Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 05, August, 2025
Website: usajournals.org

THE INFORMATIVE VALUE OF THE ASSESSMENT SCALES IN THE CHANGE BLOOD BIOMARKERS OF PATIENTS WITH ISCHEMIC STROKE

Gazieva Sh. R.
Tashkent State Medical University

Abstract
For a quick assessment of the condition and the development of an individual treatment plan in patients with ischemic stroke, the scale indicators correlate with more pronounced neurological symptoms, an aggravation of the course of the disease and an increase in the duration of hospitalization. For the rapid assessment of neurological status and the development of individualized therapy, the use of the Rankin, Rivermead, MoSs, and NIHSS scales is recommended. Studies have also established the effectiveness of correcting the standard therapy for ischemic stroke by including the nootropic oxiracetam, the dietary supplement GLA, the restoring deficiency of DGLA and the anticoagulant rivaroxaban, which significantly reduce the duration and unfavorable outcomes of rehabilitation compared with conventional therapy.

Keywords: Ischemic stroke, Rankin, Rivermead, MoSa, NIHSS, PLA2G2E, DGLA and PADI4, D-dimer.

Introduction

According to a new report by the World Stroke Organization's Commission on Neurology, if urgent action is not taken, global stroke deaths will increase by 50% by 2050, reaching 9.7 million cases per year. The economic consequences will also be significant: annual costs may reach 2 billion euros. The report highlights that an increase in morbidity will lead to a significant increase in the medical and economic consequences of stroke between 2020 and 2050, with low- and middle-income countries being the most vulnerable. Stroke is highly common: an analysis of studies has shown that its prevalence exceeds 2%, varying in most

Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 05, August, 2025
Website: usajournals.org

studies from 1% to 3%. These data reflect the general prevalence of stroke among patients [1].

It should be noted that stroke is an acute disorder of cerebral circulation that requires immediate diagnosis and treatment. Every minute of delay can lead to permanent brain damage and disability. In conditions of limited time and resources, especially at the prehospital stage and in small medical institutions, the use of standardized assessment scales (Rankin, Rivermead, MoSa, NIHSS) is becoming a critically important tool. These scales allow you to quickly and objectively assess the patient's condition, suspect an attack and determine the tactics of further actions, which ultimately increases
the chances of a favorable outcome.

Treatment of ischemic stroke (IS) is carried out in accordance with modern international standards. It includes correction of the water-electrolyte balance, maintenance of adequate blood oxygenation, glucose level control, prevention of hyperthermia and seizures, as well as reduction of intracranial pressure. Neuroprotective and antioxidant therapy, the appointment of anticoagulants and antiplatelet agents, and ensuring adequate nutritional status are also recommended. A new generation anticoagulant, rivaroxaban, is of interest. This drug is a highly selective direct inhibitor of factor Xa, is characterized by high oral bioavailability and is comparable in effectiveness to warfarin in the prevention of thromboembolism in patients with non-valvular atrial fibrillation. There is evidence of the successful use of new oral anticoagulants as an alternative to vitamin K antagonists for long-term prevention of stroke and other conditions [2-5].

In the context of stroke prevention and treatment, especially ischemic stroke, it is important to consider not only the acute phase, but also the long-term perspective. The use of rivaroxaban as an alternative to warfarin or vitamin K antagonists opens up new possibilities for patients requiring long-term anticoagulant therapy. The convenience of oral administration and predictable pharmacokinetics of the drug can increase patient adherence to treatment and, as a result, reduce the risk of recurrent strokes and other thromboembolic complications.

Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 05, August, 2025
Website: usajournals.org

However, it is necessary to take into account the individual characteristics of each patient, including the presence of concomitant diseases, the risk of bleeding and drug interactions. Careful monitoring of the patient's condition and regular evaluation of the effectiveness and safety of therapy are key to achieving optimal results.

