Diagnostic Brain Medicine

CLINICAL RESEAPCH

The Application of Systematic Management in Pre-Hospital Emergency Care for Stroke Patients

Enli Xu* & Zhenyuan Wang
Quality Control Section, Wenzhou Emergency Centre

Keywords

stroke, pre-hospital emergency care, systematic management

Correspondence

Enli Xu, Taizhou Quality Control Section, Wenzhou Emergency Centre, Wenzhou, Zhejiang. Tel: 13676440377; E-mail: 349645528@qq.com

Received: 20 March 2020; Accepted: 18 April 2020; Published online: 18 May 2020

Diagnostic Brain Medicine 2020; 1(3): 31–36

Abstract

Objective To explore the application of systematic management in pre-hospital emergency care for stroke patients. **Methods** The 1156 stroke patients admitted to the emergency medical dispatch center (EMDC) of our city from April 2019 to December 2019 were selected as the control group, and adopted with routine pre-hospital emergency care management. And the 1281 stroke patients admitted between January and August 2020 were selected as the observation group, and adopted with systematic pre-hospital emergency care management. The time from emergency call to pre-hospital emergency care, the time from emergency call to professional treatment, hospitalization time, disability and fatality rates of the two groups were compared. **Results** The time from emergency call to pre-hospital emergency care, the time from emergency call to professional treatment, and hospitalization time in the observation group were significantly shorter than those in control group ($P < 0.05$), in addition, the disability and fatality rates of the observation group were significantly lower than those in the control group ($P < 0.05$). **Conclusion** Systematic management could significantly shorten the time of stroke patients calling for help to pre-hospital emergency care, calling for help to professional treatment and hospitalization, reducing the disability and mortality rates. It is worthy of clinical application.

Introduction

Stroke is a clinically common neurological disease, which is a diffuse or localized brain function defect caused by acute cerebral blood circulation disorder. It is more common in middle-aged and elderly people, and often accompanied by sudden coma, mental retardation in clinical. Untimely treatment may lead to irreversible nerve cell necrosis and dysfunction, which can even endanger the life of the patient [1]. For the prognosis of stroke, since stroke usually occurs outside the hospital, timely and effective pre-hospital emergency care paly a important role. The systematic management is a management method that systematizes all aspects of nursing management, with modern nursing concepts as guidance and nursing procedures as the core, which embodies the systemicity, integrity, decision-making and scientific nature of nursing work [2]. In this study, systematic management was applied to the management of stroke patients' pre-hospital emergency care, in order to

explore some theoretical basis for its clinical formulation through comparison with conventional management. The report was as follows.

Materials and methods

General information

The 1156 stroke patients admitted to EMDC of our city between April and December 2019 were selected as the control group, and the 1281 patients between January and August 2020 were selected as the observation group. Among them, the control group included 609 males and 547 females, aged 39 ~ 72 years (average age of 55.47 ± 12.19), with glasgow coma score (GCS) of 8.13 ± 1.48, disease type: 804 cases of ischemic stroke and 352 cases of hemorrhagic stroke. The observation group included 675 male and 606 female, aged 36 ~ 71 years old (average age of 54.81 ± 12.16), with GCS score of 8.42 ± 1.50, disease type: 891 cases of ischemic stroke and 390 cases of hemorrhagic stroke. There was no statistically significant difference between the two groups of patients in general information gender, age, GCS score, disease type, etc. ($P > 0.05$), and they were comparable.

Methods

The two groups of patients were implemented pre-hospital emergency care management based on the 120 system of in-hospital treatment of acute stroke.

Control group

Patients in the control group were given routine pre-hospital emergency care management. After receiving the '120' call for help, the EMDC immediately issued a dispatch notice to get out of the car, and evaluated the patient's condition after arriving at the scene. Immediately afterwards, the patient was cleared airway to keep the airway unobstructed and given oxygen. Effective venous access was established, and the patient was transferred to the hospital for treatment after symptomatic treatment.

Observation group

Patients in the observation group adopted systematic pre-hospital emergency care management. The specific measures were as follows:

(1) Arrive the former

After receiving the '120' call for help, EMDC recorded the time of the call, the name of the caller, contact information and address in detail, and ensured that the ambulance would leave within 2 minutes (min). In the process of rushing to the scene, medical staff need to keep in touch with the patient's family, collect basic information consciousness, physical condition, onset time, symptoms, disease history, medication status, etc. for further evaluation, preliminary diagnosis of the type of stroke, and instruct the patient's family to perform home emergency, such as keeping the patient lying still, elevating the patient's head to make it to one side, prohibiting moving the patient, removing foreign objects such as vomit, dentures in the oral cavity of patient, ice or cold compress the patient's head, etc.

