

Impact Factor: 5.723

ISSN: 2181-0982
DOI: 10.26739/2181-0982
www.tadqiqot.uz

JNNR

JOURNAL OF NEUROLOGY AND NEUROSURGERY RESEARCH



Volume 7, Issue 5

2026

ЖУРНАЛ НЕВРОЛОГИИ И НЕЙРОХИРУРГИЧЕСКИХ ИССЛЕДОВАНИЙ

ТОМ 7 НОМЕР 5

JOURNAL OF NEUROLOGY AND NEUROSURGERY RESEARCH
VOLUME 7, ISSUE 5



МАҚОЛАДА КЕЛТИРИЛГАН
ДАЛИЛЛАРИНИҲ
ТЎҒРИЛИГИ УЧУН МҲАЛЛИФ
МАСЪУЛДИР | АВТОР НЕСЕТ
ОТВЕТСТВЕННОСТЬ ЗА
ДОСТОВЕРНОСТЬ ФАКТОВ
ИЗЛОЖЕННЫХ В СТАТЬЕ



ЖУРНАЛ НЕВРОЛОГИИ И НЕЙРОХИРУРГИЧЕСКИХ ИССЛЕДОВАНИЙ

Бухарский государственный медицинский институт и tadqiqot.uz

Главный редактор:

Ходжиева Дилбар Таджиевна
доктор медицинских наук, профессор
Бухарского государственного медицинского
института. (Узбекистан).
ORCID ID: 0000-0002-5883-9533

Зам. главного редактора:

Хайдарова Дилдора Кадиловна
доктор медицинских наук, профессор
Ташкентский государственный медицинский
университет. (Узбекистан).
ORCID ID: 0000-0002-4980-6158

Рецензируемый
научно-практический журнал
"Журнал неврологии
и нейрохирургических исследований"
Публикуется 6 раз в год
№5 (07), 2026
ISSN 2181-0982

Адрес редакции:

ООО Tadqiqot город Ташкент,
улица Амира Темура пр.1, дом-2.
web: <http://www.tadqiqot.uz/>;
Email: info@tadqiqot.uz
Тел: (+998-94) 404-0000

Макет и подготовка к печати
проводились в редакции журнала.

Дизайн - оформления:

Хуршид Мирзахмедов

Журнал зарегистрирован
в Управлении печати и информации г.
Ташкента Рег. №
от 01.07.2020 г.

Электронная версия журнала на сайтах:

<https://tadqiqot.uz>, www.bsmi.uz

Журнал включен в перечень научных
изданий, рекомендованных к публикации
основных научных результатов
диссертаций по медицинским наукам с 27
сентября 2024 года Высшей
аттестационной комиссией Республики
Узбекистан (письмо № 361/6 от 2024
года).

РЕДАКЦИОННАЯ КОЛЛЕГИЯ:

Хайдаров Нодиржон Кадилович – доктор медицинских наук, профессор, ректор Ташкентский государственный медицинский университет. (Узбекистан).

Нуралиев Неккадам Абдуллаевич – доктор медицинских наук, профессор, иммунолог, микробиолог, проректор по научной работе и инновациям Бухарского государственного медицинского института. (Узбекистан).

Кариев Гайрат Маратович – доктор медицинских наук, профессор, директор Республиканского научного центра нейрохирургии Узбекистана. (Узбекистан).

Федин Анатолий Иванович – доктор медицинских наук, профессор, заслуженный врач РФ. Российский национальный исследовательский медицинский университет имени Н.И. Пирогова. (Россия).

Маджидова Екутхон Набиевна – доктор медицинских наук, профессор, Ташкентский государственный медицинский университет. (Узбекистан).

Рахимбаева Гулнора Саттаровна – доктор медицинских наук, профессор, Ташкентский государственный медицинский университет. (Узбекистан).

Джурбекова Азиза Тахировна – доктор медицинских наук, профессор Самаркандского государственного медицинского института. (Узбекистан).

Мамадалиев Абдурахмон Маматкулович – доктор медицинских наук, профессор Самаркандского государственного медицинского института. (Узбекистан).

Чутко Леонид Семенович – доктор медицинских наук, профессор, руководитель Центра поведенческой неврологии Института мозга человека им. Н.П. Бехтерева. (Россия).

Муратов Фахмиддин Хайритдинович – доктор медицинских наук, профессор Ташкентский государственный медицинский университет. (Узбекистан).

Дьяконова Елена Николаевна – доктор медицинских наук, профессор, Ивановская государственная медицинская академия. (Россия).

Труфанов Евгений Александрович – доктор медицинских наук, профессор Национальный университет охраны здоровья Украины имени П.Л. Шупика и указать его расположение (Украина)

Норов Абдурахмон Убайдуллаевич – доктор медицинских наук, профессор, главный врач Бухарского областного многопрофильного медицинского центра. (Узбекистан)

Абдуллаева Наргиза Нурмаматовна – доктор медицинских наук, профессор Самаркандского государственного медицинского института. (Узбекистан).

Азизова Раъно Баходировна – доктор медицинских наук, доцент Ташкентский государственный медицинский университет. (Узбекистан).

Давлатов Салим Сулаймонович – Начальник отдела надзора качества образования, доцент Бухарского государственного медицинского института. (Узбекистан).

Артыкова Мавлюда Абдурахмановна – доктор медицинских наук, профессор Бухарского государственного медицинского института. (Узбекистан).

Уринов Мусо Болтаевич – доктор медицинских наук, доцент Бухарского государственного медицинского института. (Узбекистан).

Киличев Ибодулла Абдуллаевич – доктор медицинских наук, профессор Ургенчского филиала Ташкентской медицинской академии. (Узбекистан).

Рашидова Нилуфар Сафоевна – доктор медицинских наук, доцент Ташкентский государственный медицинский университет. (Узбекистан).

Ганиева Манижа Тимуровна – кандидат медицинских наук, доцент Таджикского государственного медицинского университета (Таджикистан).

Хазраткулов Рустам Бафоевич – доктор медицинских наук, руководитель научного отдела сосудистой патологии центральной нервной системы Республиканского специализированного научно – практического медицинского центра нейрохирургии, профессор кафедры нейрохирургии Центра развития профессиональной квалификации медицинских работников (Узбекистан).

Нуралиева Хафиза Отаевна – кандидат медицинских наук, доцент Ташкентского фармацевтического института. (Узбекистан).

Исмаилова Раъно Олимджановна – DSc, руководитель научного отдела патологии позвоночника и спинного мозга Республиканского специализированного научно – практического медицинского центра нейрохирургии (Узбекистан).

Югай Игорь Александрович – старший научный сотрудник отделения нейрохирургии детского возраста Республиканского специализированного научно – практического медицинского центра нейрохирургии. Доцент кафедры нейрохирургии Центра развития профессиональной квалификации медицинских работников (Узбекистан).

Иноятова Ситора Ойбековна – DSc, доцент кафедры Неврологии и народной медицины, Ташкентского государственного медицинского университета.

Абдукодилов Элдор Исроилович – DSc, доцент кафедры Неврологии и народной медицины, Ташкентского государственного медицинского университета.

Ахророва Шахло Ботировна – доцент кафедры неврологии Бухарского государственного медицинского института (DSc)

JOURNAL OF NEUROLOGY AND NEUROSURGICAL RESEARCH

Bukhara State Medical Institute and tadqiqot.uz

Chief Editor:

Khodjjeva Dilbar Tadjiyevna

Doctor of medical Sciences, Professor,
Bukhara state medical Institute. (Uzbekistan).
ORCID ID: 0000-0002-5883-9533

Deputy editor-in-chief:

Khaydarova Dildora Kadirovna

Doctor of Medical Sciences,
Professor of the Tashkent State Medical
University. (Uzbekistan).
ORCID ID: 0000-0002-4980-6158

**Peer-reviewed scientific and
practical journal "Journal of Neurology
and Neurosurgical Research"
Published 6 times a year
#5 (07), 2026
ISSN 2181-0982**

Editorial address:

Tadqiqot LLC the city of Tashkent,
Amir Temur Street pr.1, House 2.
Web: <http://www.tadqiqot.uz/>;
Email: info@tadqiqot.uz
Phone: (+998-94) 404-0000

Layout and preparation for printing held in
the editorial office of the journal.

