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Research Article

APPLICATION OF NEUROLOGICAL RATING SCALES IN THE ACUTE AND EARLY RECOVERY PERIODS IN SELECTED SUBTYPES OF ISCHEMIC STROKE

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ABSTRACT

A study was made of the validity of some neurological assessment scales in the acute and early rehabilitation periods for certain subtypes of ischemic stroke. 110 patients with ischemic stroke (IS) were examined. In the study of neurological status, the international scale NIHSS was used, the degree of disability after IS was studied using the Rankin scale. tests were carried out in the acute period in the hospital and in the early period of rehabilitation. Both in general and in individual pathogenetic subtypes, there is a tendency (in most cases, statistically significant) to a decrease in the severity of stroke and the severity of neurological and neuropsychological changes, which is assessed in a scoring system using scales and allows you to more accurately track the dynamics of each individual patient or patient groups.

KEYWORDS

Ischemic stroke, neurological rating scales.

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INTRODUCTION

Ischemic stroke (IS) predominates in the structure of acute cerebrovascular accident (CVA). Ischemic stroke is a clinical syndrome represented by focal and/or cerebral disorders that develops suddenly due to a cessation of blood supply to a certain part of it as a result of occlusion of the arteries of the head/neck with the death of brain tissue [4].

In terms of the concept of heterogeneity of cerebral infarction, clinical and neurological study of various pathogenetic subtypes of ischemic stroke (IS) is of great importance. According to E.I. Guseva et al. [1], distinguish the following periods of stroke: the most acute period - the first 3-5 days after the onset of stroke; acute period - up to 21 days; early recovery period - 6 months; late recovery period - up to two years after stroke. The most acute and acute periods of IS are the most important links in the development and course of an acute ischemic cerebrovascular accident, they directly reflect the severity of a stroke; the immediate and long-term medical and social outcomes largely depend on the characteristics of their course [2].

To objectify the severity of IS, the severity of neurological changes and disturbances in daily life, neurological assessment scales have recently been actively used, such as the NIHSS scale, the Scandinavian scale, the Barthel scale, etc. However, in the literature there is insufficient and extremely scarce information on the use of clinical assessment scales in patients in the acute and early rehabilitation periods with various pathogenetic subtypes of IS.

PURPOSE OF THE STUDY

To clarify the value of individual assessment clinical scales in patients in acute and early rehabilitation periods of IS, taking into account its pathogenetic subtypes to objectify the severity of IS, the severity of neurological and neuropsychological changes, and impairments in functional daily life.

MATERIALS AND METHODS

Our study was conducted in the Department of Neurology of the City Clinical Hospital №1 in Tashkent from 2017-2019. We examined 110 patients with MRI and clinically confirmed IS. The

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distribution of patients by type of IS is presented in Table 1.

Table 1. Distribution of patients by sex, age and subtype of ischemic stroke (M±m)

IS subtype	Age (years)	Men		Women		Total	
		N	%	n	%	n	%
Atherothrombotic	62,6±3,2	19	17,3	23	20,9	42	38,2
Lacunar	59,4±2,7	16	14,5	14	12,7	30	27,3
Cardioembolic	57,2±3,1	12	10,9	10	9,1	22	20,0
Hemodynamic	75,2±3,4	7	6,4	9	8,2	16	14,5
Total	65,9±3,1	54	49,1	56	50,9	110	100

Neurological examination of patients in 86 (78.2%) patients revealed motor disorders in the form of mild or moderate right-sided hemiparesis - 60 (54.5%) of them, left-sided hemiparesis - in 26 (23.6%) patients; coordinating (77.4%) and sensitive (64.5%) disorders. All these symptoms were not detected in lacunar IS. Elements of motor aphasia were observed in 7 (6.4%) patients, sensory - in 5 (4.5%), mixed aphasia - in 4 (3.6%).

When examining the neurological status of our patients, we used the international scale NIHSS, which was presented by the American National Institutes of Health (National Institutes of Health Stroke Scale). This scale is used to objectively assess the condition of a patient with IS. We studied the degree of disability after IS using the Rankin scale. The tests were performed in the acute period in the hospital and in the early period of rehabilitation (6 months after discharge from the hospital).

RESULTS AND DISCUSSION

An analysis of the clinical picture in the acute period of stroke revealed that the duration of impaired consciousness was more than 1.4 times longer in groups of patients with atherothrombotic and lacunar IS. This indicates

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an initially more severe condition of such patients, which is associated with the severity of IS itself, and with the presence of severe concomitant comorbid somatic pathology. The leading symptoms in the clinical picture of all study groups were motor, speech and sensory disorders, central paresis of the VII and XII cranial nerves, more pronounced in groups of patients with atherothrombotic and lacunar IS. In these groups, the NIHSS scores were higher than in the other two groups ($p<0.005$), which corresponds to a more severe neurological deficit in the groups of patients with atherothrombotic and lacunar IS, due to the high frequency of multiple localization of IS and the presence of comorbid somatic pathologies. Rankin scores in patients with atherothrombotic and lacunar IS were also significantly worse compared to groups of patients with cardioembolic and hemodynamic IS (Table 2).

