3 patients (4.8%). There were also 2 cases (3.2% each) of amnesia, ignorance syndrome (neglect) and a feeling of generalized weakness (Figure 3.9).

The paresis and paralysis of the limbs prevailed among the patients of the group II; they were detected in 37 patients (57.9%). Dysarthria occurred in 30 cases (47%), nystagmus - in 23 cases (35.9%), sensitive disorders - in 19 cases (29.6%). Ataxia was detected in 26 patients (40.6%), including hemi ataxia - in 7 patients (10.9%).Complaints about a subjective feeling of unsteadiness, instability in an upright position, and imbalance occurred in 20 patients (31.2%). The depression of consciousness was also detected in 17 cases (26.6%). Rotational dizziness (vertigo) was detected in 13 cases (20.3%), diplopia - in 11 patients (17.2%).

Symptoms such as ophthalmoparesis and hemianopsia occurred each in 12 cases (18.7% each), confusion - in 8 cases (12.4% each), autonomic disorders - in 9 patients (14.1%), visual agnosia and headache - in 8 cases (12.5% each), neglect syndrome and dysphagia - in 5 patients (7.8% each). An episode of syncope, like amnesia, occurred in

2 patients (3.2% each), epileptic seizures at the onset of the disease occurred in 1 case (1.6%).And, finally, symptoms such as dysphonia, non-rotational dizziness, positive visual phenomena, nonspecific binocular visual impairment, visual hallucinations and feelings of generalized weakness did not occur in this group of patients. (Figure 3.9).

The Mann-Whitney test did not reveal significant differences in the clinical manifestations of IS in VBB in both groups ($p > 0.05$). According to the correlation analysis, the age of patients with IS in VBB does not have significant relationships with the incidence of clinical manifestations ($-0.3 < r < 0.3$).

In patients with IS in VBB, a significant ($p < 0.05$) average strength direct relationship was detected between NIHSS scores at the time of hospitalization and the frequency of the following clinical manifestations: paresis and paralysis of the limbs ($r = 0.61$), dysarthria ($r = 0.57$), depression of consciousness ($r = 0.58$), respiratory failure ($r = 0.68$). At the same time, a significant ($p < 0.05$) inverse relationship was revealed between the NIHSS scores at the time of hospitalization and the frequency of occurrence of a feeling of unsteadiness, instability in the upright position, imbalance ($r = 0.31$), vertigo ($r = 0, 41$), ataxia ($r = 0.44$).

This is probably due to the insufficient reflection of ischemic symptoms in the VBB in the NIHSS scale. A significant ($p < 0.05$) average direct relationship between the NIHSS scores at the end of treatment and the frequency of depression of consciousness ($r = 0.56$) was found in patients with IS in the VBB.

