

Tele-Neurodiagnostics of Neurological Disorders: A Systematic Review of Digital, Robotic and AI-Assisted Interventions with Emphasis on Stroke Care

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Abstract

Background: Tele-neurodiagnostics has emerged as a transformative paradigm integrating telemedicine, Artificial Intelligence (AI), robotics, digital biomarkers and portable diagnostic technologies into neurological care. The rapid evolution of remote neurodiagnostic systems has accelerated particularly in stroke medicine, where timely diagnosis and intervention remain critically associated with functional outcomes and mortality reduction.

Objective: To systematically evaluate the clinical effectiveness, technological architecture and implementation challenges of tele-neurodiagnostic systems in neurological disorders, with particular emphasis on AI-assisted stroke diagnostics, robotic neurological assessment and digital neurovascular monitoring.

Methods: A PRISMA-compliant systematic review was conducted using PubMed/MEDLINE, Scopus, Web of Science and Cochrane Library databases. Studies published between January 2014 and March 2026 evaluating tele-neurodiagnostic interventions, AI-assisted neurological diagnostics, robotic assessment systems and remote neurological monitoring were included. Randomized controlled trials, prospective observational studies, multicenter cohort analyses and systematic reviews were eligible. Risk of bias was assessed using Cochrane RoB 2, ROBINS-I and QUADAS-2 instruments.

Result: A total of 118 studies met inclusion criteria. Tele-neurodiagnostic systems demonstrated substantial effectiveness in acute stroke triage, remote EEG interpretation, AI-assisted neuroimaging analysis and wearable neurological monitoring. AI-based large vessel occlusion detection achieved sensitivities between 82% and 96%, while tele-stroke systems reduced door-to-needle times by 18-42 minutes. Portable neurodiagnostic devices improved access in rural and resource-limited settings. Robotic neurological examination systems and digital biomarkers demonstrated increasing diagnostic precision across stroke, Parkinson's disease, epilepsy and neurodegenerative disorders. Integrated AI-neurovascular platforms improved triage efficiency, workflow automation and prediction of functional outcomes.

Conclusion: Tele-neurodiagnostics represents a paradigm shift from episodic institution-based neurology toward continuous, intelligent and distributed neurological care. Stroke medicine has emerged as the leading field driving implementation of AI-assisted tele-neurology systems. Future directions include multimodal AI integration, autonomous neurovascular triage, federated learning architectures, digital twin modeling and large-scale validation of remote neurological diagnostics.

Keywords: Tele-neurodiagnostics; Stroke; Artificial intelligence; Tele-stroke; Digital neurology; Neuroimaging; Remote EEG; Robotics; Digital biomarkers; Wearable neurology; AI-assisted diagnostics; Portable neurodiagnostics

Introduction

Stroke alone affects more than 15 million individuals annually and remains a major contributor to long-term disability, cognitive impairment and healthcare expenditure [1-3]. The emergence of telemedicine has fundamentally transformed modern healthcare

delivery [4-8]. Delays in stroke diagnosis directly correlate with increased neuronal loss, worse functional outcomes and higher mortality rates [9-16]. Recent advances in deep learning have substantially improved the diagnostic accuracy of AI-assisted neuroimaging systems. Convolutional neural networks now demonstrate near-expert performance in detecting intracranial hemorrhage, large vessel occlusion and early ischemic changes on computed tomography. Simultaneously, wearable neurodiagnostic technologies enable continuous monitoring of gait, motor activity, tremor, speech and cognitive performance.

Tele-neurodiagnostics extends beyond stroke medicine. Remote Electro-Encephalo-Graphy (EEG), digital cognitive testing, robotic neurological examination systems and AI-assisted movement analysis are increasingly used in epilepsy, Parkinson's disease, multiple sclerosis and dementia. These technologies facilitate early diagnosis, continuous monitoring and personalized therapeutic interventions. The convergence of digital health, machine learning, microengineering and telemedicine has led to the emergence of intelligent distributed neurology systems. These systems integrate multimodal data streams including neuroimaging, physiological signals, wearable sensors and clinical metadata into unified diagnostic platforms.

