CLINICAL CHARACTERISTICS AND IMAGING DIAGNOSIS OF PATIENTS WITH CEREBROVASCULAR ACCIDENTS TREATED AS INPATIENTS AT TUE TINH HOSPITAL, 2021–2023

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ABSTRACT

Objectives: *To describe the clinical characteristics and imaging diagnostic features of inpatients with cerebrovascular accidents at Tue Tinh Hospital during the period 2021–2023.*

Subjects and methods: *A retrospective cross-sectional descriptive study was conducted on 101 medical records of patients diagnosed with cerebrovascular accidents and treated at Tue Tinh Hospital between January 2021 and December 2023.*

Results: *The majority of patients were in the post-stroke sequelae stage (75.2%). The mean age was 66.51 ± 9.9 years, with a male-to-female ratio of 1.54. Hypertension was the most common comorbidity (79.2%). The most frequent clinical manifestation was hemiplegia or partial paralysis (89.1%). From the Traditional Medicine (TM) perspective, the most notable tongue feature was deviation (17.65%), while the predominant pulse patterns were deep (55.4%) and wiry (29.7%). TM syndrome differentiation was mainly characterized by the "Interior–Deficiency–Heat" pattern, with liver–kidney yin deficiency as the principal subtype. Neuroimaging findings (CT/MRI) showed cerebral infarction in 57.5% of cases, with multifocal lesions (65%), predominance in the left cerebral hemisphere (53.3%), and lesion size primarily <15 mm (52.5%).*

Conclusions: *Most patients were male and older than 65 years. Hemiplegia was the most common clinical presentation. TM characteristics were marked by tongue deviation and deep–wiry pulse, with liver–kidney yin deficiency as the predominant syndrome pattern. Imaging findings indicated that cerebral infarction, typically presenting as small (<15 mm), multifocal lesions predominantly in the left hemisphere, was the most common pattern.*

Keywords: *Cerebrovascular accident, retrospective study, Tue Tinh Hospital.*

INTRODUCTION

Cerebrovascular accident (CVA), or stroke, is a condition with a high global incidence and remains one of the leading causes of mortality and long-term disability worldwide. The majority of cases are due to cerebral infarction, which accounts for approximately 76.2% of stroke cases in Vietnam. Globally, in 2020, an estimated 11.71 million new stroke cases were reported, including 7.59 million cases of cerebral infarction. Stroke was responsible for approximately 7.08 million deaths, of which 3.48 million were attributed to cerebral infarction. Among patients with cerebral infarction, the 30-day mortality rate ranges from 8–12%. In Vietnam, stroke was the leading cause of death during the period 2009–2019, with an increase of 9.1% [1].

Accurate assessment of disease stage and post-stroke sequelae, which significantly impact patients' functional status and daily activities, is essential for improving treatment outcomes and quality of life. Such assessment relies heavily on both clinical and paraclinical characteristics.

However, to date, there remains a lack of systematic and comprehensive studies evaluating these characteristics among stroke patients receiving care at Tue Tinh Hospital. Therefore, this study was conducted with the objective: To describe the clinical characteristics and imaging findings of inpatients with cerebrovascular accidents at Tue Tinh Hospital during the period 2021–2023.

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SUBJECTS AND METHODS

Study Subjects

The study included all medical records of patients diagnosed with cerebrovascular accidents (stroke) who were treated as inpatients at Tue Tinh Hospital from January 2021 to December 2023.

Inclusion criteria:

Patients were included if they met the following criteria:

+ Diagnosed with cerebrovascular accidents according to ICD-10 classifications:

Intracerebral hemorrhage (I61)

Cerebral infarction (I63)

Sequelae of cerebrovascular diseases (I69)

+ Diagnosed with "Trúng phong" (stroke) according to Traditional Medicine, including meridian stroke and viscera stroke patterns (ICD-10: I60–I64)

Exclusion criteria:

- Medical records that were incomplete or did not meet the requirements of the data collection form.

Study location and duration

- Location: Tue Tinh Hospital.

- Duration: From October 2024 to February 2025.

Study Designs

This study employed a retrospective, cross-sectional descriptive design.

Sample size and sampling method:

All eligible medical records within the study period were collected. A total of 136 records were initially obtained. After screening for duplication and incomplete data, 101 records were deemed valid and included in the final analysis..