Further studies aimed at studying the long-term efficacy and safety of rivaroxaban and other new oral anticoagulants in various groups of patients at risk of stroke are necessary to optimize strategies for the prevention and treatment of this serious disease. It is also important to investigate the effect of these drugs on cognitive function and quality of life in stroke patients.

The aim of the work was to evaluate the degree of effectiveness of including rivaroxaban in the adapted rehabilitation program for patients after acute ischemic stroke using neuroimaging methods and standardized assessment scales.

Materials

The study included 70 patients with low levels of PLA2G2E, DGLA and PADI4 biomarkers who had suffered a cerebral stroke. To ensure the reliability of the data, patients with the most common atherothrombotic subtype of stroke were selected. The participants were divided into two groups: Group A consisted of 40 patients with ischemic stroke and low triad values who were prescribed anticoagulants, including rivaroxaban 20 mg, as well as oxiracetam, as part of basic therapy. In addition to basic therapy, patients in this group underwent additional treatment aimed at increasing the level of DGLA, which is the first link in the chain of the so-called triad of biomarkers (PLA2G2E, DGLA and PADI4), interconnected in their functional significance. To do this, they were prescribed a dietary supplement containing DGLA, which is Borago oil. Group B included 30 patients who received only basic therapy.

The average age of the participants in the main group was 60.7±0.92 years, of which 67.1% (47 people) were men with an average age of 60.5±1.42 years, and 32.9% (23 people) were women with an average age of 60.1±1.95 years. In the comparison group, the average age was 60.3±1.4 years, of which 57.5% (23

Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 05, August, 2025
Website: usajournals.org

people) were men with an average age of 60.2±1.83 years, and 42.5% (17 people) were women with an average age of 60.4±2.08 years.

All patients underwent clinical and neurological examination according to the standard procedure upon admission. The degree and nature of cognitive impairments, the possible increase in cognitive disorders, the dynamics of the disease development were also assessed, as well as a detailed analysis of somatic and neurological statuses. The diagnosis was carried out in accordance with ICD-10.

In group A, along with standard therapy, patients received rivaroxaban in 20 mg tablets once a day. To increase the level of GLA (gamma-linolenic acid), borage oil was prescribed to group A patients at a dose of 150 mg (10 drops) three times a day with oral meals for 3 months. The choice of dose was based on the results of previous studies that showed the effectiveness of adding borage oil to the diet to increase the level of DGLA (digomo-gamma-linolenic acid) in the blood serum in dermatitis [6]. The dose was adjusted to account for the partial decomposition of the oil in the stomach.

Oxiracetam was administered according to the following regimen: intravenously in the form of a solution prepared from a powder, at a dose of 4-6 g per day for 21 days, followed by a switch to taking capsules of 2 capsules 2-3 times a day. The total duration of therapy was 3 months in both group A and group B, who received standard therapy.

The severity of craniocerebral innervation insufficiency, motor function, the nature of muscle tone, changes in tendon reflexes, the presence of pathological signs, coordination and sensitivity disorders, as well as higher brain functions were assessed using neurological scales (Rankin, Rivermead, MoSa, and NIHSS).

Among other things, the effectiveness of rivaroxaban was monitored by monitoring the level of D-dimer in the blood, since an increase in the level of D-dimer, according to previous studies, may be a risk factor for recurrent stroke, therefore, its indicators reflect the effectiveness of the anticoagulants used.

The results and their discussion. In group A, who received additional therapy, there was a significant improvement on the Rankin scale: on day 10, the indicator

Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 05, August, 2025
Website: usajournals.org

increased by 7.3%, and by the end of follow-up - by 41% ($p < 0.01$). In group B, the changes were less pronounced: on day 10 - only 1.14%, and by the end of follow-up — 11.9% ($p > 0.05$). These results confirm the effectiveness of the prescribed therapy and significant improvements in the main group A (see Fig. 1).

