

NEW-TOAST CLASSIFICATION, INTRAVENOUS THROMBOLYTIC THERAPY, AND AUXILIARY EXPERIENCE IN PATIENTS WITH ACUTE STROKE

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ABSTRACT

Objective: To analyze the relationship between the NEW-TOAST classification, intravenous thrombolysis in acute stroke, and related auxiliary experience.

Methods: A total of 62 patients with acute stroke who were admitted to the Second People's Hospital of Changzhou from January 2013 to August 2014 were selected and treated with recombinant human tissue plasminogen activator (rt-PA) thrombolytic therapy within 4.5 hours of onset. According to the NEW-TOAST classification, 30 cases of atherosclerotic stroke (AT) and 32 cases of cardiac embolism (CE) were divided into two groups. The prognosis of patients treated with intravenous at-PA thrombolytic therapy was compared.

Results: After intravenous thrombolysis, there were two cases of bleeding transformation and zero cases of death in the AT group, and three cases of bleeding transformation and one case of death in the CE group. There was no statistically significant difference between the two groups ($P > 0.05$). However, comparison of National Institutes of Health Stroke Scale (NIHSS) scores after two weeks showed that NIHSS scores in the AT group were significantly lower than those in the CE group (11.9 ± 1.9 vs 13.2 ± 2.0 , $P = 0.010$).

Conclusion: The prognosis of venous thrombolysis in ischemic stroke is closely related to the NEW-TOAST classification. Thrombolytic therapy for atherosclerotic stroke has a good prognosis, and actively cooperate with doctors in the process of thrombolysis, which is of important clinical significance for monitoring the patients' condition changes and blood pressure.

Keywords: Stroke, thrombolysis, auxiliary.

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Introduction

Stroke is a clinically common critical disease, which seriously endangers human health and life safety, and has clinical features of high incidence, high disability rate, and high mortality. Stroke causes great suffering to patients, and also places a heavy burden on families and society. Therefore, the early diagnosis and treatment of stroke have important clinical significance for the prognosis of patients. Current studies have found that the application of alteplase (rt-pa) thrombolytic therapy within the 4.5-hour time window of stroke onset can significantly reduce the range of infarction, increase the rate of vascular recanalization, and improve the prognosis of patients^(1,2). Stroke can be divided into the follow-

ing five types according to the NEW-TOAST classification⁽³⁾: Atherothrombosis (AT), Cardioembolism (CE), small-vessel occlusion, other causes, and unexplained types. The pathogenesis of the five stroke types is different, and the efficacy of thrombolysis is quite different. In this paper, common AT and CE types of stroke were selected for analysis, and the prognosis and auxiliary experience of patients with two different types of stroke after intravenous thrombolysis were compared.

Methods

Research objects

This study was a retrospective case-cohort study. Patients with acute ischemic stroke who were

admitted to the emergency department and neurology department of our hospital from January 2013 to August 2014 were selected.

All patients met the diagnostic criteria for NEW-TOAST classification of atherosclerosis and cardiogenic embolism cerebral infarction. AT refers to cerebral infarction of any size and position with intracranial or extracranial atherosclerosis evidence or systemic atherosclerosis evidence related to infarction.

CE refers to the cerebral embolism caused by a variety of cardiac diseases that can produce cardiogenic embolus.

Inclusion criteria:

- Stroke symptoms were treated with at-PA intravenous thrombolysis within 4.5 hours of onset;
- Clinical manifestations include hemiplegia, sensory disorders, articulation disorders, aphasia, and unconscious disorders;
- Age 45-80 years;
- National Institutes of Health Stroke Scale (NIHSS) <25 score;
- Cerebral hemorrhage was excluded by head CT.