Study Variables:

Data were retrospectively extracted from medical records, including:

- General characteristics: Age, sex, disease duration, and medical history (hypertension, diabetes mellitus, dyslipidemia, previous stroke).

- Clinical characteristics:

+ Modern medicine: Major neurological deficits, including motor paralysis, speech disorders, and sensory impairment.

+ Traditional Medicine: Findings based on the four diagnostic methods (inspection, listening/smelling, inquiry, palpation), including main symptoms (facial paralysis, headache, dizziness, dysarthria), tongue characteristics, and pulse features for eight-principle and zang–fu syndrome differentiation.

+ Paraclinical characteristics: Brain imaging findings (CT/MRI), including lesion type, location, size, and number.

Data Analysis

All data was entered, cleaned and validated using SPSS 22.0 for analysis. Descriptive statistics were computed, including frequencies (n), percentages (%), and the mean age (± standard deviation).

Ethical Considerations

The study was conducted after approval by the Ethics Committee of the Vietnam University of Traditional Medicine and with permission from Tue Tinh Hospital.

RESULTS

Table 1. General characteristics of the patients

Patient characteristics		Number of patients (n = 101)	Percentage (%)
Age (years)	< 40	2	2.0
	40–49	1	1.0
	50–59	18	17.8
	60–69	44	43.6
	70–79	25	24.8
	80–89	10	9.9
	> 90	1	1.0

Gender	Male	61	60.6
	Female	40	39.4
Duration of disease before admission (months)	< 1	55	54.5
	1 < 3	20	19.8
	3 < 6	7	6.9
	≥ 6	19	18.8
Medical history	Hypertension	80	79.2
	Previous stroke	53	52.47
	Dyslipidemia	21	20.79
	Diabetes mellitus	27	26.74
Diagnosis	Post-stroke sequelae	76	75.2
	Other types of stroke	25	24.8
Total		101	100

Most stroke patients were admitted for treatment during the sequelae stage, accounting for 75.2%. The mean age was 66.51 ± 9,9, with the 60 – 69 age group representing the highest proportion (43.6%). Male patients predominated (60.6%). Admission within less than 1 month after onset accounted for 54.5%. Hypertension was the most common risk factor, accounting for 79.2%.

Table 2. Clinical characteristics according to modern medicine

Symptom	Characteristics	Number (n = 101)	Percentage (%)
Motor paralysis	Present	90	89.1
	Absent	10	10.9
	Total	101	100
Facial paralysis	Present	17	16.8
	Absent	84	83.2
	Total	101	100
Sensory disorders	Present	19	18.8
	Absent	71	81.2
	Total	101	100
Language disorders	Present	56	55.4
	Absent	45	44.6
	Total	101	100

According to modern medicine, the most typical clinical manifestation was motor paralysis (89.1%), followed by language disorders (55.4%), while facial paralysis was the least common symptom (16.8%).

Table 3. Frequency of syndrome manifestations according to Traditional Medicine during the sequelae stage

No.	Syndrome manifestations			Number (n)	Percentage
1	Weakness or hemiplegia			90	89.1
2	Ipsilateral or contralateral facial paralysis			16	15.84
3	Dysarthria			39	38.61
4	Numbness			44	43.56
5	Headache			53	52.48
6	Dizziness/vertigo			24	23.76
7	Urination		Urinary incontinence	3	2.97
			Dark-yellow urine	13	12.87
8	Defecation		Constipation (obstruction)	3	2.97
			Constipation (hard stool)	22	21.78
9	Stiff, deviated or retracted tongue			23	22.77
10	Pale tongue body			12	11.88
11	Tongue coating		Thick	21	20.79
			Greasy	11	10.89
			Yellow	25	24.75
12	Pulse	Depth	Deep	56	55.45
		Form	Wiry	30	29.70
			Slippery	25	24.75

(Based on the textbook Geriatrics of Traditional Medicine – Pham Vu Khanh [2] and data collected using a data collection form developed from the Traditional Medicine medical record framework)

The most common syndrome manifestation was weakness or hemiplegia (89.1%). Regarding tongue characteristics, stiff, deviated or retracted tongue accounted for 22.77%; tongue coating was mainly yellow (24.75%) and thick (20.79%). Regarding pulse, the deep pulse was most common (55.45%), followed by the wiry pulse (29.70%), while the slippery pulse had the lowest proportion (25%).

