

Original Article

High-quality nursing combined with edaravone injections in the treatment of acute cerebral infarction

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Abstract: Objective: To investigate the effect of edaravone injections combined with high-quality nursing on the treatment of acute cerebral infarction. Methods: A total of 113 patients with acute cerebral infarctions admitted to our hospital were randomly divided into an observation group (OG, n=57) and a control group (CG, n=56). The patients in the CG were managed with conventional treatment and edaravone, and those in the OG were given high-quality nursing combined with edaravone. The clinical efficacy, adverse reactions, neurological function (NIHSS), and hemorheology [high blood viscosity, low blood viscosity, platelet aggregation rate, and hematocrit levels (HCT)] were compared between the two groups. Results: The clinical efficacy of the OG was superior to that of the CG by a significantly higher overall response rate [98.25% (56/57) vs. 84.21% (48/56)] ($P<0.05$). The NIHSS scores, high or low blood viscosity, platelet aggregation rate, and HCT in the OG were significantly lower than they were in the CG after the treatment ($P<0.05$), although only slight differences were observed before the treatment ($P>0.05$). In terms of adverse reactions, there was no significant difference in the occurrence of nausea/vomiting, palpitation, chest tightness, or diarrhea between the two groups ($P>0.05$). Conclusions: Edaravone injections combined with high-quality nursing treatment showed significant effects on the treatment of acute cerebral infarction, improving the patients' neurological functions and hemorheology effectively and ensuring their safety.

Keywords: Acute cerebral infarction, edaravone injection, high-quality nursing, neurological function, hemorheology

Introduction

Acute cerebral infarction refers to the necrosis of brain tissues caused by the sudden interruption of blood supply to the brain. It leads to ischemia and hypoxia, and patients experience dizziness, tinnitus, hemiplegia, or even death [1]. Nowadays, with the development of the economy and society, the aging population has changed lifestyles, and the incidence of acute cerebral infarction has been increasing yearly. Such diseases bring a poorer quality of life and physical and mental burdens, and they give rise to anxious moods, negatively exerting effects on the patients' conditions [2].

As studies have shown that the psychological factors in patients with cerebral infarction have an impact on various biochemical parameters, taking high-quality nursing measures would be

beneficial in the clinical treatment of cerebral infarction patients [3]. Psychological counseling helps patients keep a good state of mind and cooperate with the medical staff in the treatment so as to improve the clinical prognosis. Edaravone injections reach the brain tissues through the blood-brain barrier so as to scavenge oxygen radicals, reduce oxidative damage and prevent the death of brain cells and nerve injuries. In traditional Chinese medicine, acute cerebral infarction is also called "stroke" and is thought to be caused by a qi deficiency with blood stasis, cerebral collateral obstruction, and tendon and vessel malnutrition. Therefore, the therapy focuses on the principle of promoting blood circulation to remove the blood stasis, along with clearing and activating the channels and collaterals [4]. Studies have found that edaravone injections play a role in blood coagulation, increasing the activity

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of platelets to bring the normal venous blood flow back [5].

The purpose of this study was to investigate the effect of edaravone injections combined with high-quality nursing in the treatment of acute cerebral infarction.

Materials and methods

Materials

A total of 113 patients with acute cerebral infarction admitted to our hospital from September 2018 to December 2019 were randomly divided into a control group (the CG, n=56) and an observation group (the OG, n=57). The OG included 32 males and 25 females, aged 47-82 years, with an average age of (65.54±14.11) years. The CG included 30 males and 26 females, aged 46-83 years, with an average age of (66.17±15.03) years. This study was approved by the Ethics Committee of the First Affiliated Hospital of Hainan Medical University. Inclusion criteria: The subjects met the diagnostic criteria for acute ischemic stroke established by the Cerebrovascular Division of the Neurology Branch of the Chinese Medical Association [6]; the period of time from onset to hospitalization was less than 72 h, and patients or their families signed the informed consent. Exclusion criteria: Patients who had a dysfunction of the liver, kidneys, or any other vital organs, or who had taken immunosuppressants, lipid-lowering drugs, or non-steroidal anti-inflammatory drugs within one month before the study, or who had hematological diseases, malignant tumors, etc., were excluded.

Methods

Conventional nursing in the CG included: prevention of infections, dietary instruction, education with psychological counseling focusing on related diseases. The additional high-quality nursing in the OG included: ① Thrombolytic interventions, together with a clinical evaluation, cerebral CT scans, observation of their neurological function and vital signs; ② Establishment of two venous channels for intravenous infusions and the administration of thrombolytic drugs; ③ Thrombolytic intervention, which followed the doctor's instructions

for rt-PA intravenous thrombolysis at a dose of 0.9 mg/kg, ≤90 mg in total, and the family members signed the informed consent; ④ Respiration, oxygen saturation, electrocardiogram and pulse, nerve function, and blood pressure were monitored during the thrombolytic interventions; ⑤ Psychological counseling tailored to each individual patient's conditions were developed; ⑥ In the case of rash, edema, or other symptoms, the medication should be stopped and the doctor should provide the necessary treatment; ⑦ Each patient's pupils, consciousness, nerve function, vital signs, and hemorrhages were monitored 24 h. Edaravone injection used: Manufacturer: Simcere Pharmaceutical Group, specification 5 mL: 10 mg, usage: intravenous infusion, 30 mg once a day, and a course of treatment of 14 days.