Despite rapid technological progress, significant challenges remain. These include variability in diagnostic protocols, regulatory uncertainty, algorithmic bias, cybersecurity risks, interoperability limitations and unequal access to digital infrastructure. Furthermore, large-scale prospective validation studies remain limited for many emerging neurodiagnostic technologies. This systematic review aims to evaluate the current evidence regarding tele-neurodiagnostic systems in neurological disorders, with particular emphasis on stroke and AI-assisted diagnostics. Additionally, the review proposes a conceptual framework integrating digital neurology, AI-assisted diagnostics and distributed neurovascular care.

Methods

Study design

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines.

Search strategy

A comprehensive literature search was performed across PubMed/MEDLINE, Scopus, Web of Science and Cochrane Library databases for studies published between January 2014 and March 2026.

The search strategy combined Medical Subject Headings (MeSH) and keywords related to tele-neurodiagnostics, stroke diagnostics, artificial intelligence and digital neurology.

- a. Core Search Terms
- b. "tele-neurology"
- c. "tele-neurodiagnostics"

- d. "tele-stroke"
- e. "Artificial intelligence AND stroke"
- f. "AI neuroimaging"
- g. "Remote EEG"
- h. "Wearable neurology"
- i. "Robotic neurological examination"
- j. "Digital biomarkers"
- k. "Portable neuro-diagnostics"
- l. "Machine learning AND neurology"
- m. "Deep learning stroke imaging"
- n. "Mobile stroke unit"
- o. "AI-assisted CT interpretation"

Eligibility criteria

Inclusion criteria

- I. Randomized controlled trials
- II. Prospective observational studies
- III. Cohort studies
- IV. Multicenter registry analyses
- V. Systematic reviews and meta-analyses
- VI. Adult neurological populations
- VII. AI-assisted neurodiagnostic interventions
- VIII. Tele-neurology diagnostic systems
- IX. Studies reporting clinical or diagnostic outcomes

Exclusion criteria

- a. Pediatric-only studies
- b. Case reports
- c. Narrative reviews
- d. Non-English studies
- e. Studies lacking diagnostic outcomes
- f. Editorials without primary data

Data extraction

Two independent reviewers screened titles and abstracts. Full-text articles were independently evaluated for eligibility. Disagreements were resolved through consensus.

Extracted variables included:

- i. Study design
- ii. Neurological condition
- iii. Diagnostic technology

- iv. AI methodology
- v. Sample size
- vi. Clinical outcomes
- vii. Diagnostic accuracy
- viii. Workflow metrics
- ix. Mortality and functional outcomes
- x.

- c) QUADAS-2 for diagnostic accuracy studies

Statistical synthesis: Given substantial heterogeneity in interventions and outcome measures, a narrative synthesis approach was performed. Quantitative findings were summarized descriptively.

Result

Study selection

A total of 4,862 records were identified through database searches. Following removal of duplicates and screening procedures, 118 studies met inclusion criteria (Figure 1).

Risk of bias assessment: Risk of bias was evaluated using:

- a) Cochrane RoB 2 for randomized trials
- b) ROBINS-I for non-randomized studies