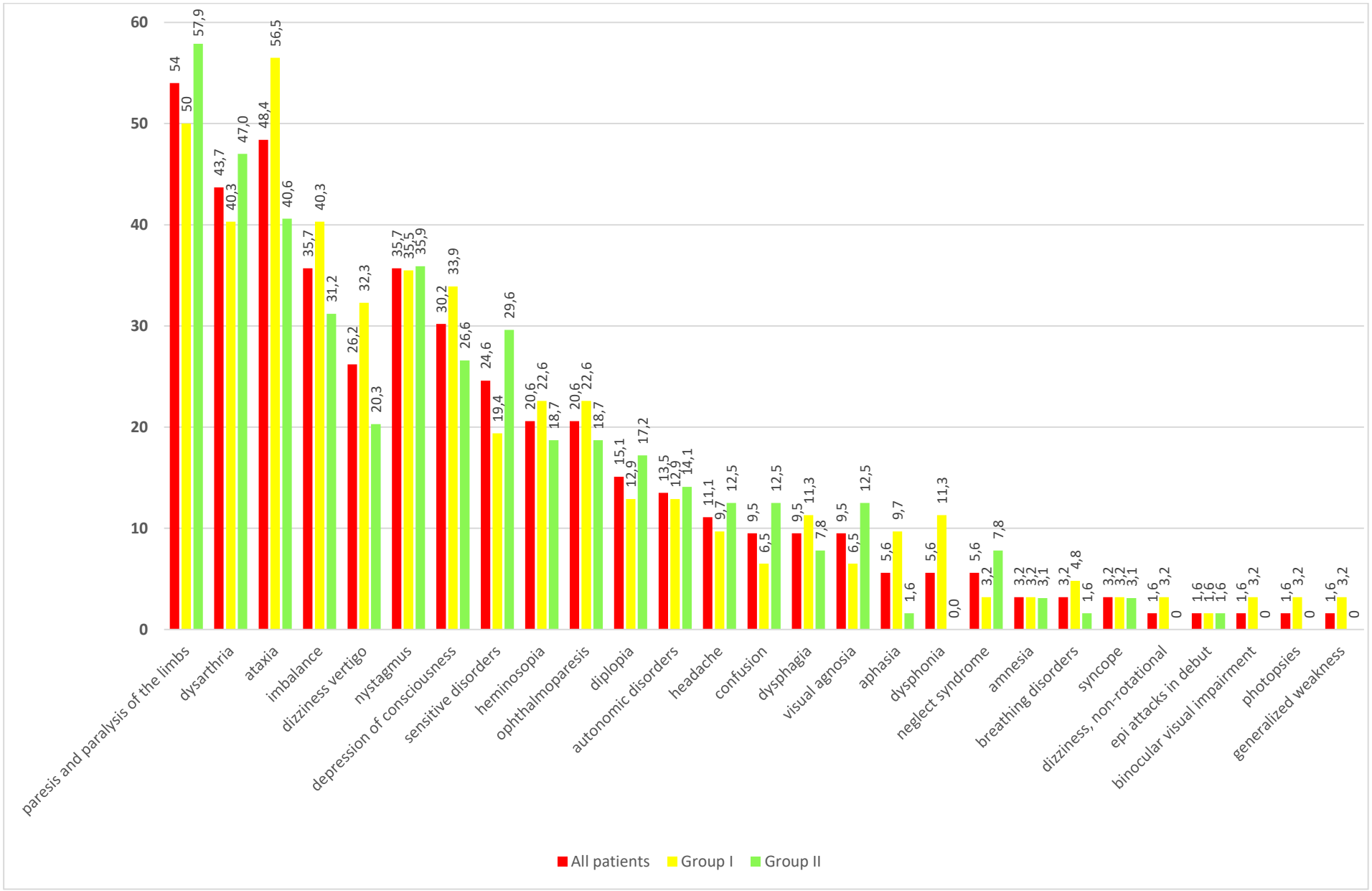



Figure 3.9. Clinical manifestations of the disease in patients with IS in VBB in %

In patients with IS in the VBB, a significant ($p < 0.05$) moderate direct relationship was detected between the Rankin scores at the time of hospitalization and the incidence of depression of consciousness ($r = 0.60$). In patients with IS in the VBB, a significant ($p < 0.05$) moderate direct relationship was detected between the Rankin scores at the end of treatment and the incidence of respiratory failure ($r = 0.34$).

In patients with IS in VBB, a significant ($p < 0.05$) strong direct relationship between the time from the moment of symptom detection to hospitalization and the incidence of sensory disorders ($r = 0.89$) was revealed.

Clinical manifestations were analyzed in patients with different pathogenetic subtypes of IS in VBB (Table 3.3). In patients with LA subtype of IS in VBB, the incidence of paresis and paralysis of the limbs is significantly higher than in patients with strokes of unspecified etiology ($p = 0.045$).

The incidence of ataxia is significantly higher in patients with IS in the VBB HD etiology than in patients with the EC subtype ($p = 0.003$), the AT subtype ($p = 0.017$) and patients with the LA subtype ($p = 0.009$).

In patients with AT subtype of IS in VBB, the frequency of occurrence of a feeling of unsteadiness, instability in the upright position, and imbalance is significantly higher than in patients with LA subtype of IS ($p = 0.038$). In patients with EC subtype IS in VBB, the incidence of a feeling of unsteadiness, unsteadiness in the upright position, and imbalance is significantly lower than in patients with HD etiology strokes ($p = 0.019$).

Table 3.