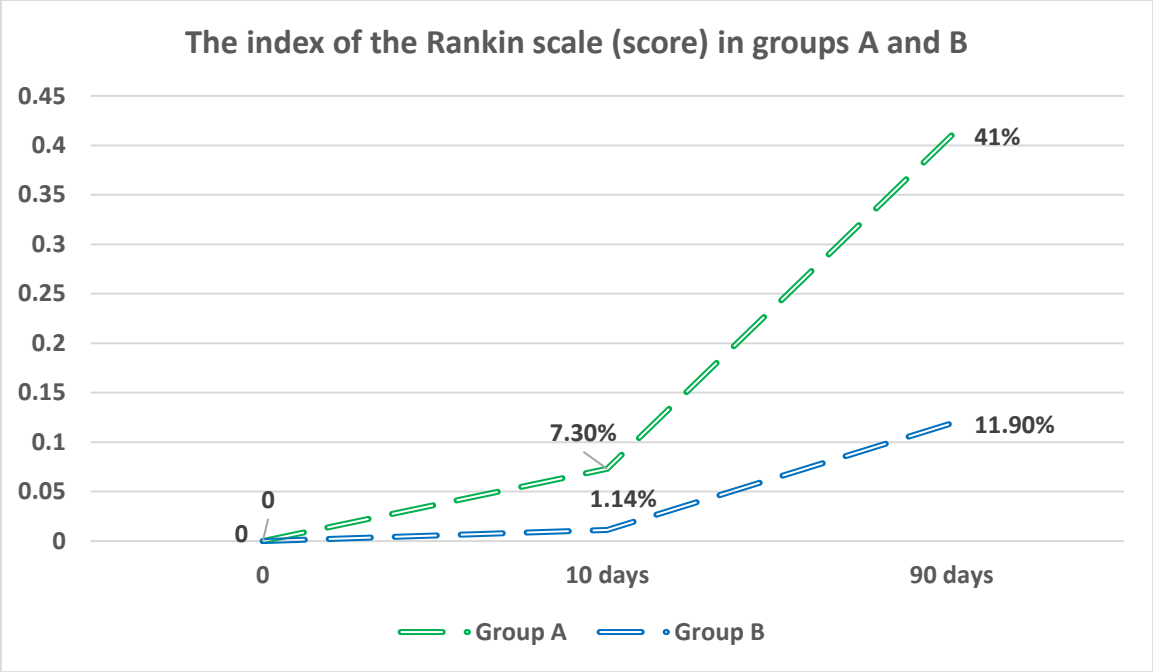

Figure 1. The degree of improvement of the indicator on the Rankin scale in the groups A and B for the full observation period

According to the Rivermead scale, before starting treatment in both groups, 2.5% of patients scored 10-11 points, 15% — 8-9 points, 32.5% — 5-7 points, and 50% — 2-4 points. After rehabilitation measures in group A, 10% of patients reached 14-15 points, 35% - 11-13 points, 47.5% — 8-10 points, and 7.5% — 6-7 points. In group B, at the end of follow—up, 8% of patients scored 10-11 points, 23.5% scored 8-9 points, 28.5% scored 5-6 points, and 40% scored 2-4 points.

The dynamics of improvement on the Rivermead scale in group A showed an increase of 39.3% on day 10 and 112.1% by the end of follow-up, which indicates the reliability of the changes ($p < 0.01$). In group B, the improvement on day 10 was only 5.4%, and by the end of follow-up it was 38.4% ($p < 0.01$) (see Fig. 2).

Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 05, August, 2025
Website: usajournals.org

These data confirm that enhanced therapy in the main group A significantly improved the quality of life compared with group B, and the effectiveness of rehabilitation therapy was achieved in a shorter time (see Fig. 2).