Table 4. Characteristics on brain CT and MRI imaging

Characteristics of the number and size of lesions on brain CT & MRI*		Cerebral infarction		Intracerebral hemorrhage		Total	
*From 44 CT & MRI results recorded in medical records		n	%	n	%	n	%
Number of lesions	Single lesion	11	27.5	2	40	13	28.89
	Multiple lesions	26	65	3	60	29	64.44
	No information recorded	3	7.5	0	0	3	6.67
Lesion size	<15mm	21	52.5	0		21	58.33

	>30 mm	1	2.5	2	40	3	8.33
	Unclear size	2	5	1	20	3	8.33
	No information recorded	8	20	1	20	0	0
Lesion location (cerebral hemisphere)	Right hemisphere	8	26.67	4	80	12	34.29
	Left hemisphere	16	53.33	1	20	17	48.57
	Both hemispheres	5	16.67			5	14.29
	No information recorded	1	3.33			1	2.85

Among the 44 patients with available brain CT and/or MRI results, multiple lesions were the most common finding (64.44%), while single lesions accounted for 28.89%. In terms of size, lesions ≤ 15 mm were most frequent (58.33%). Regarding location, lesions were predominantly located in the left cerebral hemisphere (48.57%).

DISCUSSION

General characteristics

The majority of patients in this study (75.2%) were admitted during the sequelae phase of stroke, highlighting the considerable long-term disability burden associated with this condition. According to data from the Ministry of Health and previous studies, over 80% of stroke survivors experience motor weakness or paralysis, while impairments in activities of daily living may reach as high as 98.5% [1], [3]. The mean age of the study population was over 65 years, with the 60–69 age group representing the largest proportion (43.6%). These findings are consistent with prior research, such as Nguyen Van Tha et al. (2022), which reported a mean age of 67 ± 11.5 years [4], and Alysha, Deena et al. (2024), who documented a mean age of 66 years among Vietnamese patients [5]. Stroke was more prevalent in males than in females, with males accounting for 60.6% and females 39.4%. This pattern aligns with both domestic and international studies, including Alysha, Deena et al. (2024) [5], where male patients comprised 55.8%, demonstrating a similar trend..

Clinical characteristics

Analysis of reasons for hospital admission:

Most patients presented with prominent symptoms such as hemiplegia or partial paralysis (89.1%), aphasia (27.7%), and loss or reduced sensation on one side of the body (16.8%). These findings are consistent with the typical clinical manifestations of stroke, particularly given that approximately 75.2% of cases were classified in the post-stroke sequelae stage.The results are also comparable to those reported by Nguyen Thanh Tin et al. (2020) [7], in which hemiparesis and language disorders were identified as the most common clinical presentations of stroke.

Role of risk factors and comorbidities:

Hypertension was the most prevalent comorbidity, documented in 79.2% of medical records. This high prevalence not only reinforces hypertension as the leading modifiable risk factor for stroke but also underscores the critical role of public health strategies focused on early detection and strict blood pressure control in stroke prevention. A history of recurrent stroke was observed in 52.5% of patients, suggesting a substantial cumulative disease burden and potentially reflecting inadequate long-term management of underlying risk factors. Furthermore, the presence of diabetes mellitus in 26.7% of patients highlights a population with a considerable burden of chronic metabolic disease.

Analysis of disease duration prior to treatment in post-stroke sequelae:

The duration from stroke onset to hospital admission was predominantly less than one month, accounting for 54.5% of cases. This finding is consistent with the natural clinical course of stroke. Following the acute phase - typically after approximately 20 days - when neurological deficits stabilize and no new symptoms emerge, the remaining impairments are generally classified as post-stroke sequelae. In this study, the time interval from 24 hours to 3 months constituted the largest proportion (74.3%). This period corresponds to the early rehabilitation phase [1], which is widely recognized as the most critical window for functional recovery. Timely intervention during this stage plays a pivotal role in improving motor and language functions, as well as enhancing overall quality of life in stroke patients.