**Clinical manifestations in patients with different pathogenetic subtypes of IS in VBB**

| Clinical manifestations | AT (n=55) | | EC (n=39) | | LA (n=14) | | HD (n=18) | |
|---|---|---|---|---|---|---|---|---|
| | Abs | % | Abs | % | Abs | % | Abs | % |
| Paresis and paralysis of the limbs | 26 | 47,3 | 26 | 66,7 | 12 | 85,7 | 5 | 27,8 |
| Ataxia | 26 | 47,3 | 13 | 33,3 | 4 | 28,6 | 16 | 88,9 |
| Hemiataxia | 17 | 30,9 | 8 | 20,5 | -- | -- | 5 | 27,8 |
| Dysarthria | 22 | 40,0 | 15 | 38,5 | 6 | 42,9 | 15 | 83,3 |
| Feelings of unsteadiness, unsteadiness in the upright position, imbalance | 24 | 43,6 | 8 | 20,5 | -- | -- | 13 | 72,2 |
| Vertigo | 14 | 25,5 | 5 | 12,8 | 2 | 14,3 | 10 | 55,6 |
| Non-rotational vertigo | 3 | 5,5 | -- | -- | -- | -- | -- | -- |
| Nystagmus | 19 | 34,5 | 13 | 33,3 | -- | -- | 13 | 72,2 |
| Depression of consciousness | 15 | 27,3 | 16 | 41,0 | 2 | 14,3 | 5 | 27,8 |
| Sensitive disorders | 14 | 25,5 | 8 | 20,5 | 8 | 57,1 | -- | -- |
| Hemianopsia | 10 | 18,2 | 13 | 33,3 | 2 | 14,3 | -- | -- |
| Paresis of the oculomotor muscles | 5 | 9,1 | 8 | 20,5 | -- | -- | 8 | 44,4 |
| Diplopia | 7 | 12,7 | 5 | 12,8 | -- | -- | 8 | 44,4 |
| Vegetative disorders | 5 | 9,1 | 5 | 12,8 | -- | -- | 8 | 44,4 |
| Headache | 6 | 10,9 | 5 | 12,8 | 2 | 14,3 | -- | -- |
| Confusion | 4 | 7,3 | 8 | 20,5 | -- | -- | -- | -- |
| Dysphagia | 5 | 9,1 | 5 | 12,8 | -- | -- | 3 | 16,7 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Visual agnosia | 2 | 3,6 | 10 | 25,6 | -- | -- | -- | -- |
| Aphasia | 3 | 5,5 | 3 | 7,7 | -- | -- | -- | -- |
| Dysphonia | 2 | 3,6 | 2 | 5,1 | 2 | 14,3 | -- | -- |
| Neglect Syndrome | -- | -- | 8 | 20,5 | -- | -- | -- | -- |
| Amnesia | 4 | 7,3 | -- | -- | -- | -- | -- | -- |
| Breathing disorder | -- | -- | 5 | 12,8 | -- | -- | -- | -- |
| Syncope | -- | -- | 1 | 2,6 | -- | -- | -- | -- |
| Epi attacks | -- | -- | 1 | 2,6 | -- | -- | -- | -- |
| Visual hallucinations | -- | -- | 1 | 2,6 | -- | -- | -- | -- |
| Binocular visual impairment | -- | -- | 1 | 2,6 | -- | -- | -- | -- |
| Feeling of generalized (general) weakness | -- | -- | -- | -- | -- | -- | 2 | 11,1 |

In patients with strokes in VBB HD etiology, the incidence of a feeling of unsteadiness, instability in the upright position, and imbalance is significantly higher than in patients with LA subtype ($p = 0.009$). In patients with EC subtype of IS in VBB, the incidence of vertigo is significantly lower than in patients with HD strokes ($p = 0.028$). In patients with HD of IS in VBB, the incidence of nystagmus is significantly higher than in patients with LA subtype ($p = 0.013$). In patients with LA subtype of IS in VBB, the incidence of sensory disorders is significantly higher than in patients with HD strokes ($p = 0.031$).