The exclusion criteria mainly include the following:

- Patients with severe embolism who are in a coma or have their eyes fixed to one side;
- Stroke patients with mild symptoms;
- Patients who had had a stroke within the first six weeks;
- Any existing neurological deficits (NIHSS > 22 score);
- Patients with intracranial hemorrhage, subarachnoid hemorrhage, arteriovenous malformation, aneurysm, intracranial tumor;
- Systolic blood pressure is more than 185 mmHg, or diastolic blood pressure is less than 110 mmHg;
- Septic embolism;
- Myocardial infarction within the last 30 days;
- Patients with coagulation dysfunction.

General clinical data

A database was established to record in detail the age, gender, association with hypertension, smoking, and association with hyperlipidemia of all enrolled patients (Total cholesterol >5.72 mmol/L, triglycerides >1.7 mmol/L, and LDL >3.12 mmol/L, meeting at least one of these criteria). The symptoms of neurological deficits were assessed using the NIHSS.

Thrombolytic method

Rt-PA 0.9 mg/kg (maximum dose: 90 mg), 10% (1 minute) intravenous bolus injection, the rest of the dose was given intravenous guttae for about 60 minutes. Blood pressure, nerve function, and other changes were observed within 24 hours after treatment.

Statistical analysis

SPSS 22.0 statistical software (IBM Corp., Armonk, NY) was used for statistical analysis of the data in this study. Measurement data were expressed by $\bar{x} \pm s$, counting data were expressed by frequency and percentage, independent sample t test or Fisher exact probability test was used for intergroup comparison, and χ^2 test was used for intergroup comparison. All tests were performed by bilateral test, $P < 0.05$ indicated a significant difference.

Results

Comparison of general data

A total of 62 patients (37 males) with acute ischemic stroke were included in this study, with an average age of 64.9 ± 8.9 years. According to the NEW-TOAST classification, there were 30 cases of atherosclerotic stroke and 32 cases of cardiogenic stroke. There was no statistically significant difference in age, gender, presence of hypertension, and initial NIHSS score between the two groups ($P > 0.05$). The proportion of hyperlipidemia in the atherosclerotic stroke group was higher than that in the cardiogenic embolism group ($P < 0.05$). See Table 1.

Variate	AT (n = 30)	CE (n = 32)	χ^2/t	P
Age (years)	64.3±9.7	65.6±8.3	-0.566	0.574*
Gender (Male, case)	18	19	0.003	0.960
High blood pressure	22	24	0.022	0.881
Diabetes	17	16	0.276	0.599
Hyperlipidemia	24	10	14.859	<0.001
Initial NIHSS	18.6±9.6	18.8±2.9	-0.363	0.718*

Table 1: Clinical characteristics of patients in the two groups.

*are t test, and the rest are Fisher test.

Comparison of thrombolytic prognosis

There were two cases of bleeding transformation and zero cases of death in the AT group, three cases of bleeding transformation and one case of death in the CE group. There was no difference between the two groups. However, further comparison showed that the NIHSS score in the AT group was significantly lower than that in the CE group at two weeks (11.9 ± 1.9 vs 13.2 ± 2.0 , $P = 0.010$) (see Table 2).

Variate	AT (n = 30)	CE (n = 32)	χ^2/t	P
Bleeding Transformation	2	3		1.000
Death (case)	0	1		1.000
2 weeks NIHSS	11.9±1.9	13.2±2.0	-2.661	0.010*

Table 2: Comparison of thrombolytic prognosis between the two groups.

*is t test, and the rest are Fisher test.

Auxiliary

Psychological assistance

Psychological factors play an important role in the treatment of stroke. The mortality and disability rates of cerebral infarction are very high, which brings fear, tension, and even despair to stroke patients. This emotional fluctuation seriously affects the thrombolytic effect of cerebral infarction. The assistant staff will soothe and persuade, patiently help the patient to improve the understanding of the disease, stabilize the mood, introduce knowledge about the science and treatment of patients in the past, to relieve the psychological pressure on the patient, prevent a bad psychological development, and encourage the patient to face the reality, and actively cooperate with treatment to create a good mood for the treatment of stroke.