Correlation between clinical manifestations and neuroanatomical findings:

The most prominent clinical manifestations were motor paralysis (89.1%) and language disorders (38.61%). The high prevalence of these motor and language deficits is consistent with neuroimaging findings, which showed that the left cerebral hemisphere - where key motor and language centers are located - was the most frequently affected region (53.33%). Notably, 18.8% of patients sought medical care more than six months after disease onset, while the majority (75.2%) were already in the post-stroke sequelae stage. These findings underscore the substantial demand for long-term care and rehabilitation, highlighting the chronic and persistent nature of neurological impairments following cerebrovascular events.

Analysis of Traditional Medicine (TM) diagnostic characteristics in post-stroke sequelae:

Analysis of Traditional Medicine (TM) medical records indicated that the predominant pathological pattern in post-stroke sequelae was the "Interior–Deficiency - Heat" syndrome. Among these components, Deficiency accounted for the highest proportion (84.16%) and was identified as the root (Ben) of the disease. This finding is consistent with the advanced mean age of the study population (>65 years) and the prolonged burden of chronic comorbidities.

According to TM theory, aging is associated with a gradual decline in Tian Gui and a reduction in Zheng Qi, accompanied by instability of Wei Qi, thereby facilitating the invasion of pathogenic Wind into the meridians and causing obstruction. In addition, improper diet and excessive psychological stress may impair Spleen and Stomach functions, leading to dysfunction in the transformation and transportation of fluids, with subsequent accumulation of dampness and phlegm that may transform into Heat over time. Furthermore, age-related deficiency of Kidney Essence may fail to nourish Liver Yin; the resulting Yin deficiency cannot restrain Yang, leading to hyperactivity of Liver Yang and the generation of internal Wind. Prolonged emotional disturbances may further disrupt the Liver's function of maintaining smooth Qi flow, giving rise to excessive Liver Fire and Wind, thereby contributing to disease progression [2].

The Heat component (46.53%), together with clinical manifestations such as a wiry pulse (29.7%) and deviated tongue (17.82%), is consistent with the pathophysiological process in which prolonged dysfunction of the Zang–Fu organs and stagnation of Qi and Blood lead to the generation of Heat. These features represent the manifestation (Biao) of the disease. The "root deficiency and branch excess" (Ben Xu – Biao Shi) framework effectively explains the complex nature of post-stroke sequelae and aligns with the etiological and pathophysiological characteristics observed in elderly populations [2].

Findings derived from the Four Diagnostic Methods (inspection, listening/smelling, inquiry, and palpation) further support this syndrome differentiation. A deep pulse (55.4%) typically reflects an interior disorder involving the Zang–Fu organs, while wiry and slippery pulses are indicative of Liver Qi stagnation and Phlegm accumulation. In clinical practice, TM diagnosis of post-stroke sequelae primarily relies on inspection and inquiry, with the remaining diagnostic methods serving a complementary role in syndrome differentiation and therapeutic decision-making.

Paraclinical findings:

Regarding paraclinical characteristics, multiple lesions were observed in a substantial proportion of patients (65%). The left cerebral hemisphere was the most commonly affected location (53.33%), and lesion size was predominantly less than 15 mm (52.5%). Brain CT findings further indicated that multiple cerebral infarctions were the most frequent presentation (55.6%), with lesions primarily located in the subcortical region (75.3%). Similarly, infarct size was mainly below 15 mm (70.3%). Ischemic stroke was the predominant subtype, accounting for 83.5% of cases.

CONCLUSION

In this study, the majority of participants were in the post-stroke sequelae stage (75.2%), with a high prevalence of comorbidities, particularly hypertension (79.2%). From the perspective of modern medicine, the most prominent clinical sequelae were hemiparesis or hemiplegia (89.1%) and language disorders (38.61%), which were consistent with neuroimaging findings showing a predominance of lesions in the left cerebral hemisphere (53.33%). From the Traditional Medicine perspective, the predominant syndrome pattern was characterized as Interior - Deficiency - Heat. This "root deficiency with excess manifestations" (Ben Xu – Biao Shi) pattern aligns with the chronic, prolonged, and relapse - prone nature of stroke, particularly in elderly populations.The integration of findings from both modern and Traditional Medicine provides a more comprehensive understanding of the multidimensional nature of stroke. This combined approach may help guide

therapeutic strategies and has practical implications for the development of integrated treatment protocols, with the aim of improving clinical outcomes, reducing recurrence, and enhancing patients' quality of life.

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