Design – pagemaker:

Khurshid Mirzakhmedov

Journal is registered at the Office of Press
and Information Tashkent city, Reg. No. July
1, 2020

Electronic version of the Journal on sites:

www.tadqiqot.uz, www.bsmi.uz

- - -

The journal is included in the list of
scientific publications recommended for
publication of the main scientific results of
dissertations in medical sciences since
September 27, 2024 by the Higher
Attestation Commission of the Republic of
Uzbekistan (letter No. 361/6 dated 2024).

EDITORIAL TEAM:

Khaydarov Nodirjon Kadirovich - Doctor of Medicine, Professor, Rector of Tashkent State Medical University. (Uzbekistan).

Nuraliev Nekkadam Abdullaevich - Doctor of Medical Sciences, Professor, Immunologist, Microbiologist, Vice-Rector for Research and Innovation of the Bukhara State Medical Institute. (Uzbekistan).

Kariev Gayrat Maratovich - Doctor of Medicine, Professor, Director of the Republican Scientific Center for Neurosurgery of Uzbekistan. (Uzbekistan).

Anatoly Ivanovich Fedin - Doctor of Medical Sciences, professor, Honored Doctor of the Russian Federation. Russian National Research Medical University named after N.I. Pirogova. (Russia).

Madjidova Yokutxon Nabieva - Doctor of Medicine, Professor, Tashkent State Medical University. (Uzbekistan).

Rakhimbaeva Gulnora Sattarovna - Doctor of Medical Sciences, Professor, the Tashkent State Medical University. (Uzbekistan).

Djurabekova Aziza Taxirovna - Doctor of Medicine, Professor, the Samarkand State Medical Institute. (Uzbekistan).

Mamadaliyev Abdurakhmon Mamatkulovich - Doctor of Medical Sciences, Professor of the Samarkand State Medical Institute. (Uzbekistan).

Chutko Leonid Semenovich - Doctor of Medicine, Head of the Center for Behavioral Neurology of the Institute of Human Brain named after N.P. Bekhtereva. (Russia).

Muratov Fakhriddin Khayritdinovich - Doctor of Medical Sciences, Professor, the Tashkent State Medical University. (Uzbekistan).

Dyakonova Elena Nikolaevna - Doctor of Medicine, professor of the Ivanovo State Medical Academy. (Russia).

Trufanov Evgeniy Aleksandrovich - Doctor of Medical Sciences, Professor, P.L. Shupyk National University of Health Protection of Ukraine and indicate its location (Ukraine).

Norov Abdurakhmon Ubaydullaevich - Doctor of Medicine, professor, Chief Physician of the Bukhara Regional Multidisciplinary Medical Center. (Uzbekistan).

Abdullaeva Nargiza Nurmatovna - Doctor of Medicine, professor of the Samarkand State Medical Institute. (Uzbekistan).

Azizova Rano Baxodirovna - doctor of medical Sciences, associate Professor of the Tashkent State Medical University. (Uzbekistan).

Davlatov Salim Sulaimonovich - Head of the Department of education quality supervision, associate Professor of the Bukhara state medical Institute. (Uzbekistan).

Artykova Mavlyuda Abdurakhmanovna - Doctor of Medical Sciences, Professor of the Bukhara State Medical Institute. (Uzbekistan).

Urinov Muso Boltaevich - Doctor of Medicine, Associate Professor, Bukhara State Medical Institute. (Uzbekistan).

Kilichev Ibodulla Abdullaevich - Doctor of Medicine, professor of the Urgench branch of the Tashkent Medical Academy. (Uzbekistan).

Rashidova Nilufar Safoevna - doctor of medical Sciences, associate Professor of the Tashkent State Medical University. (Uzbekistan).

Ganieva Manizha Timurovna - Candidate of Medical Sciences, Associate Professor, Tajik State Medical University. (Tajikistan).

Hazratkulov Rustam Bafievich - Doctor of Medicine, head of the scientific department of vascular pathology of the central nervous system of the Republican specialized scientific and practical medical center for neurosurgery, professor of the department of neurosurgery at the Center for the development of professional qualifications of medical workers (Uzbekistan).

Nuralieva Hafiza Otayevna - Candidate of medical Sciences, associate Professor, Toshkent pharmaceutical Institute. (Uzbekistan).

Ismailova Rano Olimdjanovna - Doctor of Medicine, head of the spine department of the Republican specialized scientific and practical medical center of neurosurgery (Uzbekistan).

Yugay Igor Aleksandrovich - senior research of the scientific department of pediatric of the Republican specialized scientific and practical medical center for neurosurgery. Associate professor of the department of neurosurgery at the Center for the development of professional qualifications of medical workers (Uzbekistan).

Inoyatova Sitora Oybekovna – DSc Associate Professor, Department of Neurology and Traditional Medicine, Tashkent State Medical University

Abdukodirov Eldor Isroilovich – DSc Associate Professor, Department of Neurology and Traditional Medicine, Tashkent State Medical University

Akhrorova Shakhlo Botirovna - Associate Professor of the Department of Neurology, Bukhara State Medical Institute, Doctor of Science (DSc).