Table 2. Mean scores on the NIHSS and Rankin scales in the acute period of IS (M±σ)

Form IS	NIHSS scale, points, M+σ	Rankin scale scores,M+σ
Atherothrombotic (n=42)	11,6±1,2	12,4±1,5
Lacunar (n=30)	10,3±1,7	11,2±1,3
Cardioembolic (n=22)	10,1 ±1,6	10,7±1,4
Hemodynamic (n=16)	10,2±1,7	10,4±1,6

In patients with atherothrombotic and lacunar IS, there was a less pronounced tendency to a decrease in the severity of focal neurological symptoms compared with groups of patients with cardioembolic and hemodynamic IS. This is probably due to a lack of neuroplasticity and a lack of the necessary energy expenditure, which leads to a lesser regression of symptoms.

For additional assessment of neurological status in the early rehabilitation period, the Barthel Index was used (score assessment of daily activities and ability to serve oneself) [3]. In the Barthel scale, the sum of points from 0 to 45 corresponds to severe disability (significant or complete impairment of neurological functions), 50-70 points - moderate disability (limitation of neurological functions), 75-100 points - minimal

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limitation or preservation of neurological functions [5]. According to the Kansas City Stroke Study, the Barthel Index scale has a "ceiling effect" in patients with minimal stroke consequences (most patients get high scores) and the scale is not sensitive enough for mild strokes [6].

In our study, there were no statistically significant changes in the Barthel scores for various subtypes of IS (Table 4).

Table 4 Barthel Index indicators with different subtypes of IS (scores, M±σ)

Atherothrombotic (n=42)		Lacunar (n=30)		Cardioembolic (n=22)		Hemodynamic (n=16)	
3 months	6 months	3 months	6 months	3 months	6 months	3 months	6 months
59,4±3,5	67,8±3,7	61,3±3,2	69,7±3,4	61,4±3,7	67,2±3,6	63,2±3,5	72,9±3,2

At the same time, in the neurological status of all patients, an improvement in superficial and deep sensitivity was observed. So, in 18 (20%) patients they completely regressed. In these same patients with almost completely recovered speech disorders. All patients noted an increase in general tone, an improvement in mood, an increase in activity, self-confidence during classes - this was of particular importance for the rehabilitation of patients with more pronounced neurological deficits. However, these changes in the status of patients were not reflected in the Barthel scale as a non-significant difference.

To assess the neuropsychological status in the acute and early rehabilitation period in all patients with IS, we used the Montreal Cognitive Assessment Scale (MoCA) and the Hospital Anxiety and Depression Scale (HADS). For each subgroup of both groups, the average value of the scales was calculated.

The time for MoCA was about 10 minutes for each patient. The maximum possible number of points - 30, 26 points or more was considered a normal indicator.

The time for self-completion by the patient, after instructing, of the HADS scale form was also about 5-10 minutes. The classical form of the HADS scale for cognitively intact patients includes questions of the anxiety subscale with odd numbers, questions of the depression subscale with even numbers, the scores of odd and even questions were calculated separately, obtaining

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two scores for each subscale. Questions were given to each patient separately to prevent data distortion. The score result was interpreted according to the following criteria: 0-7 points "normal" (absence of significantly expressed symptoms of anxiety and depression), 8-10 points "subclinically expressed anxiety / depression", 11 points and above "clinically expressed anxiety / depression".

The analysis revealed a direct correlation between the average scores of both scales (HADS - 2 indicators) with the general neurological status of patients (Table 3).

Table 3. Neuropsychological status of patients in the acute period depending on the type of IS (scores, M±σ)

Patient groups	Neuropsychological status		
	MoCA	HADS anxiety	HADS depression
Atherothrombotic (n=42)	19,1±2,2	8,2±1,3	7,5±0,8
Lacunar (n=30)	20,2±2,4	7,8±1,1	7,1±0,9
Cardioembolic (n=22)	20,8±1,9	7,6±1,4	7,2±1,2
Hemodynamic (n=16)	21,1±1,8	7,3±1,2	7±1,1
Average (n=72)	20,6±2,2	7,8±1,3	7,3±0,9

Based on the visual indicators, we concluded that significantly lower scores on the MoCA scale and higher scores on both HADS subscales were found in patients with more pronounced disorders in the neurological status of patients, which once again confirms the dependence of the neuropsychological status on the functional state of the brain.

The rate of regression of both neurological and neuropsychological disorders in the early rehabilitation period in patients with cardioembolic and hemodynamic IS subgroups was somewhat more intense than in the subgroup with atherothrombotic IS (about 1.6 times). In patients with subgroups with cardioembolic and hemodynamic IS, the overall improvement was 13.2%, versus 6.3% in the subgroup with atherothrombotic IS. In dynamics, after 6 months, the increase was 21.3% against 14.9%, respectively.