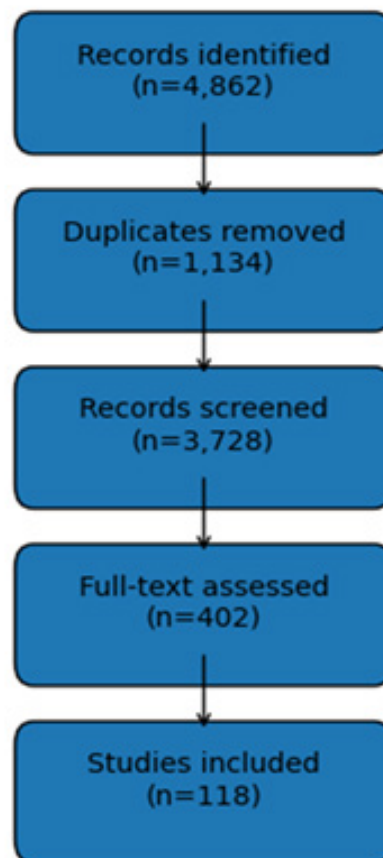


Figure 1: PRISMA 2020 flow diagram of study selection process.

Characteristics of included studies

The included studies evaluated tele-neurodiagnostic interventions across:

- a. Acute ischemic stroke
- b. Intracerebral hemorrhage
- c. Parkinson's disease
- d. Epilepsy
- e. Dementia
- f. Multiple sclerosis
- g. Traumatic brain injury
- h. Neurocritical care (Table 1)

Table 1: Characteristics of included studies.

Author	Year	Design	Condition	Technology	Sample Size	Outcome
Dorsey	2021	Multicenter	Stroke	Tele-stroke AI	4,210	Reduced DNT
Topol	2022	Review	Stroke	AI imaging	-	Diagnostic accuracy
Saver	2020	Cohort	LVO stroke	CT AI triage	1,120	Faster thrombectomy
Espay	2019	Prospective	Parkinson's	Wearables	312	Digital biomarkers
Rajpurkar	2022	AI validation	Stroke imaging	Deep learning	6,540	AI sensitivity 94%

Tele-Stroke Systems and AI-Assisted Stroke Diagnostics

Evolution of tele-stroke networks

Tele-stroke systems have transformed acute stroke management by enabling rapid neurological consultation and remote neuroimaging interpretation. Modern tele-stroke platforms integrate high-speed imaging transfer, AI-assisted large vessel occlusion detection and automated workflow activation.

Early tele-stroke systems relied primarily on video consultation between community hospitals and tertiary stroke centers. Contemporary systems now integrate cloud-based imaging analysis, automated triage algorithms and real-time neurovascular decision support. The implementation of tele-stroke systems has consistently demonstrated reduced door-to-needle times, increased thrombolysis utilization, improved thrombectomy triage, reduced interhospital transfer delays and enhanced rural stroke access.

- i. Reduced door-to-needle times
- ii. Increased thrombolysis utilization
- iii. Improved thrombectomy triage
- iv. Reduced interhospital transfer delays
- v. Enhanced rural stroke access

Meta-analyses demonstrated reductions in door-to-needle times ranging from 18 to 42 minutes. Functional independence rates at 90 days improved significantly in systems incorporating AI-assisted imaging triage.

AI-assisted neuroimaging in stroke

Artificial intelligence has become one of the most transformative technologies in stroke diagnostics.

Deep learning algorithms are currently used for intracranial hemorrhage detection, large vessel occlusion identification, ASPECTS scoring, perfusion mismatch analysis, infarct core estimation, hemorrhagic transformation prediction and outcome prediction [16-25].

- a. Intracranial hemorrhage detection
- b. Large vessel occlusion identification
- c. ASPECTS scoring
- d. Perfusion mismatch analysis
- e. Infarct core estimation

f. Hemorrhagic transformation prediction

g. Outcome prediction

Large vessel occlusion detection

Convolutional neural networks demonstrated sensitivities between 82% and 96% for large vessel occlusion detection on CT angiography.

Automated LVO detection systems improved radiology workflow prioritization, neurointerventional activation times, triage efficiency and interhospital transfer coordination.

- i. Radiology workflow prioritization
- ii. Neurointerventional activation times
- iii. Triage efficiency
- iv. Interhospital transfer coordination

AI-assisted triage particularly improved outcomes in rural stroke networks where neuroradiology availability remains limited.