(2) Emergency on site

When first responders arrive at the scene, they immediately checked the patient's body temperature, breathing, pulse and other vital signs, observed the mind and pupil changes, and evaluated coma by GCS score to determine rescue measures and transfer strategies. Secondly, the patient's collar and buckle were untied to reduce the resistance of the respiratory tract, and the secretions in the mouth and respiratory tract were cleared to prevent suffocation induced by aspiration. For patients with convulsions, the opener was put in to prevent biting the tongue. For patients with coma and respiratory arrest, tracheal intubation and cardiopulmonary resuscitation were performed, and then oxygen was given. Besides, 1 to 2 venous were established channels to maintain effective circulation. Mannitol was used to reduce intracranial pressure through rapid intravenous drip. If the blood pressure was > 220/120 mmHg, the patient was given blood pressure treatment immediately to control the blood pressure at 200/110 mmHg, and transferred to the hospital for treatment after the vital signs are stabilized.

(3) On the way to rescue

When carrying the patient, it was worth noting that the patient should be carried on the head, back, buttocks, lower limbs and someone was specially set to fix and protect the patient's head. During the driving of the ambulance, the driver should drive steadily to avoid the patient's head bump, the head position need to be placed opposite to the ambulance's traveling direction in order to avoid blood reperfusion caused by sudden braking, and the patient usually adopted the recovery position or the supine position. The conscious patient could raise the head appropriately, the unconscious patient could turn the head to one side to prevent aspiration of vomit, and the patients with suspected cerebral hemorrhage could raise the head by about 30° to reduce cerebral edema and prevent patients from asphyxiation. And the breathing, blood pressure, heart rate, state of consciousness, pupil changes should be closely observe during the whole process, and emergency personnel should pay attention to avoid compressing or breaking the venous tube to keep the venous passage unobstructed.

(4) Hospital emergency reception

The hospital was informed in advance during emergency reception and transfer, medical staff, equipment and rescue items were get ready, and the condition, disease history, medication status, and related symptoms before admission of patient were introduced accurately, so that the rescue plan could be prepared in advance. After entering the hospital, the green channel was opened to directly send the patient to the emergency room, so that the patient could receive treatment quickly and timely, to ensure the continuity and effectiveness of the rescue work.

Observation indicators

Observation indicators included the time from emergency call to pre-hospital emergency care, the time from emergency call to professional treatment, the length of hospitalization, and the disability and fatality rates of the two groups of patients. All observation indicators of the two groups were observed and recorded.

Statistical methods

SPSS 20.0 software was used to conduct statistical analysis on the research data. Measurement data were expressed by mean ± standard deviation ($\bar{x}\pm s$), *t* test was used for comparison, counting data were expressed by rate (%), χ^2 test was used for comparison, and $P < 0.05$ was considered statistically significant.

Results

Comparison of time indicators between the two groups of patients

The results showed that the time from emergency call to pre-hospital emergency care, emergency call to professional treatment, and hospitalization of patients in the observation group were significantly less than those in the control group (Table 1, $P < 0.05$).

Table 1. Comparison of time indicators between the two groups of patients ($\bar{x}\pm s$)

Groups	Number of cases	The time from emergency call to pre-hospital emergency care (min)	The time from emergency call to professional treatment (min)	Hospitalization time (d)
Observation group	1281	17.56 ± 3.59	33.62 ± 4.15	15.42 ± 3.26
Control group	1156	20.15 ± 3.84	39.15 ± 4.73	21.38 ± 3.62
t		-17.206	-30.740	-42.765
P		0.000	0.000	0.000

Comparison of disability and fatality rates between the two groups

The results showed that the disability and fatality rates of patients in the observation group were significantly

lower than those in the control group (Table 2, $P < 0.05$).

Table 2. Comparison of disability and fatality rate between the two groups of patients (n (%))

Groups	Number of cases	Disability rate	Fatality rate
Observation group	1281	94 (7.34)	30 (2.34)
Control group	1156	198 (17.13)	118 (10.21)
χ^2		55.223	65.907
P		0.000	0.000

Discussion

Stroke is a critical cerebrovascular disease with a high incidence, due to the intensification of aging society, its incidence has gradually increased in recent years . Rports [3, 4] have pointed out that there are approximately 2.1 million new stroke patients in China each year, and the mortality rate is up to 74.86 %. Besides, stroke has even surpassed tumors and heart disease to become the most lethal diseases among Chinese residents, and about 67.14 % survivors have physical disorders with various degrees, that seriously affects the quality of life of patients and their families [5]. A stydy [6] suggests that 3 ~ 6 hours after the onset of stroke is the time window of effective treatment for patients, so timely and effective pre-hospital emergency care is particularly important. And another related study [7] has revealed that the central nervous system can be reorganized in structure or function after stroke and some neurons can be regenerated under suitable conditions, both of which are the important prerequisites for brain tissue reconstruction and functional rehabilitation. Therefore, early nursing intervention can ensure the safety of patients with ischemic stroke, which further improve the quality of patients' life. In the study, systematic management was applied to the management of stroke patients' pre-hospital emergency care. The results were summarized as follows.