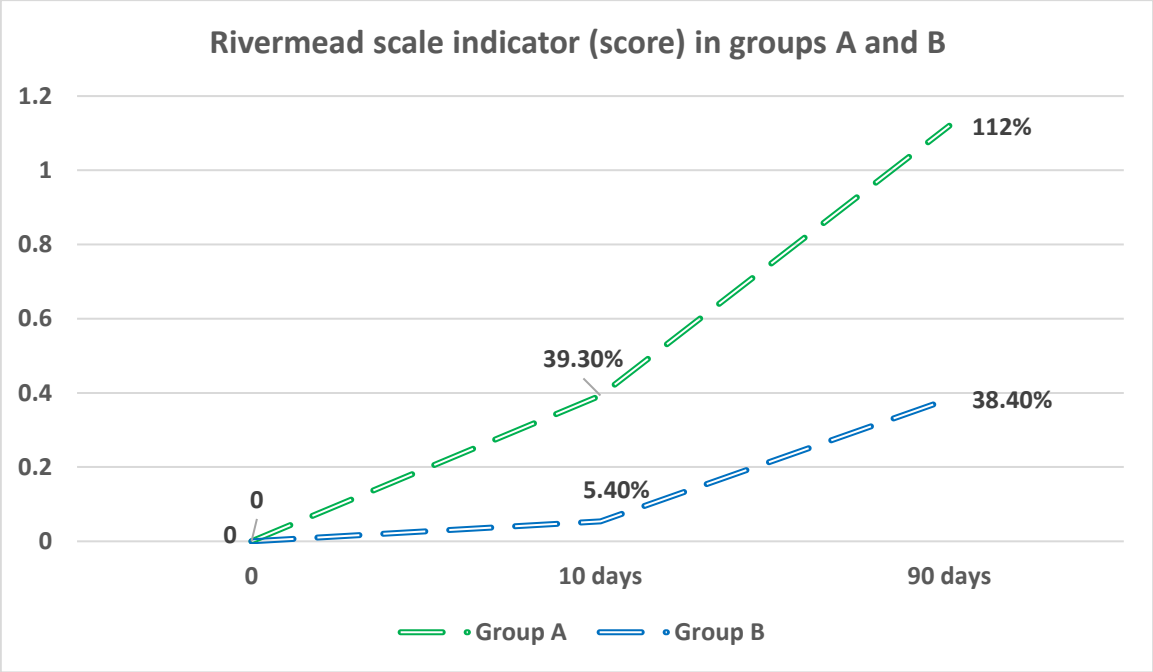

Figure 2. The degree of improvement of the Rivermead score in the groups A and B for the full observation period

According to the results of the assessment of cognitive functions on the MoCA scale in group A after treatment, the average score was 25.9 ± 1.30, which corresponds to mild cognitive impairment. This improvement is statistically significant ($p < 0.01$) compared with the baseline before treatment (20.5 ± 2.17) (Fig. 3).

In group B, the average MoCA score after treatment was 22.1 ± 2.30, which corresponds to moderate cognitive impairment. The improvement in this group did not reach statistical significance ($p > 0.05$) compared with the baseline indicator.

The dynamics of improvement on the MoCA scale in group A shows an increase of 9.8% on day 10 and a statistically significant 26.3% ($p < 0.01$) by the end of the observation period. In group B, the improvement was only 3.9% on day 10

Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 05, August, 2025
Website: usajournals.org

and 8.9% by the end of the study, which is not statistically significant ($p > 0.05$) (Fig. 3).