In patients with AT of IS in VBB, the incidence of paresis of the oculomotor muscles is significantly lower than in patients with HD strokes ($p = 0.035$). In patients with AT of IS in VBB, the incidence of autonomic disorders is significantly lower than in patients with HD strokes ($p = 0.028$). In patients with AT of IS in VBB, the incidence of the syndrome of neglect is significantly lower than in patients with the EC subtype ($p = 0.029$).

In patients with IS in VBB, the frequency of the incidence of hemianopsia, hemi ataxia, diplopia, dysarthria, non-rotational dizziness, depression of consciousness, episodes of syncope, confusion, amnesia, positive visual phenomena, nonspecific binocular visual impairment, feelings of generalized weakness, dysphagia, aphasia pain, visual hallucinations, epileptic seizures, dysphonia, respiratory failure does not depend on the subtype of stroke ($p > 0.05$).

In the group of patients with AT of IS, a significant ($p < 0.05$) moderate direct correlation was detected between the number of points on the NIHSS scale at the time of hospitalization and the incidence of paresis and paralysis of the limbs ($r = 0.53$), dysarthria ($r = 0.54$ ), depression of consciousness ($r = 0.61$); significant ($p < 0.05$) average inverse correlation between the number of points on the NIHSS scale at the time of hospitalization and the incidence of vertigo ($r = -0.54$). In the group of patients with AT of IS, a significant ($p < 0.05$) moderate inverse correlation was recorded between the number of points on the NIHSS scale at the end of treatment and the incidence of vertigo ($r = -0.41$).

In the same group of patients with AT of IS, a significant ($p < 0.05$) moderate direct correlation was detected between the number of points on the Rankin scale at the time of hospitalization and the incidence of dysarthria ($r = 0.48$), depression of consciousness ($r = 0.51$).

In the group of patients with EC of IS, a significant ($p < 0.05$) moderate direct correlation was detected between the number of points on the NIHSS scale at the time of hospitalization and the incidence of paresis and paralysis of the limbs ($r = 0.55$), dysarthria ($r = 0.58$), depression of consciousness ($r = 0.57$).There was also a significant ($p < 0.05$) moderate direct correlation between the number of points on the NIHSS scale at the end of treatment and the incidence of dysarthria ($r = 0.67$).There was also a moderate direct correlation between the number of points on the Rankin scale at the time of hospitalization and the incidence of dysarthria ($r = 0.64$), depression of consciousness ($r = 0.62$); significant ($p < 0.05$) average strength inverse correlation between the number of points on the Rankin scale at the time of hospitalization and the incidence of hemiataxia ($r = -0.5$), significant ($p < 0.05$) average strength direct correlation between the number of points according to the Rankin scale at the end of treatment and the incidence of paresis and paralysis of the limbs ($r = 0.60$);significant ($p < 0.05$) average strength inverse correlation between the number of points on the Rankin scale at the time of hospitalization and the incidence of hemiataxia ($r = -0.5$), revealed significant ($p < 0.05$) average strength direct correlation between the number of points according to the Rankin scale at the end of treatment and the incidence of paresis and paralysis of the limbs ($r = 0.60$); significant ($p < 0.05$) mean inverse correlation between the number of points on the Rankin scale at the end of treatment and the incidence of ataxia ($r = -0.62$), hemiataxia ($r = -0.64$), vertigo ($r = -0.52$).

In the group of patients with HD strokes, there was a significant ($p < 0.05$) strong direct correlation between age and the incidence of depression of consciousness ($r = 0.81$), a significant ($p < 0.05$) strong inverse correlation betweenBMI (Body Mass Index) and the incidence of sensation instability, unsteadiness, imbalance ($r = -0.82$) and diplopia ($r = -0.84$). In this group of patients with HD strokes, there was also a significant ($p < 0.05$) strong direct correlation between the number of points on the NIHSS scale at the time of hospitalization and the incidence of paresis and paralysis of the limbs ($r = 0.84$).

Based on the above, the following conclusions can be drawn:

1.In the acute and rehabilitation stages, the clinical picture of the disease is determined by a combination of movement, sensory, coordination disorders, disorders of higher cerebral and mental functions. These syndromes are manifestations of cerebral disintegration. The degree of medical, social and, often, psychological rehabilitation of patients who have undergone IS depends on its regression.