Outcome measures

Before and after the treatment, the National Institutes of Health Stroke Scale (NIHSS) [7] was used to assess the extent of the neurological deficits. A higher score suggests more severe neurological deficits. Fasting venous blood of 2 ml was collected to determine the whole blood viscosity (high & low), platelet aggregation, and HCT before and after the treatment as well as the incidence of adverse reactions.

Evaluation of the therapeutic effects

The therapy had different levels of success, including generally cured, excellent, effective and ineffective. A reduction in the NIHSS scores >91% plus no disability was considered generally cured. A reduction in the NIHSS scores >45% with a disability < grade 3 was considered excellent. A reduction in the NIHSS scores >18% was considered effective. Otherwise, ineffective was recorded. Overall response rate = (generally cured + excellent + effective)/total × 100%.

Statistical analysis

SPSS 18.0 was used for the statistical analysis. The measurement data were expressed as ($\bar{x} \pm s$) and subject to t tests. The enumeration data were expressed as n (%) and subject to χ^2 tests. Rank-sum tests were used for the ranked data. P<0.05 indicated a significant difference.

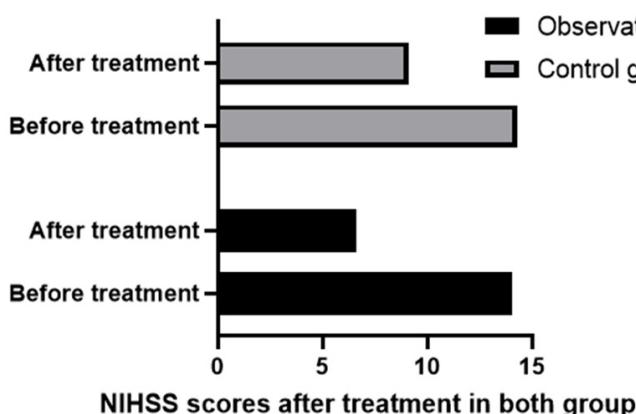


Figure 1. The NIHSS scores after the treatment in the two groups. After the treatment, the NIHSS neurological function scores in the OG were reduced compared with those in the CG ($P<0.05$), suggesting that high-quality nursing combined with edaravone injections promoted the recovery of nerve function.

Results

Comparison of the baseline data

The NIHSS was 18.63 ± 4.25 in the CG and 18.23 ± 4.17 in the OG. There were no statistically significant differences in the baseline data, including gender, age, and NIHSS between the two groups ($P>0.05$).

High-quality nursing combined with edaravone improves neurological function

There was no significant difference in the NIHSS scores between the two groups before the treatment ($P>0.05$). After the treatment, the NIHSS scores in the OG were lower than they were in the CG, and the differences were statistically significant ($P<0.05$), as shown in **Figure 1**.

High-quality nursing combined with edaravone improves hemorheology

The high blood viscosity, low blood viscosity, platelet aggregation rate, and HCT reported in the OG were smaller than they were in the CG ($P<0.05$), although only slight differences were found before the treatment ($P>0.05$), as shown in **Table 1**.

High-quality nursing combined with edaravone reduces adverse reactions

The incidence of adverse reactions such as nausea/vomiting, palpitation, chest tightness, and diarrhea in the OG was lower than it was in

the CG, with a significant difference ($P<0.05$), as shown in **Table 2**.

High-quality nursing combined with edaravone achieves a better clinical efficacy

The clinical efficacy of the OG was better than the clinical efficacy of the CG judging by the total response rate [98.25% (56/57) vs. 84.21% (48/56)] ($P<0.05$), as shown in **Table 3**.

Discussion

Acute cerebral infarction is common in cerebrovascular diseases, has been increasing yearly, and is prone to affecting the younger population [8, 9]. Patients with acute cerebral infarction are susceptible to disturbances of consciousness and hemiplegia, significantly reducing the patient's quality of life [10, 11]. Due to thorough research on nursing and the treatment of cerebral infarction, the available drugs, in addition to surgery, mainly include anticoagulants, thrombolytics, and neuroprotective agents. However, the side effects of the drugs have increased patients' physical and mental burdens. Advances in medical research lead people to demand medical services that not only treat diseases, but also provide a better treatment experience. Nursing care is an essential part of medical services. For nursing care, high-quality nursing, systematic nursing, humanized nursing, and psychological nursing are the most used. Relevant research has shown that high-quality nursing plays a very important role in patients' treatment and recovery, and it can accelerate rehabilitation and reduce pain. Systematic research on the effect of high-quality nursing on cancer pain is not available. Safe and effective nursing combined with drug therapy for patients with acute cerebral infarctions can lower the occurrence of complications. Relief from the clinical symptoms has been a hot issue among experts and scholars [12, 13].