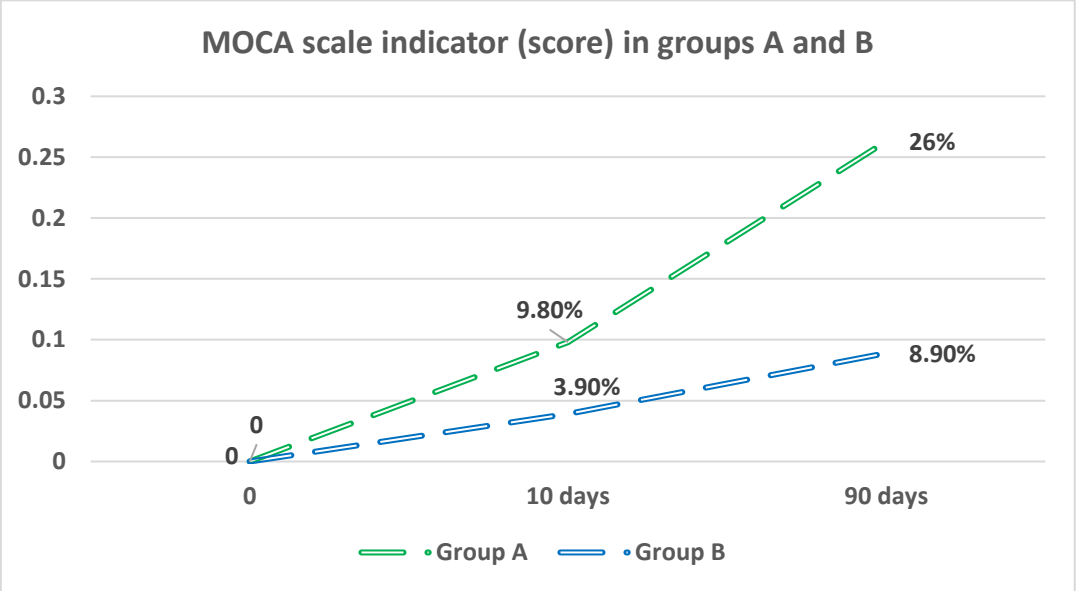

Figure 3. The degree of improvement of the indicator on the MoHs scale in the groups A and B for the full observation period

Analysis of individual cognitive functions

Before treatment, visual-spatial and constructive praxis disorders were observed in 37.5% of patients in group A and in 40% of patients in group B. In group A, after treatment, the proportion of patients with apraxia decreased to 20%, while in group B it remained almost unchanged (36.6%).

Delayed reproduction disorders before treatment were observed in 95% of patients in group A. After treatment, their proportion decreased statistically significantly by more than half, to 45% ($p < 0.01$). In group B, disorders of delayed reproduction after treatment were detected in 86.6% of patients.

Abstraction disorders before treatment were observed in 82.5% of patients in group A. After treatment, their proportion decreased threefold to 27.5% ($p < 0.01$). In group B, posttreatment aberration was observed in 73.3% of patients.

Errors in performing attention and counting tests before treatment were noted in 87.5% of patients in both groups. After treatment, the proportion of patients in group A who made mistakes decreased to 37.5%. In group B, 76.6% of patients

Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 05, August, 2025
Website: usajournals.org

made errors in attention and counting tests after treatment, which is statistically significantly higher than in group A ($p < 0.01$).

Errors in orientation tests before treatment were noted in 37.5% of patients in both groups. After treatment in group A, the proportion of patients making mistakes decreased to 15%, which indicates a pronounced positive trend. In group B, 30% of patients made mistakes in orientation tests after treatment.

According to the NIHHS scale used to assess the level of neurological deficit, 12.5% of patients had severe neurological disorders (13 points), 62.5% had moderate disorders (9-12 points), and 25% had mild disorders (7 points) before starting treatment.

After rehabilitation measures in group A, 2.5% of patients had moderate neurological disorders (9 points), 85% had mild disorders (3-8 points), and 12.5% were assessed as satisfactory (2 points). In group B, after rehabilitation, 3.5% of patients had severe neurological disorders (13 points), 42% had moderate disorders (9 points), 51.2% had mild disorders (3-8 points), and 3.3% were assessed as satisfactory (2 points) (Fig. 4).

The dynamics of improvement in the NIHHS score in group A shows an increase of 11% on day 10 and a significant improvement of 49.6% ($p < 0.01$) by the end of follow-up. In group B, the improvement on day 10 was only 3.1%, and by the end of follow-up it was 19.2%, indicating a slower recovery compared to Group A (Fig. 4).

