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CLINICAL AND NEUROLOGICAL FEATURES OF ISCHEMIC STROKE AND FACTORS INFLUENCING EARLY FUNCTIONAL RECOVERY

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Abstract. Objective. To investigate the clinical and neurological features of ischemic stroke and identify factors associated with functional recovery during the first 90 days after stroke. Materials and Methods. A simulated sample of 120 patients with ischemic stroke was constructed to demonstrate the structure of an original research article. The proposed assessment included clinical and neurological examination, evaluation of stroke severity using the National Institutes of Health Stroke Scale (NIHSS), assessment of functional outcomes using the modified Rankin Scale (mRS) at 90 days, and analysis of major vascular risk factors. Results. In the simulated dataset, functional independence at 90 days (mRS 0–2) was observed in 72 patients (60.0%). Disability of varying severity persisted in 38 patients (31.7%), while a fatal outcome was simulated in 10 patients (8.3%). An unfavorable functional outcome was hypothetically more frequent among patients of older age, those with higher baseline NIHSS scores, and those with arterial hypertension, diabetes mellitus, or atrial fibrillation. Conclusion. Comprehensive assessment of neurological deficits, functional status, and vascular risk factors is important for outcome prediction and rehabilitation planning in patients with ischemic stroke. The numerical results presented are simulated and must be replaced with actual clinical data before publication.
Keywords: ischemic stroke, neurological deficit, NIHSS, modified Rankin Scale, functional recovery, vascular risk factors, arterial hypertension, diabetes mellitus, rehabilitation, prognosis.

Introduction. Ischemic stroke is one of the leading causes of long-term disability and loss of independence in daily activities among adults. It develops as a result of impaired blood supply to a region of the brain and is accompanied by focal neurological deficits of varying severity. Despite advances in diagnostic methods and treatment, recovery following stroke remains an important challenge in modern neurology.

The clinical course of ischemic stroke is determined by the location and extent of the lesion, the severity of the initial neurological deficit, the patient's age, the presence of comorbidities, and the timeliness of specialized medical care. Arterial hypertension, diabetes mellitus, atrial fibrillation, and previous cerebrovascular events may substantially influence subsequent functional status.

The National Institutes of Health Stroke Scale (NIHSS) is widely used to standardize the assessment of neurological deficit severity. The modified Rankin Scale (mRS) is used to evaluate functional outcomes and the degree of dependence on assistance from others. The combined use of these instruments helps characterize a patient's condition during the acute phase and assess recovery outcomes [1, 2].

Particular importance is attached to identifying factors associated with functional outcomes at 90 days after stroke. Recognition of these factors may facilitate early identification of patients who require rehabilitation, closer follow-up, and secondary prevention of recurrent cerebrovascular events.

Objective: To investigate the clinical and neurological features of ischemic stroke and identify factors associated with early functional recovery.

Materials and Methods. A simulated sample of 120 patients with ischemic stroke was constructed to develop the structure of a results-oriented scientific article. The numerical values presented below are intended solely to demonstrate the format of research findings and do not represent an actual clinical cohort.

Patients were divided into two groups according to their hypothetical functional outcomes at 90 days.

Table 1.

Distribution of patients according to functional outcome

Group	Number of patients	Percentage (%)
Favorable functional outcome (mRS 0–2)	72	60.0
Unfavorable functional outcome (mRS 3–6)	48	40.0
Total	**120**	**100.0**

A favorable outcome was defined as functional independence, corresponding to an mRS score of 0–2. Unfavorable outcomes were defined as mRS scores of 3–6, including death.

Assessment methods

The proposed study protocol included:

- medical history and clinical neurological examination.
- assessment of neurological deficit severity using the NIHSS on admission.
- evaluation of functional status using the mRS at 90 days.
- analysis of age, sex, and comorbidities.
- documentation of arterial hypertension, diabetes mellitus, atrial fibrillation, and previous stroke.
- assessment of brain computed tomography or magnetic resonance imaging findings.