1. Ўринов Мусо Болтаевич, Мустафоева Мухаммад Олим ўгли ТРАНЗИТОР ИШЕМИК АТАКА УТКАЗГАН БЕМОРЛАРДА ВЕГЕТАТИВ ДИСФУНКЦИЯ ҲАМДА СУТКАЛИК АРТЕРИАЛ БОСИМ ВАРИАБЕЛЛИГИНИНГ ҚИЁСИЙ ХУСУСИЯТЛАРИ.....	7
2. Раимова Малика Мухамеджановна, Сафаров Шахзоджон Шухратович СТРУКТУРНЫЕ И КЛИНИКО-ТЕРРИТОРИАЛЬНЫЕ ОСОБЕННОСТИ ПАРКИНСОНИЗМА, ДИФФЕРЕНЦИАЛЬНЫЙ ПОДХОД И МЕРОПРИЯТИЯ (на примере Кашкадарьинской области).....	12
3. Сатторов Алишер Рахимович, Рахмонов Хуршиджон Мамадиевич ХИРУРГИЧЕСКОЕ ЛЕЧЕНИЕ ПОЯСНИЧНЫХ СПОНДИЛОЛИСТЕЗОВ С ТРАНСПЕДИКУЛЯРНОЙ ФИКСАЦИЕЙ В СОЧЕТАНИИ С PLIF-КЕЙДЖАМИ.....	16
4. Ravshanov Davron Mavlonovich ORQA MIYANING KOMPRESSION-ISHEMIK MIELOPATIYASI BILAN KECHUVCHI BO‘YIN UMURTQA POG‘ONASI KANALINING IKKILAMCHI STENOZI: KLINIK HOLAT.....	22
5. Равшанов Даврон Мавлонович МНОГОУРОВНЕВЫЙ ДЕГЕНЕРАТИВНЫЙ СТЕНОЗ С3–С7 С ШЕЙНОЙ МИЕЛОПАТИЕЙ: ОПИСАНИЕ КЛИНИЧЕСКОГО НАБЛЮДЕНИЯ.....	28
6. Раимова Малика Мухамеджановна, Маматова Шахноза Абдужалиловна, Кобиров Жасур Соибович, Мухаммадсаидова Ирода Абдувахоб кизи СОВРЕМЕННЫЕ СТРАТЕГИИ И ЭФФЕКТИВНОСТЬ РЕПЕРFUЗИОННОЙ ТЕРАПИИ ПРИ ИШЕМИЧЕСКОМ ИНСУЛЬТЕ (системный обзор доказательной базы).....	35
7. Олимов Жонибек Наимович, Болтаев Собиржон, Бакаев Илхом Курбанович, Абдурахманов Мамур Мустафоевич, Нарзуллаева Наргиза Сайфиллоевна ИММУННАЯ ДИСФУНКЦИЯ, У БОЛЬНЫХ ХРОНИЧЕСКОЙ ИШЕМИЕЙ ГОЛОВНОГО МОЗГА.....	40
8. Кадиров Азизбек Абдувохитович, Худайбердиев Кобил Турсунович СУБАКСИАЛ БЎЙИН УМУРТҚАЛАРИ ШИКАСТЛАНИШЛАРИДА ARGENSON ТАСНИФИГА АСОСЛАНГАН ДИФФЕРЕНЦИАЛЛАШГАН ЖАРРОҲЛИК ДАВОЛАШ НАТИЖАЛАРИ.....	43
9. Адамбаев Зуфар Ибрагимович, Екубжонов Асилбек Абдувахоб ўгли РАСПРОСТРАНЁННОСТЬ И КЛИНИЧЕСКАЯ ЗНАЧИМОСТЬ СОЧЕТАНИЯ МЕЖПОЗВОНОЧНОЙ ГРЫЖИ С ИЗМЕНЕНИЯМИ ПО МОДИК В ПОПУЛЯЦИИ ПАЦИЕНТОВ С ХРОНИЧЕСКОЙ БОЛЬЮ В ПОЯСНИЦЕ.....	50
10. B.G‘.G‘ofurov, G.N.Mirjuraeva KARDIOEMBOLIK INSULT: ETIOPATOGENETIK TUZILISHI, XUSUSIYATLARI KLINIKASI, OLDINI OLISH VA DAVOLASH.....	59
11. Якубов Жахонгир Баходирович, Кариев Гайрат Маратович КЛИНИЧЕСКОЕ НАБЛЮДЕНИЕ ПАЦИЕНТА С ПРОДОЛЖЕННЫМ РОСТОМ ЗЛОКАЧЕСТВЕННОЙ ГЛИОМЫ: КЛИНИЧЕСКИЙ СЛУЧАЙ И АНАЛИЗ КЛИНИЧЕСКИХ И ЛЕЧЕБНЫХ АСПЕКТОВ.....	64
12. Рахматова Санобар Низомовна, Бобоназаров Жахонгир Бобоназарович ИШЕМИК ИНСУЛЬТДА ЛАБОРАТОР БИОМАРКЕРЛАРНИНГ КЛИНИК ВА ПРОГНОСТИК АҲАМИЯТИ.....	69
13. Олимов Жонибек Наимович, Ходжаева Назира Ахмедовна, Нарзуллоева Наргиза Сайфиллоевна ОСОБЕННОСТИ НЕВРОЛОГИЧЕСКИХ ПРОЯВЛЕНИЙ ПРИ ХРОНИЧЕСКОЙ ИШЕМИИ ГОЛОВНОГО МОЗГА I И II СТАДИИ У БОЛЬНЫХ ГИПЕРТОНИЧЕСКОЙ БОЛЕЗНЬЮ.....	75
14. Назарова Садокат Одилловна КЛИНИЧЕСКИЙ СЛУЧАЙ ПОДОСТРОГО СКЛЕРОЗИРУЮЩЕГО ПАНЭНЦЕФАЛИТА У ДЕТЕЙ.....	80
15. Абдувойтов Бобур Баходирович КЛИНИКО-АНАМНЕСТИЧЕСКИЕ ПРЕДИКТОРЫ ФОРМИРОВАНИЯ ФАРМАКОРЕЗИСТЕНТНОЙ ЭПИЛЕПСИИ У ВЗРОСЛЫХ ПАЦИЕНТОВ.....	84
16. Абдувойтов Бобур Баходирович КОГНИТИВНЫЕ, ПСИХОЭМОЦИОНАЛЬНЫЕ НАРУШЕНИЯ И КАЧЕСТВО ЖИЗНИ У ПАЦИЕНТОВ С ФАРМАКОРЕЗИСТЕНТНОЙ ЭПИЛЕПСИЕЙ.....	93
17. Ёкубжонов Асилбек Абдувахоб ўгли РОЛЬ МАТРИКСНЫХ МЕТАЛЛОПРОТЕИНАЗ (ММП-1, ММП-3, ММП-9) И ИХ ТКАНЕВЫХ ИНГИБИТОРОВ (TIMP) В ПАТОГЕНЕЗЕ ДЕГЕНЕРАЦИИ МЕЖПОЗВОНКОВОГО ДИСКА.....	101
18. Раимова Малика Мухамеджановна, Турдиева Нигора Мурод кизи СТОЙКАЯ ГИПЕРФЕРРИТИНЕМИЯ КАК ПОТЕНЦИАЛЬНЫЙ БИОМАРКЕР И ПАТОГЕНЕТИЧЕСКИЙ КОФАКТОР ПРОГРЕССИРОВАНИЯ УМЕРЕННЫХ КОГНИТИВНЫХ НАРУШЕНИЙ ПРИ ДИСЦИРКУЛЯТОРНОЙ ЭНЦЕФАЛОПАТИИ (клинический случай с комплексным лабораторно-клиническим анализом и обзором литературы).110	110