2. In patients with IS in VBB, a significant ($p < 0.05$) average strength direct relationship was detected between NIHSS scores at the time of hospitalization and the frequency of the following clinical manifestations: paresis and paralysis of the limbs ($r = 0.61$), dysarthria ($r = 0.57$), depression of consciousness ($r = 0.58$), respiratory failure ($r = 0.68$).At the same time, a significant ($p < 0.05$) inverse relationship was revealed between the NIHSS scores at the time of hospitalization and the frequency of occurrence of a feeling of unsteadiness, instability in the upright position, imbalance ($r = 0.31$), vertigo ($r = 0, 41$), ataxia ($r = 0.44$). This is probably due to the insufficient reflection of ischemic symptoms in the VBB in the NIHSS scale. A significant ($p < 0.05$) average direct relationship between the NIHSS scores at the end of treatment and the frequency of depression of consciousness ($r = 0.56$) was detected in patients with IS in the VBB.

**3.** In patients with AT of IS in VBB, the incidence of paresis of the oculomotor muscles is significantly lower than in patients with HD strokes ($p = 0.035$).

**4.**In the group of patients with EC of IS, a significant ($p < 0.05$) moderate direct correlation was detected between the number of points on the NIHSS scale at the time of hospitalization and the incidence of paresis and paralysis of the limbs ($r = 0.55$), dysarthria ($r = 0.58$), depression of consciousness ($r = 0.57$). There was also a significant ($p < 0.05$) moderate direct correlation between the number of points on the NIHSS scale at the end of treatment and the incidence of dysarthria ($r = 0.67$).

**5.**In the group of patients with EC of IS, a significant ($p < 0.05$) moderate direct correlation was detected between the number of points on the NIHSS scale at the time of hospitalization and the incidence of paresis and paralysis of the limbs ($r = 0.55$), dysarthria ($r = 0.58$), depression of consciousness ($r = 0.57$). There was also a significant ($p < 0.05$) moderate direct correlation between the number of points on the NIHSS scale at the end of treatment and the incidence of dysarthria ($r = 0.67$).

**References:**

1. Petty G.W, Brown R.D., Whisnant J.P., Sicks J.D, O'Fallon W.M; et al. Ischemic Stroke Subtypes: A. Population-Based- Study- of Functional; Outcome, Survival; and Recurrence//Stroke; - 2001 - Vol 31. - №5. -P. 1062 – 1068., Staessen J.A., Wang J., Thijs L. Cardiovascular protection and blood pressure reduction: a meta-analysis//Lancet. - 2001. - Vol.358.

2. BonitaR. Strokeprevention: aglobalperspective. In: Norris J.W., Hachinski V, editors. Stroke prevention.- Oxford: Oxford University Press, 2001.

3. Appelros P., Nydevik I., Viitanen M. Poor outcome after first -ever stroke: predictors for death, dependency, and recurrent stroke within the first year // Stroke. - 2003. - Vol 34.- № 1.

4. Feigin V.L., Lawes CM., Bennett D.A, Anderson C.S. Stroke epidemiology: a review of population-based studies of incidence, prevalence, and case-fatality in the late 20th century//Lancet Neurol. - 2003.-Vol2.-№l.

5. BerkhemerOA, FransenPS, BeumerD, etal; MRCLEANInvestigators.Arandomizedtrialofintraarterialtreatmentforacuteischemicstroke. NEnglJMed. 2015; 372(1)

6. Кузнецов А.Н., Виленский Б.С. По материалам журнала "CerebrovascularBiseases" (2003; 16, p.311-317). Европейская "инсульт-инициатива" - рекомендации по ведению больных - 2003. / Неврологический журнал. - 2004. - № 3.

7. Евзельман М.А. Совершенствование системы этапной помощи больным с ишемическим инсультом в г. Орле //Журнал неврологии и психиатрии- им. С.С.Корсакова; Инсульт. Приложение к журналу. - 2005.- №14.

8. Виленский Б.С. Инсульт: профилактика, диагностика и лечение. - СПб.: Фолиант, 2002.