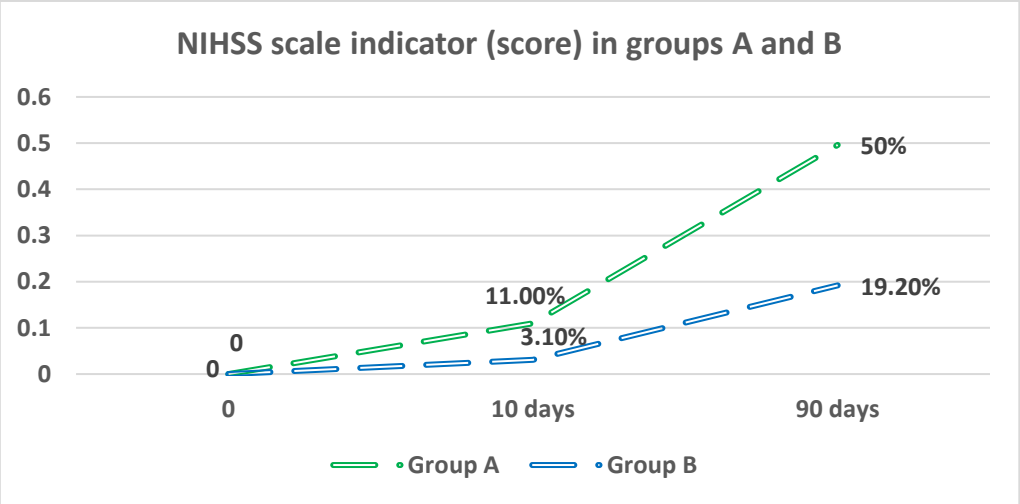

Figure 4. The degree of improvement of the indicator on the NIHHS scale in the groups A and B for the full observation period

Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 05, August, 2025
Website: usajournals.org

As for the D-dimer index, there is a significant recovery trend in group A, while in group B the changes were insignificant (Fig. 5).

The conducted studies and data analysis for the specified period showed the presence of positive correlations between the scales before and after treatment. The more pronounced the values of the scales are before treatment, the more noticeable the changes after it.

After therapy, patients in both groups showed positive dynamics in both subjective and objective indicators: the number of complaints of headache, dizziness, motor disorders and other symptoms decreased significantly. The main parameters reflecting neurological status and daily activity showed an improvement trend after three months of treatment, and in group A the changes were more pronounced.

The study conducted using the selected scales demonstrated high sensitivity and informative value. The use of rivaroxaban in combination with the nootropic oxiracetam and the dietary supplement GLA helps to accelerate the processes of neuroplasticity and shorten the rehabilitation period. An analysis of the dynamics of neurological parameters in patients receiving complementary therapy along with standard therapy confirmed the positive effect of correction of rehabilitation procedures on the restoration of functional activity of the trophic systems of the brain, as well as on trophism and regeneration of cholinergic neurons of the central nervous system.