19. Матмусаев Махсуд Махмудович, Ибрагимов Ақобир Исмоилович, Норов Абдурахмон Убайдуллоевич, Юлдашев Равшан Муслимович, Джуманов Камаллидин Нуриддинович ОСОБЕННОСТИ ИНСТРУМЕНТАЛЬНОЙ ДИАГНОСТИКИ СПОНДИЛОЛИСТЕЗА ПОЯСНИЧНОГО ОТДЕЛА ПОЗВОНОЧНИКА.....	115
20. Qaraxonova Sarvinoz Alisherovna INTEGRATIV PSIXODIAGNOSTIKA YONDASHUVI: VASKULYAR DEMENSIYADA NAZORAT LOKUSINI ANIQLASHDA SAMARADORLIK TAHLILI.....	124
21. Раҳимбаева Гулнора Саттаровна, Охунова Диёрахон Алишер кизи НЕБЛАГОПРИЯТНОЕ ТЕЧЕНИЕ СИНДРОМА ПАРКИНСОНИЗМА: СОВРЕМЕННЫЕ ПРЕДИКТОРЫ И ВОЗМОЖНОСТИ ПЕРСОНАЛИЗИРОВАННОЙ ПРОФИЛАКТИКИ.....	128
22. Ярашев Акмал Рустамович, Сабиров Джурабой Марифбаевич, Эшонов Олим Шойимкулович, Нариманова Хаидабону Анваровна ИШЕМИЧЕСКИ - РЕПЕРФУЗИОННОЕ ПОВРЕЖДЕНИЕ ПОСЛЕ ТРОМБОЛИТИЧЕСКОЙ ТЕРАПИИ ПРИ ИШЕМИЧЕСКОМ ИНСУЛЬТЕ.....	133
23. Bokiyeva Fayziniso Adxam qizi, Alimov Doniyor Anvarovich, Nosirov Shuxrat To'lqin o'g'li, Berdiyev Nodirbek Fayziyevich, Maxmudov Mamurjon Mansur o'g'li IMPROVING THE MANAGEMENT STRATEGY FOR PATIENTS WITH ACUTE ISCHEMIC STROKE DURING THE THERAPEUTIC WINDOW: A REVIEW OF CURRENT REPERFUSION APPROACHES.....	142
24. Баҳадирханов Мухамедшокир Мухамедкабирович, Назарова Жанна Авзаровна, Гуломитдинов Санджар Нуриддин угли ВЛИЯНИЕ ПЕРИОПЕРАЦИОННЫХ ФАКТОРОВ КОРОНАРНОГО ШУНТИРОВАНИЯ НА РИСК РАЗВИТИЯ ИШЕМИЧЕСКОГО ИНСУЛЬТА.....	150
25. Баҳадирова Муниса Анваровна, Артиков Нематжон Каримович, Назарова Жанна Авзаровна, Абдужамилова Рано Мирхалиловна ОСОБЕННОСТИ МИКРОНУТРИЕНТНОГО СТАТУСА И ИХ РОЛЬ В РАЗВИТИИ НЕВРОЛОГИЧЕСКИХ ОСЛОЖНЕНИЙ У ПАЦИЕНТОВ С ПЕРВИЧНЫМ ГИПОТИРЕОЗОМ, ПРОЖИВАЮЩИХ В РЕГИОНЕ ПРИАРАЛЬЯ.....	158
26. Xodjiyeva Dilbar Tadiyevna, Usmonova Sarvinoz Salohiddin qizi INSULTDAN KEYINGI KOGNITIV VA PSIXOEMOTSIONAL BUZILISHLARNI ERTA ANIQLASH VA REABILITATSIYADAGI ZAMONAVIY YONDASHUVLAR.....	164
27. Мусаева Юлдуз Алписовна, Ганиева Муаззамхон Жавлон кизи НЕЙРОФИЛАМЕНТ ЛЕГКОЙ ЦЕПИ ПРИ ИШЕМИЧЕСКОМ ИНСУЛЬТЕ: ВРЕМЕННАЯ ДИНАМИКА, СВЯЗЬ С ТЯЖЕСТЬЮ ЗАБОЛЕВАНИЯ И ПРОГНОЗОМ (ЛИТЕРАТУРНЫЙ ОБЗОР).....	168
28. Алиев Мансур Абдухоликович, Саит Озтюрк ГЛУБОКАЯ СТИМУЛЯЦИЯ МОЗГА ПРИ ДЛИТЕЛЬНО ТЕКУЩЕЙ БОЛЕЗНИ ПАРКИНСОНА: КЛИНИЧЕСКИЙ СЛУЧАЙ С МУЛЬТИМОДАЛЬНОЙ ОЦЕНКОЙ РЕЗУЛЬТАТОВ ЛЕЧЕНИЯ.....	175
29. Aliev Mansur Abdukholikovich, Sait Ozturk BILATERAL THALAMIC DEEP BRAIN STIMULATION IN ADVANCED TREMOR-RIGID PARKINSON DISEASE: A CASE REPORT WITH MULTIMODAL CLINICAL AND STEREOTACTIC ASSESSMENT.....	186
30. Нурматова Дилором Абдусаламовна, Охунбаев Жаҳонгир Музаффарович КЛИНИКО-ДИАГНОСТИЧЕСКИЕ ОСОБЕННОСТИ ЦЕРВИКАЛЬНЫХ ТИКОВ У ДЕТЕЙ И ПОТЕНЦИАЛЬНАЯ РОЛЬ НЕЙРОНАЛЬНО-ГЛИАЛЬНЫХ И ИММУНОВОСПАЛИТЕЛЬНЫХ МАРКЕРОВ В ДИФФЕРЕНЦИАЛЬНОЙ ДИАГНОСТИКЕ PANS/PANDAS.....	195
31. Ким Ольга Владиславовна ВЛИЯНИЕ ЦЕРЕБРАЛЬНОЙ ВЕНОЗНОЙ ДИСЦИРКУЛЯЦИИ НА РАЗВИТИЕ ЗАБОЛЕВАНИЙ ГОЛОВНОГО МОЗГА.....	203
32. Абдурасулов Фарход Хабибуллоевич, Ибрагимов Ақобир Исмоилович, Норов Абдурахмон Убайдуллаевич, Юлдашев Равшан Муслимович, Хазраткулов Рустам Бафоевич ОСОБЕННОСТИ КЛИНИКО-НЕВРОЛОГИЧЕСКИХ ПРОЯВЛЕНИЙ РАЗЛИЧНЫХ ФОРМ СПОНДИЛОЛИСТЕЗОВ ПОЯСНИЧНОГО ОТДЕЛА ПОЗВОНОЧНИКА.....	209
33. Маджидова Ёқутхон Набиевна, Адамбаев Зуфар Ибрагимович, Камолдинова Дилдора Бахтияровна СРАВНИТЕЛЬНЫЙ АНАЛИЗ КЛИНИКО-НЕВРОЛОГИЧЕСКИХ И НЕЙРОФИЗИОЛОГИЧЕСКИХ ОСОБЕННОСТЕЙ АФФЕКТИВНЫХ РЕСПИРАТОРНЫХ ПРИСТУПОВ У ДЕТЕЙ С ЖЕЛЕЗОДЕФИЦИТНОЙ АНЕМИЕЙ И БЕЗ НЕЕ...214	214
34. Гулямова М.К., Норова Д.Б., Мирзаева Д.Ф. МИГРЕНЬ СО СТОЛОВОЙ АУРОЙ У ПОДРОСТКОВ: КЛИНИЧЕСКОЕ НАБЛЮДЕНИЕ И СОВРЕМЕННЫЕ ПРЕДСТАВЛЕНИЯ О ПАТОГЕНЕЗЕ.....	220

УО'К/УДК: 616.831-005.4-08

Bokiyeva Fayziniso Adxam qizi,

Alimov Doniyor Anvarovich,

Nosirov Shuxrat To'lqin o'g'li,

Berdiyev Nodirbek Fayziyevich,

Maxmudov Mamurjon Mansur o'g'li

Republican Research Center of Emergency Medicine (RRCM)

IMPROVING THE MANAGEMENT STRATEGY FOR PATIENTS WITH ACUTE ISCHEMIC STROKE DURING THE THERAPEUTIC WINDOW: A REVIEW OF CURRENT REPERFUSION APPROACHES<http://dx.doi.org/10.5281/zenodo.22380620>**ANNOTATION**

Background. Acute ischemic stroke (AIS) is a major neurological emergency and one of the leading causes of death and long-term disability worldwide. The effectiveness of reperfusion therapy is strongly dependent on the time from symptom onset to treatment. However, recent advances in neuroimaging and endovascular treatment have demonstrated that the biological status of ischemic brain tissue may be more important than chronological time alone in selected patients.

Objective. To review current approaches to the management of patients with acute ischemic stroke during the therapeutic window and to identify strategies for optimizing reperfusion therapy, patient selection, and functional outcomes.

Materials and Methods. A narrative literature review was conducted based on contemporary international clinical guidelines, randomized controlled trials, systematic reviews, and meta-analyses published predominantly between 2020 and 2026. The review focused on intravenous thrombolysis, alteplase, tenecteplase, mechanical thrombectomy, bridging therapy, multimodal neuroimaging, extended therapeutic windows, and tissue-based patient selection.

Results. Current evidence supports rapid intravenous thrombolysis in eligible patients with disabling acute ischemic stroke within 4.5 hours of symptom onset or last known well. Tenecteplase at a dose of 0.25 mg/kg has demonstrated non-inferior functional outcomes compared with alteplase at 0.9 mg/kg in contemporary randomized clinical trials and provides the practical advantage of single-bolus administration. Mechanical thrombectomy is a highly effective treatment for selected patients with large-vessel occlusion and is recommended within 6 hours in appropriate patients and up to 24 hours in selected patients based on clinical and imaging criteria. Computed tomography angiography and computed tomography perfusion facilitate identification of vascular occlusion, infarct core, and potentially salvageable tissue.

Conclusion. Optimization of acute ischemic stroke management during the therapeutic window requires a coordinated, time-sensitive, and individualized approach. Rapid recognition, immediate neuroimaging, early reperfusion, identification of large-vessel occlusion, appropriate use of intravenous thrombolysis and mechanical thrombectomy, and tissue-based patient selection represent the major components of contemporary stroke care.

Keywords: acute ischemic stroke; therapeutic window; intravenous thrombolysis; tenecteplase; alteplase; mechanical thrombectomy; reperfusion therapy; large-vessel occlusion; CT perfusion; functional outcome.