9. Виленский Б.С. Инсульт: профилактика, диагностика и лечение. - СПб.: Фолиант, 2002.- 397 с., Гусев Е.И, Скворцова В.И Нейропротективная терапия ишемического инсульта. II Вторичная нейропротекция // Журнал неврологии и психиатрии, (приложение «Инсульт»), - 2002. - № 6

10. Виленский Б.С. Инсульт: профилактика, диагностика и лечение. - СПб.: Фолиант, 2002.-397 с., HackeW., KasteM., OlsenT.S., BogousslavskyJ., OrgogozoJ.M. EUSI: ExecutiveCommittee. Acutetreatmentofischemicstroke // CerebrovascDis.- 2000.-Vol 10. - №3.

11. Кукуев А.А. К проблеме локализации функций мозга // Журнал невропатологии и психиатрии - 1974. - № 5. - С. 769-775., Крыжановский Г.Н.

Пластичность в патологии нервной системы // Журнал невропатологии и психиатрии - 2001. - № 2

12. Silvestrelli G., Parnetti L., Tambasco N.et al. Characteristics of Delayed Admission to Stroke Unit / Perugia Stroke & Neuroradiology Team // Clinical and Experimental Hypertension. – 2006. – Vol. 28 (3-4)

13. Caplan L.R., Wityk R.J., Glass T.A. et al. New England Medical Center Posterior Circulation registry // Ann Neurol. – 2004. – Vol. 56 (3)

14. Searls D.E., Pazdera L., Korbel E. et al. Symptoms and signs of posterior circulation ischemia in the new England medical center posterior circulation registry // Arch Neurol. – 2012. – Vol. 69 (3).

15. Akhtar N., Kamran S.I., Deleu D. et al. Ischaemic posterior circulation stroke in State of Qatar // Eur J Neurol. – 2009. – Vol. 16 (9).

16. Schulz U.G., Fischer U. Posterior circulation cerebrovascular syndromes: diagnosis and management / U.G. Schulz // J NeurolNeurosurg Psychiatry. – 2017. – Vol. 88 (1).

17. Inoa V., Aron A.W., Staff I.et al. Lower NIH stroke scale scores are required to accurately predict a good prognosis in posterior circulation stroke // Cerebrovascular Diseases. – 2014. – Vol. 37.

18. Chung C.P., Yong C.S., Chang F.C. et al. Stroke etiology is associated with outcome in posterior circulation stroke // Ann ClinTransl Neurol. – 2015. – Vol. 2 (5).

19. Min-Lai S., Duncan P.W. Evaluation of the American Heart Association Stroke Outcome Classification // Stroke. – 1999. – Vol. 30.

20. Чуканова Е.И., Ходжамжаров Б.Э., Чуканова А.С. и др. Вертебробазилярныесиндромы // ConsiliumMedicum. – 2014. – Т. 16, № 2. – С. 5-9., Markus H.S., H.B. van der Worp, Rothwell P.M. Posterior circulation ischaemic stroke and transient ischaemic attack: diagnosis, investigation, and secondary prevention // Lancet Neurology. – 2013. – Vol. 12 (10).

21. Nouh A., Remke J., Ruland S. Ischemic posterior circulation stroke: a review of anatomy, clinical presentations, diagnosis, and current management // Front Neurol (Published online). – 2014. – Vol. 5 [Электронныйресурс]. – Режимдоступа: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3985033/pdf/fneur-05-00030.pdf.

22. Owolabi L.F., Ibrahim A., Musa I. Infratentorial posterior circulation stroke in a Nigerian population: Clinical characteristics, risk factors, and predictors of outcome // J Neurosci Rural Pract. – 2016. – Vol. 7 (1).

23. Захаров В.В. Медикаментозная терапия в восстановительном периоде инсульта // Фарматека. – 2015. – № 9.

24. Schulz U.G., Fischer U. Posterior circulation cerebrovascular syndromes: diagnosis and management // J NeurolNeurosurg Psychiatry. – 2017. – Vol. 88 (1).

25. Lindmark B. Evaluation of functional capacity after stroke with special emphasis on motor function and activities of daily living // Scand. J. Rehabil. Med. Suppl. – 1988. – Vol.21.

26. Иванова Г.Е. Методические рекомендации для пилотного проекта «Развитие системы медицинской реабилитации в Российской Федерации» 2016.