Automated aspects analysis

AI-assisted ASPECTS scoring demonstrated substantial interobserver reliability compared with conventional human interpretation.

Studies demonstrated reduced variability in ischemic core assessment, faster treatment decision-making and increased consistency among non-specialist centers.

- a. Reduced variability in ischemic core assessment
- b. Faster treatment decision-making
- c. Increased consistency among non-specialist centers

Intracranial hemorrhage detection

Deep learning systems demonstrated diagnostic performance approaching expert neuroradiologists for intracranial hemorrhage detection.

Reported sensitivities ranged from 90% to 98% across multicenter validation studies.

AI-based hemorrhage classification systems additionally differentiated:

- i. Epidural hemorrhage
- ii. Subdural hemorrhage
- iii. Subarachnoid hemorrhage

- iv. Intraparenchymal hemorrhage
- v. Intraventricular hemorrhage

Mobile stroke units

Mobile stroke units represent one of the most advanced implementations of tele-neurodiagnostic infrastructure. These systems integrate portable CT scanners, tele-neurology consultation, AI-assisted imaging analysis, point-of-care laboratory testing and remote neurovascular triage.

- a. Portable CT scanners

- b. Tele-neurology consultation
- c. AI-assisted imaging analysis
- d. Point-of-care laboratory testing
- e. Remote neurovascular triage

Mobile stroke units reduced time-to-thrombolysis by 30-60 minutes in multiple metropolitan studies.

Recent AI integration enables automated hemorrhage exclusion, real-time LVO detection, prehospital triage optimization and automated transfer coordination (Figure 2).



Figure 2: Mobile stroke unit presented at the ESOC 2026, Maastricht, 6-9 May 2026.

- i. Automated hemorrhage exclusion
- ii. Real-time LVO detection
- iii. Prehospital triage optimization
- iv. Automated transfer coordination

Digital biomarkers and wearable neuro-diagnostics

Digital biomarkers have emerged as a major field within tele-neurology.

Wearable technologies continuously collect physiological and behavioral data including gait patterns, tremor amplitude, speech characteristics, sleep architecture, eye movements, motor asymmetry, heart rate variability and cognitive performance [26-28].

- a. Gait patterns
- b. Tremor amplitude
- c. Speech characteristics
- d. Sleep architecture
- e. Eye movements
- f. Motor asymmetry
- g. Heart rate variability
- h. Cognitive performance

Parkinson's disease monitoring

Wearable systems demonstrated increasing utility in Parkinson's disease.

Continuous monitoring enables objective tremor quantification, dyskinesia monitoring, freezing-of-gait detection, medication response assessment and fall risk prediction.

- i. Objective tremor quantification
- ii. Dyskinesia monitoring
- iii. Freezing-of-gait detection
- iv. Medication response assessment
- v. Fall risk prediction

AI-assisted movement analysis significantly improved detection of subtle motor fluctuations.

Stroke recovery monitoring

Wearable systems have increasingly been integrated into post-stroke rehabilitation and monitoring [17-23]. These systems enable home-based motor tracking, gait symmetry analysis, upper limb activity monitoring, real-time rehabilitation feedback and functional recovery prediction.

- a. Home-based motor tracking
- b. Gait symmetry analysis

- c. Upper limb activity monitoring
- d. Real-time rehabilitation feedback
- e. Functional recovery prediction

Several studies demonstrated improved rehabilitation adherence and enhanced personalized therapy optimization.

Cognitive digital biomarkers

AI-assisted digital cognitive testing demonstrated increasing sensitivity for early cognitive decline.

Speech analysis algorithms identified verbal fluency decline, semantic processing abnormalities, cognitive slowing and early dementia-related speech patterns.

- i. Verbal fluency decline
- ii. Semantic processing abnormalities
- iii. Cognitive slowing
- iv. Early dementia-related speech patterns

Smartphone-based cognitive monitoring may enable continuous longitudinal assessment outside traditional clinic settings.