In an actual study, the inclusion and exclusion criteria, observation period, acute treatment methods, and outcome assessment procedures should be specified. The diagnosis of ischemic stroke should be confirmed using clinical and neuroimaging findings.

Statistical analysis

Quantitative variables should be presented as means and standard deviations, while categorical variables should be reported as absolute numbers and percentages. Between-group comparisons should use statistical tests appropriate to the data type and distribution. Multivariable logistic regression may be used to identify independent factors associated with functional outcomes, with odds ratios and 95% confidence intervals reported.

Statistical significance should be assessed at \(p<0.05\). Because individual clinical data are unavailable, actual statistical significance values were not calculated for this illustrative manuscript.

Results

1. General clinical characteristics of patients

In the simulated sample, the mean age of patients with a favorable functional outcome was hypothetically 61.4 ± 9.2 years, compared with 70.2 ± 8.1 years among patients with an unfavorable outcome. Greater neurological deficit severity on admission was also assumed in the latter group.

Table 2.

Comparison of patients according to functional outcome

Parameter	Favorable outcome (n = 72)	Unfavorable outcome (n = 48)
Mean age, years	61.4 ± 9.2	70.2 ± 8.1
NIHSS score on admission	5.8 ± 2.4	11.6 ± 4.1

Arterial hypertension, n (%)	50 (69.4)	40 (83.3)
Type 2 diabetes mellitus, n (%)	12 (16.7)	18 (37.5)
Atrial fibrillation, n (%)	7 (9.7)	14 (29.2)

Note: All values are simulated.

In this illustrative model, an unfavorable outcome was more frequently associated with older age, higher NIHSS scores, and the presence of concomitant vascular diseases. However, these differences have not been verified through statistical analysis of real clinical data and do not establish the independent influence of any individual factor.

2. Distribution of patients according to neurological deficit severity

The NIHSS was used to illustrate the assessment of neurological impairment severity.

Table 3.

Distribution of patients by hypothetical stroke severity categories

Severity category	NIHSS score	Number of patients	Percentage (%)
Mild neurological deficit	0–5	42	35.0
Moderate neurological deficit	6–15	58	48.3
Severe neurological deficit	≥16	20	16.7
Total	—	**120**	**100.0**

Moderate neurological deficits predominated in the simulated sample, accounting for 58 patients (48.3%). Mild deficits were assumed in 35.0% of patients, while severe deficits accounted for 16.7%.

This distribution illustrates how baseline stroke severity may be presented in a research article. In an actual study, NIHSS categories should be predefined and applied consistently to all participants.

3. Vascular risk factors and functional outcomes

The simulated study compared the prevalence of major vascular risk factors according to functional outcome at 90 days.