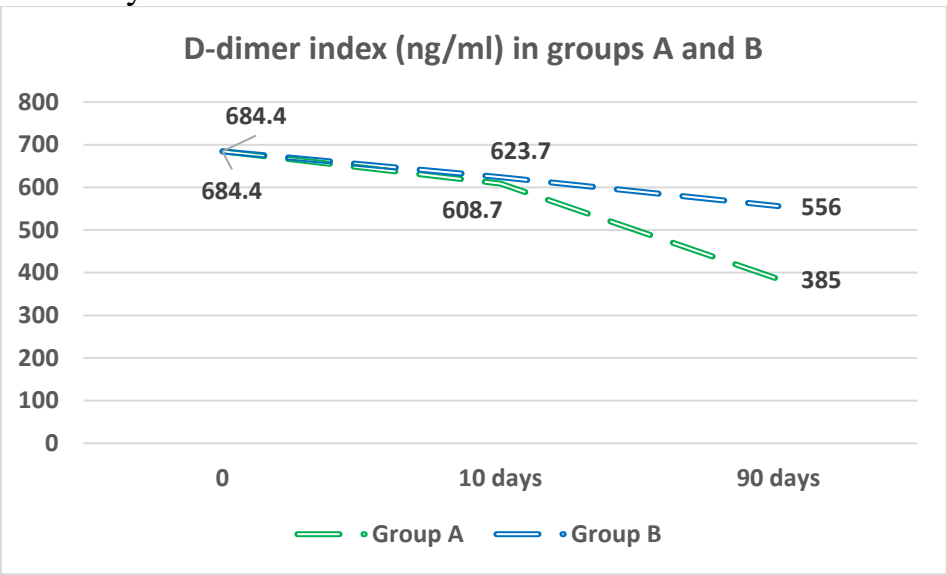

Figure 5. The degree of improvement of the D-dimer index in the groups A and B for the full observation period

Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 05, August, 2025
Website: usajournals.org

In addition, the data obtained indicate that early and adequate rehabilitation based on an individualized approach to each patient can significantly affect the speed of recovery and quality of life. The positive dynamics in subjective and objective indicators, as well as the improvement in neurological status observed three months after the start of therapy, confirm the need for further research in this area. It is important to note that the results of the study can serve as a basis for the development of new clinical recommendations for the treatment and rehabilitation of patients with ischemic stroke. Additional research is needed to better understand the mechanisms of action of the drugs used and their effect on various aspects of recovery after stroke.

Conclusion

An integrated approach to the treatment of ischemic stroke, including both drug therapy and rehabilitation procedures, is a key factor in achieving optimal results in the recovery of patients with the need for timely use of selected scales that have demonstrated high sensitivity and informativeness. This highlights the importance of a multidisciplinary approach in treatment and rehabilitation, which can lead to an improved quality of life for patients and a reduction in the burden of stroke on the healthcare system as a whole.

References

1. Powers, W. J., Rabinstein, A. A., Ackerson, T., Adeoye, O. M., Bambauer, J. Z., Billiard, B. M. ... & American Heart Association Stroke Council. (2019). 2018 Guidelines for the early management of patients with acute ischemic stroke: A guideline for healthcare professionals from the American Heart Association/American Stroke Association. Stroke, 50(3), e344-e418.
2. Zagorodny N.N.,Zakirova A.R., Skipenko T.O. and others. The experience of using rivaroxaban for the prevention of venous thrombosis and embolism in arthroscopic plastic surgery of the anterior cruciate ligament. Zh: Effective pharmacotherapy, No. 10, 2014, pp.12-14.

Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 05, August, 2025
Website: usajournals.org

3. Katelnitsky I.I., Zorkin A.A., Drozhzhin E.V. and others. The possibilities and own experience of using rivaroxaban in the complex treatment of patients with critical limb ischemia syndrome. breast cancer. 2018;6(II):85-88.
4. Fedoseenko A.V., Zenin S.A., Kononenko O.V., Pyataeva O.V., Voskoboinikov Yu.E. The experience of using rivaroxaban in patients with type 1 atrial flutter: efficacy, safety, compliance. Complex problems of cardiovascular diseases. 2018;7(3):44-55. https://doi.org/10.17802/2306-1278-2018-7-3-44-55
5. Cappato R., Ezekowitz M.D., Klein A.L., et al. Rivaroxaban vs. vitamin K antagonists for cardioversion in atrial fibrillation // Eur. heart J. – 2014. Sep. 2. [Epub ahead of print].
6. Asadi-Samani M, Bahmani M, Rafieian-Kopaei M. The chemical composition, botanical characteristic and biological activities of Borago officinalis: a review. Asian Pac J Trop Med. 2014 Sep;7S1:S22-8. doi: 10.1016/S1995-7645(14)60199-1. PMID: 25312125.