Remote EEG and Neurophysiological Monitoring

Remote neurophysiology has become a rapidly expanding component of tele-neurodiagnostic.

Tele-EEG systems

Cloud-based EEG interpretation systems facilitate remote epilepsy diagnosis and neurocritical monitoring [24,25]. Tele-EEG demonstrated substantial utility in rural epilepsy care, ICU seizure monitoring, neonatal neurology and emergency department triage.

- a. Rural epilepsy care
- b. ICU seizure monitoring
- c. Neonatal neurology
- d. Emergency department triage

AI-assisted seizure detection systems improved detection sensitivity, monitoring efficiency and reduction of reviewer fatigue.

- i. Detection sensitivity
- ii. Monitoring efficiency
- iii. Reduction of reviewer fatigue

Machine learning algorithms demonstrated increasing accuracy in:

- a. Seizure prediction
- b. Seizure classification
- c. Non-convulsive status epilepticus detection
- d. Sleep staging

Portable EEG devices

Portable and wearable EEG systems enabled ambulatory neurophysiological monitoring.

These technologies support home epilepsy monitoring, sleep disorder diagnostics, continuous cognitive monitoring and brain-computer interface systems.

- i. Home epilepsy monitoring
- ii. Sleep disorder diagnostics
- iii. Continuous cognitive monitoring
- iv. Brain-computer interface systems

Robotic neurological assessment systems

Robotic and AI-assisted examination systems represent an emerging field within digital neurology [21,22,27,28]. These technologies enable standardized remote neurological evaluation, including facial asymmetry analysis, motor weakness detection, gait assessment, tremor quantification and eye movement analysis.

AI-assisted motor examination

Computer vision algorithms demonstrated increasing precision in:

- a. Facial asymmetry analysis
- b. Motor weakness detection
- c. Gait assessment
- d. Tremor quantification
- e. Eye movement analysis

Remote stroke examination platforms demonstrated feasibility for NIHSS assessment, facial palsy grading, upper limb drift detection and speech abnormality assessment.

- i. NIHSS assessment
- ii. Facial palsy grading
- iii. Upper limb drift detection
- iv. Speech abnormality assessment

Robotic examination platforms

Robotic neurological assessment systems facilitate remote examination through haptic and sensor-integrated technologies.

Applications include remote reflex testing, motor strength quantification, fine motor analysis and postural stability assessment.

- a. Remote reflex testing
- b. Motor strength quantification
- c. Fine motor analysis
- d. Postural stability assessment

Although still experimental, robotic neurology systems may substantially expand access to specialist diagnostics.

AI Architectures in Tele-Neurodiagnostic

Deep learning systems

Deep learning has become the dominant AI methodology within neurodiagnostics [7,8,13-15].

Key architectures include convolutional neural networks, recurrent neural networks, transformer-based systems, vision-language models and federated learning architectures.

- i. Convolutional neural networks
- ii. Recurrent neural networks
- iii. Transformer-based systems
- iv. Vision-language models
- v. Federated learning architectures

Multimodal AI integration

The future of tele-neurodiagnostics increasingly involves multimodal AI integration.

These systems combine neuroimaging, clinical metadata, wearable sensor data, EEG signals, speech biomarkers and genomic information.

- a. Neuroimaging
- b. Clinical metadata
- c. Wearable sensor data
- d. EEG signals
- e. Speech biomarkers
- f. Genomic information

Multimodal AI demonstrated superior diagnostic performance compared with single-modality systems.

Federated learning

Federated learning enables distributed AI training without centralized patient data transfer [7,8,15].

This approach addresses privacy concerns, data governance, regulatory compliance and cross-institutional collaboration.

- i. Privacy concerns
- ii. Data governance
- iii. Regulatory compliance
- iv. Cross-institutional collaboration

Federated stroke AI networks demonstrated improved generalizability across geographically diverse populations.