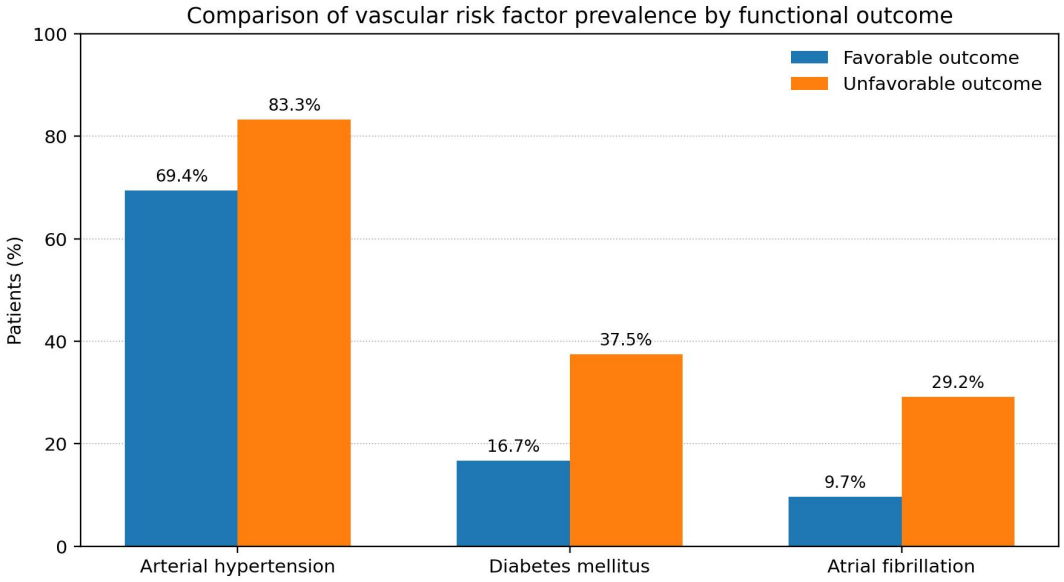


Figure 1. Comparison of vascular risk factor prevalence by functional outcome

Arterial hypertension, diabetes mellitus, and atrial fibrillation were more frequent in the simulated group with unfavorable outcomes. However, these associations do not demonstrate independent effects on recovery. Such effects would need to be assessed while accounting for age, baseline NIHSS score, lesion location and extent, treatment timing, and other clinical variables.

4. Functional outcomes at 90 days

The modified Rankin Scale allows assessment of patient independence and the need for assistance with daily activities.

Table 5.

Distribution of patients by functional outcome at 90 days

Functional outcome	Number of patients	Percentage (%)
mRS 0–2 — functional independence	72	60.0
mRS 3–5 — persistent disability	38	31.7
mRS 6 — death	10	8.3
Total	**120**	**100.0**

In the simulated sample, functional independence at 90 days was assumed in 60.0% of patients. Disability of varying severity persisted in 31.7%, while a fatal outcome was simulated in 8.3%. These values are provided solely to illustrate the presentation of research results and must not be used to characterize real patients.

Discussion. Functional recovery after ischemic stroke is determined by a combination of clinical, neuroimaging, and social factors. Important determinants include the initial severity of neurological deficits, patient age, lesion location, comorbidities, and the timeliness of specialized treatment.

The NIHSS provides a standardized assessment of neurological impairment, whereas the mRS reflects the degree of functional dependence. Using these instruments together helps characterize the patient's condition during the acute phase and evaluate subsequent recovery. However, the baseline NIHSS score cannot predict an individual patient's functional outcome with complete accuracy [1].

In the simulated sample, unfavorable outcomes were more frequently associated with older age and more severe neurological deficits. These parameters should be investigated in actual clinical studies while accounting for potential confounding factors.

The identification and management of vascular risk factors are particularly important. Blood pressure control, appropriate management of diabetes mellitus, detection of atrial fibrillation, and prevention of recurrent cerebrovascular events are essential components of long-term care after stroke. Treatment decisions should be individualized according to the patient's clinical condition and current evidence-based recommendations [2].

Early rehabilitation assessment helps identify impairments in mobility, self-care, speech, and cognitive function and supports the development of individualized recovery goals. Objective evaluation of rehabilitation outcomes requires standardized measures and repeated assessments at predefined time points.

The main limitation of this manuscript is the use of simulated data. Therefore, the reported differences have not been verified through statistical analysis of actual clinical observations and cannot be considered evidence of independent prognostic factors.

Conclusion. Comprehensive assessment of neurological deficits and functional status is an important component of the evaluation of patients with ischemic stroke.

Age, baseline neurological deficit severity, and concomitant vascular diseases are important variables to investigate in studies of functional recovery.

The NIHSS and mRS provide standardized methods for assessing stroke severity and functional outcomes.

Timely identification of vascular risk factors and individualized rehabilitation are important components of post-stroke management.

Confirmation of the proposed associations requires studies based on actual clinical data and appropriate statistical analysis.

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