Bokiyeva Fayziniso Adxam qizi,

Alimov Doniyor Anvarovich,

Nosirov Shuxrat To'lqin o'g'li,

Berdiyev Nodirbek Fayziyevich,

Maxmudov Mamurjon Mansur o'g'li

Respublika shoshilinch tibbiy yordam ilmiy markazi (RShTYoIM)

O'TKIR ISHEMIK INSULTLI BEMORLARNI TERAPEVTIK DARCHADA BOSHQARISH STRATEGIYASINI TAKOMILLASHTIRISH: ZAMONAVIY REPERFUZION YONDASHUVLARNI TAHLILI**ANNOTATSIYA**

Kirish. O'tkir ishemik insult (O'I) asosiy nevrologik shoshilinch holatlardan biri bo'lib, dunyoda o'lim va uzoq muddatli nogironlikning yetakchi sabablaridan hisoblanadi. Reperfuizion terapiya samaradorligi simptomlar boshlanishidan davolashgacha

o'tgan vaqtga bog'liq. Biroq neyrotasvirlash va endovaskulyar davolashdagi so'nggi yutuqlar tanlangan bemorlarda ishemik miya to'qimasining biologik holati xronologik vaqtdan ko'ra muhimroq bo'lishi mumkinligini ko'rsatmoqda.

Maqsad. O'tkir ishemik insultli bemorlarni terapevtik darcha davomida boshqarishning zamonaviy yondashuvlarini tahlil qilish hamda reperfuzion terapiya, bemorlarni tanlash va funksional natijalarni optimallashtirish strategiyalarini aniqlash.

Material va usullar. Asosan 2020-2026 yillarda nashr etilgan zamonaviy xalqaro klinik qo'llanmalar, randomizatsiyalangan klinik tadqiqotlar, tizimli sharhlar va meta-tahlillar asosida tavsifiy adabiyot sharhi o'tkazildi. Sharh venaga tomchilatib trombolizis, alteplaza, tenekteplaza, mexanik trombektomiya, ko'priki terapiyasi, multimodal neyrotasvirlash, kengaytirilgan terapevtik darchalar va to'qimaga asoslangan bemor tanlashga qaratildi.

Natijalar. Zamonaviy dalillar simptomlar boshlanishidan yoki oxirgi marta sog'lom ko'rilgan vaqtdan 4,5 soat ichida nogironlikka olib keluvchi o'tkir ishemik insultli mos bemorlarda tezkor venaga tomchilatib trombolizisni qo'llab-quvvatlaydi. 0,25 mg/kg dozadagi tenekteplaza zamonaviy randomizatsiyalangan klinik tadqiqotlarda 0,9 mg/kg dozadagi alteplazaga nisbatan kam bo'lmagan funksional natijalarni ko'rsatdi va yagona bolyus tarzida yuborilishi amaliy afzallik hisoblanadi. Mexanik trombektomiya katta tomir okklyuziyasi bo'lgan tanlangan bemorlar uchun yuqori samarali davolash usuli bo'lib, mos bemorlarda 6 soatgacha, tanlangan bemorlarda esa klinik va tasvirlash mezonlariga asosan 24 soatgacha tavsiya etiladi. Kompyuter tomografik angiografiya va perfuziya tomir okklyuziyasi, infarkt yadrosi va potentsial saqlanadigan to'qimani aniqlashga yordam beradi.

Xulosa. O'tkir ishemik insultni terapevtik darcha davomida boshqarishni optimallashtirish muvofiqlashtirilgan, vaqtga sezgir va individuallashtirilgan yondashuvni talab qiladi. Tezkor aniqlash, zudlik bilan neyrotasvirlash, erta reperfuziya, katta tomir okklyuziyasini aniqlash, venaga tomchilatib trombolizis va mexanik trombektomiyadan oqilona foydalanish hamda to'qimaga asoslangan bemor tanlash zamonaviy insult yordamining asosiy tarkibiy qismlaridir.

Kalit so'zlar: o'tkir ishemik insult; terapevtik darcha; venaga tomchilatib trombolizis; tenekteplaza; alteplaza; mexanik trombektomiya; reperfuzion terapiya; katta tomir okklyuziyasi; KT-perfuziya; funksional natija.

Бокиева Файзинисо Адхам кизи,
Алимов Дониёр Анварович,
Носиров Шухрат Тулкин угли,
Бердиев Нодирбек Файзиевич,
Махмудов Мамуржон Мансур угли

Республиканский научный центр экстренной медицинской помощи (РНЦЭМП)

СОВЕРШЕНСТВОВАНИЕ СТРАТЕГИИ ВЕДЕНИЯ ПАЦИЕНТОВ С ОСТРЫМ ИШЕМИЧЕСКИМ ИНСУЛЬТОМ В ТЕРАПЕВТИЧЕСКОМ ОКНЕ: ОБЗОР СОВРЕМЕННЫХ РЕПЕРFUЗИОННЫХ ПОДХОДОВ

АННОТАЦИЯ

Введение. Острый ишемический инсульт (ОИИ) является одним из основных неврологических неотложных состояний и одной из ведущих причин смертности и длительной инвалидизации в мире. Эффективность реперфузионной терапии в значительной степени зависит от времени от начала симптомов до лечения. Последние достижения в области нейровизуализации и эндоваскулярного лечения показали, что биологическое состояние ишемической ткани мозга может иметь большее значение, чем хронологическое время, у отдельных пациентов.

Цель. Обзор современных подходов к ведению пациентов с острым ишемическим инсультом в терапевтическом окне и определение стратегий оптимизации реперфузионной терапии, отбора пациентов и функциональных исходов.

Материалы и методы. Проведён нарративный обзор литературы на основе современных международных клинических руководств, рандомизированных контролируемых исследований, систематических обзоров и метаанализов, опубликованных преимущественно в 2020-2026 годах. Обзор был сосредоточен на внутривенном тромболизисе, альтеплазе, тенектеплазе, механической тромбэктомии, мостовой терапии, мультимодальной нейровизуализации, расширенных терапевтических окнах и отборе пациентов на основе состояния ткани.

Результаты. Современные данные подтверждают целесообразность быстрого внутривенного тромболизиса у подходящих пациентов с инвалидизирующим острым ишемическим инсультом в течение 4,5 часов от начала симптомов или последнего известного времени, когда пациент чувствовал себя хорошо. Тенектеплаза в дозе 0,25 мг/кг продемонстрировала не меньшую эффективность функциональных исходов по сравнению с альтеплазой в дозе 0,9 мг/кг в современных рандомизированных клинических исследованиях и обеспечивает практическое преимущество однократного болюсного введения. Механическая тромбэктомия является высокоэффективным методом лечения отобранных пациентов с окклюзией крупных сосудов и рекомендуется в течение 6 часов у подходящих пациентов и до 24 часов у отдельных пациентов на основании клинических и визуализационных критериев. КТ-ангиография и КТ-перфузия облегчают выявление сосудистой окклюзии, ядра инфаркта и потенциально жизнеспособной ткани.

Заключение. Оптимизация ведения острого ишемического инсульта в терапевтическом окне требует скоординированного, чувствительного ко времени и индивидуализированного подхода. Быстрое распознавание, немедленная нейровизуализация, ранняя реперфузия, выявление окклюзии крупных сосудов, надлежащее применение внутривенного тромболизиса и механической тромбэктомии, а также отбор пациентов на основе состояния ткани представляют собой основные компоненты современной помощи при инсульте.

Ключевые слова: острый ишемический инсульт; терапевтическое окно; внутривенный тромболизис; тенектеплаза; альтеплаза; механическая тромбэктомия; реперфузионная терапия; окклюзия крупных сосудов; КТ-перфузия; функциональный исход.

1. Introduction

Acute ischemic stroke (AIS) is caused by sudden interruption of cerebral blood flow resulting from arterial occlusion and represents a major cause of mortality and long-term disability. The pathophysiological process following arterial occlusion is characterized by the development of an irreversible ischemic core surrounded by potentially salvageable tissue known as the ischemic penumbra.

The principal objective of acute stroke treatment is therefore to restore cerebral perfusion before irreversible neuronal injury becomes extensive. This concept is commonly summarized by the principle of “time is brain,” emphasizing that treatment delay is associated with progressive loss of viable brain tissue.

Intravenous thrombolysis and mechanical thrombectomy have fundamentally changed the prognosis of patients with AIS. Nevertheless, the effectiveness of these interventions depends on rapid treatment initiation, appropriate patient selection, and accurate assessment of vascular and tissue status.