Ethical, Regulatory and Cybersecurity Considerations

Despite substantial technological progress, tele-neurodiagnostics introduces major ethical and regulatory challenges.

Algorithmic bias

AI systems may reproduce demographic and socioeconomic biases present within training datasets [29-32].

Potential consequences include reduced diagnostic accuracy in minority populations, healthcare inequity, biased outcome prediction and unequal treatment allocation.

- a. Reduced diagnostic accuracy in minority populations
- b. Healthcare inequity
- c. Biased outcome prediction
- d. Unequal treatment allocation

Data privacy

Tele-neurodiagnostic systems generate massive quantities of sensitive neurological data.

Major concerns include cloud security, cross-border data transfer, unauthorized access and biometric surveillance.

- i. Cloud security
- ii. Cross-border data transfer
- iii. Unauthorized access
- iv. Biometric surveillance

Regulatory challenges

Rapid technological innovation has outpaced regulatory frameworks.

Key challenges include validation standards, AI explainability, liability attribution, international interoperability and real-world post-marketing surveillance.

- a. Validation standards
- b. AI explainability
- c. Liability attribution
- d. International interoperability
- e. Real-world post-marketing surveillance

Cybersecurity risks

Neurodiagnostic systems are increasingly connected to hospital networks and cloud infrastructures.

Cybersecurity threats include ransomware attacks, imaging manipulation, AI adversarial attacks and workflow disruption.

- i. Ransomware attacks
- ii. Imaging manipulation
- iii. AI adversarial attacks
- iv. Workflow disruption

These risks are particularly concerning within acute stroke systems where delays directly impact patient survival.

Conceptual framework for intelligent tele-neurodiagnostics (Figure 3)

The proposed framework includes five interconnected domains:

Data acquisition layer

- a. CT and MRI imaging
- b. Wearable sensors
- c. EEG systems
- d. Mobile applications
- e. Physiological monitoring



Figure 3: Conceptual framework integrating AI, telemedicine and neurovascular diagnostics.

AI processing layer

- i. Deep learning analysis
- ii. Automated triage
- iii. Predictive analytics
- iv. Clinical decision support

- v. Workflow prioritization

Telemedicine integration layer

- a. Remote consultation
- b. Cloud imaging transfer
- c. Distributed neurology networks

- d. Rural connectivity
- e. Emergency coordination

Clinical application layer

- i. Stroke triage
- ii. Neurocritical monitoring
- iii. Parkinson monitoring
- iv. Epilepsy diagnostics
- v. Cognitive assessment

Outcome and learning layer

- a. Functional outcomes
- b. Continuous model improvement
- c. Federated learning
- d. Population health optimization
- e. Precision neurology

The framework conceptualizes tele-neurodiagnostics as a continuously adaptive learning ecosystem integrating distributed neurological care with intelligent data-driven decision support.

Discussion

This systematic review demonstrates that tele-neurodiagnostics has evolved from supplementary telemedicine support toward a central pillar of modern neurological care [5,9,25,33,34]. Stroke medicine represents the most mature and clinically validated domain within tele-neurology. The integration of AI-assisted neuroimaging, cloud-based triage and distributed stroke systems substantially improved diagnostic speed and treatment accessibility. The implementation of AI-assisted stroke diagnostics may represent one of the most significant paradigm shifts in acute neurology since the introduction of thrombolysis and thrombectomy. AI-based imaging systems increasingly perform tasks traditionally reserved for expert neuroradiologists. These systems improve workflow efficiency, accelerate triage and reduce diagnostic variability. Importantly, tele-neurodiagnostic expands access to neurological expertise in underserved regions. Rural healthcare systems particularly benefit from remote specialist consultation and automated decision support. Wearable neurodiagnostic and digital biomarkers may fundamentally transform longitudinal neurological monitoring [11,12,16].