Bedside preparation and assistance

Doctors in the emergency thrombolytic group screened the patients according to the severity of the disease and treated them with thrombolytic therapy. The emergency nurses undertook urgent examination of blood routine, blood glucose, renal function, electrolyte, myocardial enzyme spectrum, and coagulation function. Rt-PA treatment within 4.5 h of the onset of acute stroke can significantly improve the prognosis of most patients.

The earlier the intravenous thrombolysis, the better the clinical prognosis. After receiving the notification of thrombolysis, the nurses in the ward should cooperate with the physicians to make relevant preparations before thrombolysis as soon as possible, including: Prepare bedside ECG blood pressure monitors, oxygen inhalers, and infusion pumps immediately. Once the patient arrives at the ward, the ward nurse immediately performs bedside monitoring, oxygen inhalation, open venous access, and medication according to the doctor's advice, to provide thrombolytic therapy within the optimal thrombolysis time window.

Observation and assistance of the condition after thrombolysis

All patients were given absolute bed rest. The nurse recorded the changes of the patient's consciousness, pupil, blood pressure, and respiration in detail, such as whether there was any aggravation, whether there was headache or vomiting, and observed and recorded whether there was a bleeding tendency of the gums, mucous membrane, and skin in detail every hour. Once the condition worsens, limb muscle paralysis worsens, and consciousness changes, head CT shall be reexamined immediately, and rescue measures shall be taken immediately to ensure that the rescue drugs and equipment are adequate and intact at all times. Always on standby.

Discussion

There are certain differences in the treatment and prognosis of ischemic stroke resulting from different causes⁽⁴⁾. To analyze the relationship more reasonably between ischemic stroke and venous thrombolysis, we used the most recognized ischemic stroke typing method in the world, the improved heparinoid therapy for acute ischemic stroke test to classify the selected patients. In the NEW-TOAST classification, small-vessel occlusive symptoms are so mild that they are generally not up to the standard of intravenous thrombolysis, and the mechanism of other types and unexplained stroke diseases were unknown. Therefore, we mainly selected AT and CE stroke, and then analyzed the prognosis of intravenous thrombolysis for the two types of stroke. Compared with the previous TOAST classification, the NEW-TOAST classification followed the previous basic classification method and introduced the concept of atherosclerosis. Arotid plaque >4 mm can be regarded as evidence of atherosclerosis, and the other classifications remain unchanged⁽³⁻⁵⁾. The new classification method replaced the original macrovascular lesions with atherosclerotic thrombosis, which made for a more accurate classification. We found that at the early stage of stroke, there was no significant difference in the initial NIHSS scores between the two groups, but hyperlipidemia in the AT group was higher than that in the CE group, suggesting that hyperlipidemia plays an important role in the occurrence and development of AT. Both groups were treated with intravenous thrombolysis. No significant difference was found in the proportion of cerebral hemorrhage transformation and death between the two groups, but the prognosis two weeks

after intravenous thrombolysis in the AT group was better than that in the CE group.

The possible mechanism may be related to the following:

- Cardiogenic stroke is formed by the shedding of cardiac emboli, with more rapid onset and poor establishment of intracranial collateral circulation, while atherosclerosis may be the gradual formation of thrombus based on the original vascular stenosis, with some small intracranial blood vessels as compensation;

- The heart source embolus, more common were fat embolus and air embolus, which were less sensitive to at-PA than thrombus from the in situ artery. Therefore, the prognosis of venous thrombolysis in atherosclerotic stroke is better than that of cardiogenic stroke. The prognosis of venous thrombolysis in patients with ischemic stroke is closely related to the NEW-TOAST classification, and the prognosis of thrombolysis in patients with atherosclerotic stroke is better. In the process of thrombolysis, nurses need to cooperate actively with doctors to do auxiliary work, and at the same time, it has important clinical significance to monitor patients' condition and blood pressure.

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