Intravenous thrombolysis has traditionally been administered within 4.5 hours in eligible patients. However, contemporary evidence has demonstrated that selected patients with unknown onset or presentation beyond 4.5 hours may benefit from thrombolytic therapy when imaging demonstrates a favorable mismatch between the infarct core and potentially salvageable tissue [1].

Mechanical thrombectomy has similarly expanded the therapeutic possibilities for patients with large-vessel occlusion. Current recommendations support endovascular treatment within 6 hours in appropriately selected patients and in selected patients presenting between 6 and 24 hours when clinical and imaging characteristics indicate a favorable treatment profile [1].

Another important development is the increasing use of tenecteplase as an alternative to alteplase. Tenecteplase has a longer plasma half-life and greater fibrin specificity and can be administered as a single intravenous bolus, potentially simplifying acute stroke workflows [2,3,4,5].

Consequently, modern stroke treatment is increasingly moving from a purely chronological definition of the therapeutic window toward an individualized time-and-tissue-based approach.

2. Aim of the Review

The aim of this review was to analyze contemporary approaches to the management of patients with acute ischemic stroke during the therapeutic window and to identify strategies for improving the effectiveness of reperfusion therapy and functional outcomes.

Objectives:

1. To assess the current role of intravenous thrombolysis in acute ischemic stroke.
2. To compare tenecteplase and alteplase as thrombolytic agents.
3. To evaluate the role and timing of mechanical thrombectomy.
4. To assess the role of CT angiography and CT perfusion in patient selection.
5. To analyze the clinical significance of bridging therapy.
6. To evaluate treatment strategies in extended therapeutic windows.
7. To analyze the emerging evidence regarding thrombectomy in patients with larger ischemic cores.
8. To propose an optimized management algorithm for patients with acute ischemic stroke.

3. Materials and Methods

A narrative literature review was conducted using contemporary international clinical guidelines, randomized controlled trials, systematic reviews, and meta-analyses concerning the management of acute ischemic stroke.

The literature search focused on the following key concepts: acute ischemic stroke; therapeutic window; intravenous thrombolysis; alteplase; tenecteplase; mechanical thrombectomy; endovascular therapy; large-vessel occlusion; bridging therapy; CT angiography; CT perfusion; ischemic core; ischemic penumbra; reperfusion therapy; functional outcome.

Priority was given to publications from 2020-2026, while landmark randomized clinical trials establishing the efficacy of reperfusion therapies were also considered.

The principal clinical outcome considered in the reviewed literature was functional status at 90 days, particularly functional independence defined as a modified Rankin Scale (mRS) score of 0-2.

4. Results

4.1. Evolution of the Therapeutic Window Concept

The therapeutic window has traditionally been defined according to the time elapsed from symptom onset or last known well. Although time remains one of the most important determinants of treatment efficacy, substantial interindividual differences exist in the rate of infarct progression.

Some patients develop a large infarct core within a short period, whereas others retain substantial viable penumbral tissue for many hours. This biological heterogeneity has led to the development of the concept of the “tissue clock.”

Modern neuroimaging allows clinicians to identify patients with potentially salvageable tissue despite delayed presentation. Thus, contemporary patient selection increasingly incorporates: chronological time; neurological severity; vascular occlusion; infarct core volume; collateral circulation; tissue viability; pre-stroke functional status.

Therefore, the therapeutic window should be considered a dynamic clinical-radiological concept rather than a fixed chronological interval [1,6].

4.2. Intravenous Thrombolysis

Intravenous thrombolysis remains one of the fundamental reperfusion strategies in acute ischemic stroke.

Alteplase has historically been the standard thrombolytic agent, administered at a dose of 0.9 mg/kg, with 10% administered as an initial bolus and the remainder infused over 60 minutes.

The current American Heart Association/American Stroke Association recommendations support either alteplase 0.9 mg/kg or tenecteplase 0.25 mg/kg, with a maximum tenecteplase dose of 25 mg, in eligible adult patients within the conventional 4.5-hour treatment window [1].

A key principle is that thrombolytic treatment should be initiated as rapidly as possible in eligible patients. Unnecessary additional imaging should not delay treatment when the patient already fulfills established criteria for intravenous thrombolysis.

4.3. Tenecteplase Versus Alteplase

Tenecteplase is a genetically modified variant of tissue plasminogen activator with greater fibrin specificity and a longer plasma half-life than alteplase.

Its most important practical advantage is that it can be administered as a single intravenous bolus, whereas alteplase requires a bolus followed by a 60-minute infusion.

The ORIGINAL trial demonstrated that tenecteplase was non-inferior to alteplase with regard to excellent functional outcome at 90 days [2]. Similarly, the ATTEST-2 trial demonstrated non-inferiority of tenecteplase compared with alteplase in patients treated within 4.5 hours [3]. A systematic review and meta-analysis of randomized trials confirmed these

findings [4], and a comprehensive review further summarized the evidence on tenecteplase for thrombolysis [5].

The practical advantages of tenecteplase may be particularly relevant in patients requiring transfer to an endovascular-capable center because single-bolus administration can simplify treatment during transportation [8].

Table 1

Comparison of Alteplase and Tenecteplase in Acute Ischemic Stroke

Parameter	Alteplase	Tenecteplase
Pharmacological class	Recombinant tissue plasminogen activator	Genetically modified tissue plasminogen activator
Standard dose	0.9 mg/kg; maximum 90 mg	0.25 mg/kg; maximum 25 mg
Administration	10% IV bolus + remainder over 60 min	Single IV bolus
Conventional treatment window	≤4.5 h in eligible patients	≤4.5 h in eligible patients
Fibrin specificity	Lower	Higher
Plasma half-life	Shorter	Longer
Use before thrombectomy	Yes, when eligible	Yes, when eligible
Main practical advantage	Established clinical experience	Simple single-bolus administration
Functional efficacy	Established efficacy	Non-inferior efficacy demonstrated in major trials
Safety	Established safety profile	Comparable safety profile in contemporary trials

4.4. Extended-Window Intravenous Thrombolysis

The conventional 4.5-hour window does not identify all patients who may benefit from thrombolytic therapy.

Patients with wake-up stroke or unknown symptom onset may retain substantial salvageable tissue despite an apparently prolonged chronological window. MRI diffusion-weighted imaging and perfusion imaging can identify tissue mismatch and provide evidence of potentially viable tissue [7].

Consequently, selected patients beyond 4.5 hours may be considered for intravenous thrombolysis when appropriate imaging criteria are fulfilled. This represents an important transition from a strictly time-based model toward a tissue-based treatment strategy.

4.5. Mechanical Thrombectomy

Mechanical thrombectomy is now a standard treatment for selected patients with acute ischemic stroke caused by large-vessel occlusion.

The strongest evidence concerns occlusion of the internal carotid artery and proximal middle cerebral artery. Treatment within 6 hours is recommended in appropriately selected patients, while selected patients may benefit from thrombectomy between 6 and 24 hours [1].

The expansion of the treatment window was largely driven by studies demonstrating that some patients maintain viable tissue for prolonged periods after symptom onset.

More recent randomized evidence has also demonstrated benefit from thrombectomy in selected patients with larger ischemic cores [6]. Consequently, a large infarct core should not

automatically exclude a patient from consideration for endovascular therapy.

4.6. Large-Vessel Occlusion and Vascular Imaging

Early identification of large-vessel occlusion is critical for timely endovascular treatment.

CT angiography provides rapid assessment of the intracranial vascular system and can identify occlusion of the internal carotid artery, M1 and selected M2 segments of the middle cerebral artery, basilar artery, and other clinically relevant vessels.

The integration of CTA into the initial stroke imaging pathway allows rapid triage and facilitates transfer to an endovascular-capable center. In patients with suspected LVO, vascular imaging should therefore be performed without creating unnecessary delays in intravenous thrombolysis when IVT is indicated.

4.7. CT Perfusion and Tissue-Based Selection

CT perfusion provides information regarding cerebral blood flow and tissue viability and may assist in differentiating the infarct core from potentially salvageable ischemic tissue.

The main parameters assessed include: estimated ischemic core; hypoperfused tissue; mismatch volume; mismatch ratio.