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Detailed indicators of the scales of the neurological and neuropsychological status of patients in both subgroups are presented in Table 4.

Subgroups with atherothrombotic and lacunar IS showed significantly higher levels of anxiety and depression ($p<0.05$). The average decrease in HADS scores was 1.1±0.3 points for anxiety and 1.3±0.4 for depression ($p<0.05$). The average increase in points on the MoCA scale in patients with atherothrombotic and lacunar IS subgroups was 2.6±0.8 points.

In subgroup patients with cardioembolic and hemodynamic IS, significantly lower HADS scores were observed, and their regression did not have significant differences - 1.7±0.3 points for anxiety and 1.9±0.4 for depression, according to the MoCA scale, the dynamics of recovery functions was better - the average increase was 3.4±0.6 ($p<0.05$).

Table 4. Dynamics of indicators of scales of neurological and neuropsychological status of patients in the early rehabilitation period, depending on the subtype of IS (points, M±σ)

Scale sections		Max score / norm	Patient groups							
			Atherothrombotic (n=42)		Lacunar (n=30)		Cardioembolic (n=22)		Hemodynamic (n=16)	
			3 mont	6 mont	3 mont	6 mont	3 mont	6 mont	3 мес	6 мес
Barthel Index		100	58,6±5,2	65,1±4,3*			58,8±4,4	68,3±3,4*	59,7±5,6	72,2±3,8
MoCA		30	21,2±2,3	23,4±2,6	23,1±2,1	24,8±3,1	22,3±2,8	23,6±2,4	23,6±2,7	25,4±2,4
HADS	Anxiety	7	8,2±1,3	7,4±1,5	7,8±1,1	6,7±1,2	8,1±1,4	7,1±1,2	7,3±0,8	6,3±0,9
	Depression	7	7,5±0,8	6,4±0,9	7,1±0,9	6,4±1	7,6±0,7	6,7±0,8	6,1±0,7	5,4±0,9

CONCLUSION

Thus, the presence in the arsenal of a neuropathologist of various reliable tools for objective and subjective assessment of the patient's condition, both purely neurological - NIHSS (National Institutes of Health Stroke Scale - for an objective assessment of the condition of a patient with IS) and the Rankin scale (studies the

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degree of disability after IS), and and neuropsychological - MoCA (Montreal Cognitive Assessment Scale) and HADS (Hospital Anxiety and Depression Scale) allows you to assess the condition of each patient almost completely and comprehensively.

The use of assessment clinical scales: NIHSS and Rankin in the acute period allows us to quantify (in points) the severity of IS, both in general and in individual pathogenetic subtypes, as well as the severity of neurological changes. The Barthel scale in our study did not show statistically significant differences between IS subtypes.

Neuropsychological scales for assessing cognitive functions (MoCA) and the Hospital Anxiety and Depression Scale (HADS) allow for an objective assessment of the psychological state of each patient or groups of patients, allow you to assess the dynamics of state changes in different periods of IS.

In the time interval from the beginning of the acute period to the end of the period of early rehabilitation of IS, both in general and in individual pathogenetic subtypes, there is a tendency (in most cases, statistically significant) to a decrease in the severity of stroke and the severity of neurological changes.

REFERENCES

1. Stroke: diagnosis, treatment, prevention / Ed. BEHIND. Suslina, M.A. – Moscow: MED press-inform. – 2008. – P. 288.
2. Berkhemer OA, Fransen PS, Beumer D, et al; MR CLEAN Investigators.A randomized trial of intraarterial treatment for acute ischemic stroke. N Engl J Med. 2015; 372(1):11-20
3. Duncan P.W., Jorgensen H.S., Wade D.T. Outcome Measures in Acute Stroke Trials: A Systematic Review and Some Recommendations to Improve Practice // Stroke. –2000. – Vol. 31. – P. 1429 – 1438.
4. Cardiogenic and angiogenic cerebral ischemic stroke (physiological mechanisms and clinical implications) / Y. L. Shevchenko, M. M. Odinak, A. N. Kuznetsov, A. A. Yerofeev. — M: GEOTAR-media, 2006. — 270 P.
5. Mikhaevich S.A. Movement recovery and neuroprotective therapy of acute ischemic stroke / V.A. Provotorov, S.A. Mikhaevich,

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Publisher: Frontline Journals

L.N. Anisimova , N.V. Tzygan, I.A. Voznyuk // Int. J. of Stroke. – 2008. – Vol. 3, – P. 472.

6. Min-Lai S., Duncan P.W. Evaluation of the American Heart Association Stroke Outcome Classification // Stroke. – 1999. – Vol. 30. – P. 1840-1843.