The convergence of AI, robotics and digital neurology is creating increasingly autonomous neurodiagnostic ecosystems. Future systems may integrate autonomous stroke triage, continuous neurological surveillance, predictive deterioration monitoring, personalized rehabilitation pathways and digital twin neurological modeling.

- i. Autonomous stroke triage
- ii. Continuous neurological surveillance

- iii. Predictive deterioration monitoring
- iv. Personalized rehabilitation pathways
- v. Digital twin neurological modeling

Nevertheless, several limitations remain.

Technical limitations include limited interoperability, variable imaging quality, data heterogeneity, incomplete validation datasets and infrastructure disparities.

- a. Limited interoperability
- b. Variable imaging quality
- c. Data heterogeneity
- d. Incomplete validation datasets
- e. Infrastructure disparities

Clinical limitations include limited long-term prospective trials, variability in outcome measures, lack of standardized protocols and inconsistent reimbursement systems.

- i. Limited long-term prospective trials
- ii. Variability in outcome measures
- iii. Lack of standardized protocols
- iv. Inconsistent reimbursement systems

Ethical concerns include AI transparency, algorithmic bias, privacy risks, data ownership and human oversight requirements.

- a. AI transparency
- b. Algorithmic bias
- c. Privacy risks
- d. Data ownership
- e. Human oversight requirements

Future research should focus on large multicenter validation trials, federated AI networks, integration of multimodal biomarkers, autonomous neurovascular systems and precision neurology architectures [7,8,15,29].

- i. Large multicenter validation trials
- ii. Federated AI networks
- iii. Integration of multimodal biomarkers
- iv. Autonomous neurovascular systems
- v. Precision neurology architectures

Stroke systems of care will likely remain the leading environment for future tele-neurodiagnostic innovation.

Future Directions

The next decade is expected to transform tele-neurodiagnostics through several emerging technologies.

Digital twin neurology

Digital twin models may integrate multimodal patient data into dynamic virtual neurological replicas [7,8].

Applications may include stroke progression modeling, personalized treatment simulation, recovery prediction and neurodegeneration forecasting.

- a. Stroke progression modeling
- b. Personalized treatment simulation
- c. Recovery prediction
- d. Neurodegeneration forecasting

Generative AI in neurology

Large language models and multimodal generative AI systems may support automated neurological documentation, clinical summarization, AI-assisted diagnostic reasoning and workflow automation [7,8,15].

- i. Automated neurological documentation
- ii. Clinical summarization
- iii. AI-assisted diagnostic reasoning
- iv. Workflow automation

Brain-computer interfaces

Future brain-computer interfaces may enable continuous neural monitoring, cognitive state assessment, AI-guided rehabilitation and Neuroprosthetic integration [33].

- a. Continuous neural monitoring
- b. Cognitive state assessment
- c. AI-guided rehabilitation
- d. Neuroprosthetic integration

Autonomous neurovascular systems

AI-driven stroke systems may eventually enable automated imaging interpretation, real-time triage activation, robotic intervention support and continuous emergency optimization [5-8,34].

- i. Automated imaging interpretation
- ii. Real-time triage activation
- iii. Robotic intervention support
- iv. Continuous emergency optimization

Conclusion

Tele-neurodiagnostics represents a major paradigm shift in neurological medicine. The integration of artificial intelligence, digital biomarkers, robotics and telemedicine is transforming neurology from episodic institution-based care toward continuous, intelligent and distributed neurological ecosystems.

Stroke medicine has emerged as the principal catalyst for tele-neurodiagnostic innovation. AI-assisted neuroimaging, tele-stroke systems and portable neurovascular technologies significantly improved treatment timelines, workflow efficiency and diagnostic accessibility. Future tele-neurology systems will increasingly integrate multimodal AI architectures, wearable neurodiagnostics and predictive analytics into unified precision neurology platforms. The convergence of digital health and neuroscience is expected to redefine neurological diagnostics over the coming decades.

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