CT perfusion is particularly useful in selected late-presenting patients and patients with unknown onset. However, imaging findings should always be interpreted in conjunction with clinical status, vascular anatomy, baseline functional status, and other relevant factors.

4.8. Bridging Therapy

Bridging therapy refers to administration of intravenous thrombolysis followed by mechanical thrombectomy in patients who meet criteria for both interventions.

The rationale is based on the complementary mechanisms of pharmacological and mechanical reperfusion. Intravenous thrombolysis may achieve early recanalization in some patients, while mechanical thrombectomy provides direct removal of persistent thrombus in patients with large-vessel occlusion.

Importantly, the potential need for thrombectomy should not be used as a reason to delay or withhold intravenous thrombolysis in otherwise eligible patients. Therefore, the optimized pathway for an eligible patient with LVO may be:

Intravenous thrombolysis → immediate endovascular pathway → mechanical thrombectomy.

5. Comparison of Contemporary Reperfusion Strategies

Table 2

Reperfusion Strategies in Acute Ischemic Stroke

Treatment strategy	Main indication	Typical window	Required assessment	Main advantage
Intravenous thrombolysis	Eligible AIS with disabling deficit	≤4.5 h	NCCT ± CTA	Rapid pharmacological reperfusion
Tenecteplase	Eligible AIS	≤4.5 h	NCCT ± CTA	Single-bolus administration
Alteplase	Eligible AIS	≤4.5 h	NCCT ± CTA	Established evidence base
Extended-window IVT	Selected patients	Selected patients beyond 4.5 h	MRI/CTP-based selection	Expands treatment eligibility
Mechanical thrombectomy	LVO	Usually ≤6 h	NCCT + CTA	Direct thrombus removal
Extended-window EVT	Selected LVO	6-24 h	CTA + CTP/MRI or other selection criteria	Treatment of selected late presenters
Bridging therapy	IVT-eligible LVO	Within appropriate IVT/EVT window	NCCT + CTA	Combined pharmacological and mechanical reperfusion

Abbreviations: AIS – acute ischemic stroke; IVT – intravenous thrombolysis; EVT – endovascular therapy; LVO – large-vessel occlusion; NCCT – non-contrast computed tomography; CTA – computed tomography angiography; CTP – computed tomography perfusion; MRI – magnetic resonance imaging.

6. Patient Selection According to the Therapeutic Window

The therapeutic window should not be interpreted as an isolated time interval. Clinical and imaging characteristics should be integrated into treatment decisions.

Table 3

Patient Selection According to Time and Tissue Status

Time from onset / last known well	Initial assessment	Additional imaging	Main treatment strategy
0-4.5 h	NIHSS + NCCT	CTA if LVO suspected	IVT when eligible; EVT if LVO criteria fulfilled
4.5-6 h	NIHSS + NCCT + vascular assessment	CTA; advanced imaging when indicated	EVT in eligible LVO; selected IVT according to specific criteria
6-9 h	NIHSS + NCCT	CTA + CTP/MRI when indicated	EVT in eligible patients; selected extended-window IVT
9-24 h	NIHSS + NCCT	CTA + CTP/MRI-based selection	EVT in selected patients with favorable profile
Wake-up/unknown onset	NIHSS + NCCT	MRI DWI-FLAIR and/or CTP	Reperfusion therapy in selected patients according to imaging criteria

Time from onset / last known well	Initial assessment	Additional imaging	Main treatment strategy
>24 h	Individualized clinical assessment	Multimodal imaging	Highly individualized treatment; evidence remains limited

Abbreviations: NIHSS – National Institutes of Health Stroke Scale; NCCT – non-contrast computed tomography; CTA – computed tomography angiography; CTP – computed tomography perfusion; MRI – magnetic resonance imaging; DWI – diffusion-weighted imaging.

7. Discussion

The findings of contemporary research demonstrate a major transformation in the management of acute ischemic stroke.

Historically, treatment decisions were predominantly based on chronological time. Although time remains critically important, current evidence demonstrates substantial heterogeneity in the rate of infarct progression among individual patients. This has resulted in a transition from a purely time-based approach toward a time-and-tissue paradigm.

For patients presenting within 4.5 hours with disabling neurological deficits, rapid intravenous thrombolysis remains a central component of treatment. Current evidence supports both alteplase and tenecteplase, with tenecteplase providing the practical advantage of single-bolus administration [2,3,4,5].

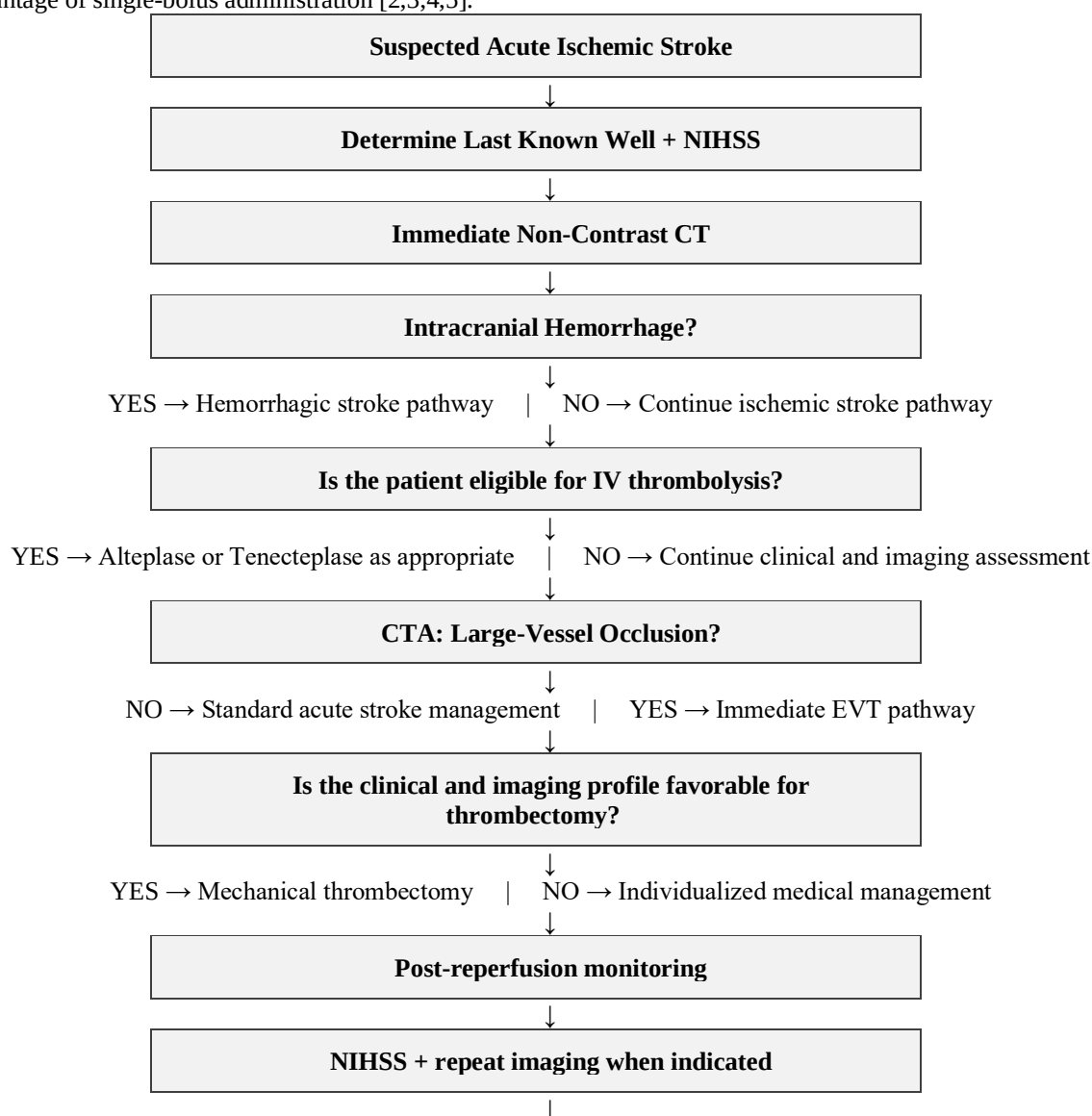
In patients with large-vessel occlusion, intravenous thrombolysis and mechanical thrombectomy should be regarded as complementary rather than mutually exclusive treatment strategies when both are indicated.