In the clinic, the goal of the treatment for patients with acute cerebral infarction is to reduce ischemia and hypoxia, reduce the infarct size, and improve the nerve function [14, 15]. Through high-quality nursing models,

Table 1. A comparison of the hemorheological index levels in the two groups before and after the treatment ($\bar{x} \pm s$)

| | Group | High blood viscosity (mPa·s) | Low blood viscosity (mPa·s) | Platelet aggregation rate (%) | HCT (%) |
|------------------|-----------|------------------------------|-----------------------------|-------------------------------|------------|
| Before treatment | OG (n=57) | 7.46±1.21 | 15.63±2.55 | 75.54±7.69 | 53.65±6.14 |
| | CG (n=56) | 7.68±1.07 | 15.17±2.73 | 74.49±7.14 | 52.10±6.57 |
| | <i>t</i> | 1.023 | 0.926 | 0.752 | 1.295 |
| | <i>P</i> | 0.308 | 0.357 | 0.452 | 0.195 |
| After treatment | OG (n=57) | 4.12±0.54 | 10.21±0.81 | 54.21±5.16 | 35.61±5.43 |
| | CG (n=56) | 5.23±0.79 | 12.42±1.37 | 62.25±6.24 | 46.25±6.22 |
| | <i>t</i> | 8.733 | 10.460 | 7.470 | 9.692 |
| | <i>P</i> | 0.000 | 0.000 | 0.000 | 0.000 |

Table 2. A comparison of the incidences of adverse reactions in the two groups [n (%)]

| Group | Nausea/vomiting | Palpitation | Chest distress | Diarrhea |
|-----------------------|-----------------|-------------|----------------|----------|
| OG (n=57) | 2 (3.57) | 1 (1.75) | 1 (1.79) | 0 (0.00) |
| CG (n=56) | 3 (5.26) | 3 (5.36) | 2 (3.51) | 2 (3.51) |
| <i>X</i> ² | 0.000 | 0.278 | 0.000 | 0.491 |
| <i>P</i> | 0.984 | 0.598 | 0.988 | 0.483 |

the nursing staff would be better prepared to provide such treatments and to cooperate more with the doctors, so those responsible for the implementation of high-quality nursing should have a better understanding of each patient's clinical indicators and treatment options so as to improve the clinical efficiency and reduce the occurrence of adverse reactions [16, 17]. High-quality nursing remedies the imperfection in conventional nursing care that occurs due to operational defects. Studies have found that the implementation of high-quality nursing to patients with acute cerebral infarction can effectively improve the patients' quality of life and mental state, etc. [18, 19]. In this study, high-quality nursing combined with edaravone promoted the recovery of patients' neurological and physiological functions. It has been confirmed that edaravone injections restore blood circulation and reduce ischemia and hypoxia. The results show that patients' clinical symptoms improved significantly after treatment, and the NIHSS scores were superior in the OG ($P<0.05$), suggesting that the treatment combination is safe and brings less harm to patients.

Abnormal hemorheology (including increased whole blood viscosity, elevated platelet aggregation, lifted plasma fibrinogen, etc.) is a cru-

cial factor for acute cerebral infarction. The increased viscosity leads to slower blood flow, which makes the patient prone to ischemia and hypoxia or can even cause serious damage to the cranial nerves [20, 21]. Also, slower blood flow causes obstructions in the blood circulation, resulting in complications such as thrombosis. Hematocrit (HCT) has an impact on blood viscosity. An increase in hematocrit will cause aggregation, giving rise to lower blood flow and blocked blood vessels, which further induces thrombosis [11, 22-24]. In this study, the use of edaravone injections combined with high-quality nursing improved the blood viscosity and flow rate ($P<0.05$), indicating that such a combination can significantly relieve the clinical symptoms, promote recovery and lead to an ideal prognosis.

In summary, edaravone injection combined with high-quality nursing treatment can significantly reduce the clinical symptoms of patients with acute cerebral infarction, accelerate the recovery of the nervous system, and prevent the occurrence of complications such as thrombosis. The patients were highly satisfied with the nursing.

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Table 3. A comparison of the clinical efficacy in the two groups [n (%)]

| Group | Generally cured | Excellent | Effective | Ineffective | Total response rate |
|------------------|-----------------|------------|------------|-------------|---------------------|
| OG (n=57) | 7 (12.28) | 29 (50.88) | 19 (33.33) | 2 (3.51) | 56 (98.25) |
| CG (n=56) | 2 (3.57) | 21 (37.50) | 25 (44.64) | 8 (14.29) | 48 (84.21) |
| Z/X ² | | 2.584 | | | 7.015 |
| P | | 0.010 | | | 0.008 |

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