CTA is essential for early detection of LVO, while CT perfusion or MRI may provide additional information regarding infarct core and salvageable tissue in selected patients presenting beyond conventional time limits.

The expansion of the thrombectomy window and the emerging evidence for treatment in selected patients with larger ischemic cores further support individualized patient selection [6]. Therefore, the optimal stroke pathway should integrate clinical assessment, rapid imaging, vascular evaluation, reperfusion therapy, and post-reperfusion monitoring.

8. Proposed Optimized Management Algorithm

Based on the reviewed evidence, the following algorithm may be proposed for the management of patients with acute ischemic stroke during the therapeutic window.



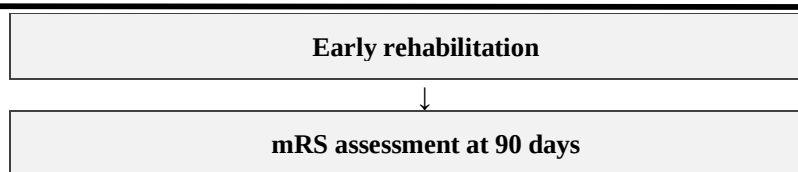


Figure 1. Proposed Algorithm for Optimized Management of Acute Ischemic Stroke

9. Optimizing the Organization of Stroke Care

Optimization should not be limited to pharmacological or endovascular treatment. The entire stroke-care pathway should be improved. The main organizational priorities include:

1. Early recognition of stroke symptoms.
2. Rapid activation of emergency medical services.
3. Accurate determination of last known well.
4. Prehospital notification of the receiving stroke center.
5. Immediate neurological assessment.
6. Rapid non-contrast CT.
7. Early CTA in suspected LVO.
8. Reduction of door-to-needle time.
9. Reduction of door-to-groin time.
10. Immediate transfer to an endovascular-capable center when indicated.
11. Standardized multidisciplinary stroke protocols.
12. Early neurological rehabilitation.
13. Continuous monitoring of quality indicators.

Table 4

Proposed Quality Indicators for Acute Stroke Management

Indicator	Clinical significance
Onset-to-door time	Reflects prehospital delay
Door-to-imaging time	Reflects diagnostic efficiency
Door-to-needle time	Reflects efficiency of IV thrombolysis pathway
Door-to-groin time	Reflects efficiency of EVT pathway
Onset-to-reperfusion time	Overall treatment efficiency
Successful reperfusion rate	Technical efficacy of EVT
Symptomatic intracranial hemorrhage	Major safety outcome
NIHSS at discharge	Neurological recovery
mRS at 90 days	Functional outcome
Mortality	Major clinical outcome

10. Clinical Significance

The reviewed evidence indicates that the optimization of acute ischemic stroke treatment requires an integrated clinical-radiological approach.

The principal components of such a strategy include rapid recognition, early imaging, identification of LVO, timely intravenous thrombolysis, rapid mechanical thrombectomy when indicated, appropriate use of advanced neuroimaging, and coordinated multidisciplinary care.

The concept of the therapeutic window should therefore be reconsidered as a combination of time, tissue, vessel, and patient factors. This approach may increase the proportion of patients who receive reperfusion therapy and may improve functional outcomes while maintaining acceptable safety.

11. Limitations

This review has several limitations. First, it represents a narrative review rather than a formal systematic review or meta-analysis conducted by the authors.

Second, randomized trials included different patient populations, imaging criteria, treatment windows, and outcome measures, limiting direct comparison between studies.

Third, the field of acute ischemic stroke reperfusion therapy continues to evolve rapidly, particularly regarding tenecteplase,

extended-window thrombolysis, large-core thrombectomy, posterior circulation stroke, and emerging endovascular techniques. Therefore, treatment decisions should always be based on current international guidelines and local institutional protocols.

12. Conclusion

The management of acute ischemic stroke during the therapeutic window has undergone substantial transformation. Current evidence demonstrates that successful reperfusion depends not only on chronological time but also on the biological characteristics of ischemic brain tissue.

Intravenous thrombolysis remains a fundamental treatment for eligible patients with disabling neurological deficits within 4.5 hours. Tenecteplase 0.25 mg/kg has emerged as an effective alternative to alteplase 0.9 mg/kg and offers the practical advantage of single-bolus administration.

Mechanical thrombectomy provides substantial benefit for appropriately selected patients with large-vessel occlusion and has expanded the treatment possibilities for selected patients presenting during extended time windows.

The integration of CT angiography and CT perfusion enables more individualized assessment of vascular occlusion, infarct core, and potentially salvageable tissue. Thus, the

modern therapeutic strategy for acute ischemic stroke should combine rapid treatment, vascular assessment, tissue-based selection, intravenous thrombolysis, mechanical thrombectomy, and multidisciplinary stroke care.

The transition from a purely time-based therapeutic window toward a time-and-tissue-based model represents one of the most important developments in contemporary ischemic stroke management and may contribute to improved reperfusion rates and functional outcomes.

References / литература / adabiyotlar

1. Prabhakaran S, Gonzalez NR, Zachrison KS, et al. 2026 guideline for the early management of patients with acute ischemic stroke: a guideline from the American Heart Association/American Stroke Association. *Stroke*. 2026.
2. DT Hodzhieva, SS Pulatov, DK Hajdarova Vse o gemorragicheskom insulte lic pozhilogo i starcheskogo vozrasta.[All about hemorrhagic stroke of elderly and elderly people] *Nauka molodyh-Young Science*. 2015. 87-96.
3. Muir KW, Ford GA, Ford I, Wardlaw JM, McConnell A, Greenlaw N, et al. Tenecteplase versus alteplase for acute stroke within 4.5 h of onset (ATTEST-2): a randomised, parallel group, open-label trial. *Lancet Neurol*. 2024;23(11):1087-96. doi:10.1016/S1474-4422(24)00377-6.
4. Khaydarova Dildora Kadirovna, Khodjyeva Dilbar Tadjiyevna, Bobokulov Gulmurod Dilmurodovich. Optimization Of Neuroprotective Therapy Of Ischemic Stroke In The Acute Period. *European Journal of Molecular & Clinical Medicine*. Volume 07, Issue 03, 2020. P. 3720-3723
5. Khaydarova Dildora Kadirovna, Samadov Alibek Uktamovich. Current issues in the development of neuroprotective therapy in ischemic stroke. *International Scientific Research Journal (WoS)* 2021.6. Moreno-Gomez V, Wold JJ. Therapeutic options for disabling acute ischemic stroke. *Med Clin North Am*. 2025;109(2):343-56.
7. Khaydarova Dildora Kadirovna, Xaydarov Nodirjon Kadirovich, Khodjyeva Dilbar Tadjiyevna. Clinical basis for the development of neuroprotective therapy in acute ischemic stroke. *International Journal of Health Sciences*, 4177-4183. 2022
8. Huang J, et al. Tenecteplase versus alteplase for the treatment of acute ischemic stroke: a meta-analysis of randomized controlled trials. *Ann Med*. 2024.

ЖУРНАЛ НЕВРОЛОГИИ И НЕЙРОХИРУРГИЧЕСКИХ ИССЛЕДОВАНИЙ

JOURNAL OF NEUROLOGY AND NEUROSURGERY RESEARCH

Editorial staff of the journals of www.tadqiqot.uz
Tadqiqot LLC the city of Tashkent,
Amir Temur Street pr.1, House 2.
Web: <http://www.tadqiqot.uz/>; Email: info@tadqiqot.uz
Phone: (+998-94) 404-0000

Контакт редакций журналов. www.tadqiqot.uz
ООО Тадqiqot город Ташкент,
улица Амира Темура пр.1, дом-2.
Web: <http://www.tadqiqot.uz/>; Email: info@tadqiqot.uz
Тел: (+998-94) 404-0000