Integrated pre-hospital emergency care management could significantly shorten the emergency, treatment and hospitalization time

In routine emergency management, it was often to get out of the car after receiving the dispatch notice, and then the patient's condition is evaluated after arriving at the scene. Next, the patient was transferred to the hospital after initial treatment. The emergency doctor would make detailed examination and diagnosis before making relevant treatment preparations and treatment. However, those could delay the treatment time and affect the treatment effect. The systematic pre-hospital emergency care management, in which could get out of the car within 2 min after receiving the '120' call, evaluate the patient's condition and make a preliminary diagnosis of the type of stroke on the rescue road by contacting with the patient's family, that really not only saved the on-site assessment time, but also quickly treated patients symptomatically. During the transfer, the related departments including emergency department were notified by telephone and required to prepare ready for targeted examination and treatment, thereby shortening the time form emergency call to pre-hospital emergency care and the time form emergency call to professional treatment. The timely treatment would obviously improve the treatment effect, improve the prognosis and shorten the length of hospital stay.

Systematic pre-hospital emergency care management could significantly reduce the disability and fatality rate of patients

When a stroke patient develops, the treatment effect can be greatly improved through the timely implementation of emergency measures by family

members, thereby reducing the disability and mortality rates. But in fact, most of the family members do not have the knowledge of emergency for stroke. Even in case of an emergency, family members take improper emergency measures. For xamples: families move the patients at will (drag, back, hug, drive or take a taxi) and feed the patients themselves with water or improper drugs. The improper home emergency is a risk factor for poor prognosis in patients with hemorrhagic stroke [8]. Therefore, in systematic pre-hospital emergency care management, the family emergency is emphasized. First responders were required to keep in contact with the patient's families to grasp the patient's situation and guided families to perform home emergency, such as: keeping lying stilll, raising the head, prohibiting moving the patient, removing foreign bodies from the oral cavity, applying ice or cold compressing the patient's head, etc. The above measures not only not only shorten pre-hospital management time, but also benefit to the prognosis thereby reducing the disability and mortality rates of stroke. It is well known that the GCS score is an effective method to judge patient awareness and prognosis internationally, and is a predictor of death and disability in stroke [9]. Consequently, GCS score was used to evaluate the coma in time at the emergency scene and during transit, then the corresponding emergency was performed. Until the vital signs were relatively stable, the patient would be transported, which was conducive to the improvement of the treatment effect and the reduction of mortality and disability rates. What's more, for patients with intracranial hypertension, timely mannitol treatmen could reduce the possibility of bleeding and secondary brain injury, which was beneficial to the prognosis of patients. And in contrast to conventional emergency management, the emergency preparation time of systematic pre-hospital emergency care management was greatly shortened, so patients could receive targeted treatment immediately, which lead to lower disability and mortality rates.

To sum up, systematic management could significantly shorten the time of stroke patients emergency call to pre-hospital first aid, emergency call to professional treatment and hospitalization, reducing the disability and fatality rate, and it was worthy of clinical application.

Funding

This work was approved by Project of Wenzhou Municipal Office of Science and Technology entitled "Construction of 120 system-based acute stroke treatment system in Wenzhou" (Grant No.2016Y0833).

Declaration of conflict-of-interest

The authors declare no conflict-of-interest.

References

[1] JONG BC M S, BO KS. The Effects of Motor Imagery Combined with Neuromuscular Electrical Stimulation on Using Transcranial Magnetic Stimulation in Stroke Patients [J]. J MAGN, 2019, 24(4): 763-9.

[2] MARTIN L K, LEWIS V J, CLARK D, et al. Frontline barriers to effective paramedic and emergency nursing STEMI management: clinician perspectives [J]. Australas Emerg Care, 2020, 23(2): 126-36.

[3] WANG C, DU Z, YE N, et al. Using the Atherogenic Index of Plasma to Estimate the Prevalence of Ischemic Stroke within a General Population in a Rural Area of China [J]. Biomed Res Int, 2020, 2020: 7197054.

[4] ZHENG S, YAO B. Impact of risk factors for recurrence after the first ischemic stroke in adults: A systematic review and meta-analysis [J]. J Clin Neurosci, 2019, 60: 24-30.

[5] A WH B Y, C JC. Short-term effect of fine particular matter on daily hospitalizations for ischemic stroke: A time-series study in Yancheng, China [J]. ECOTOX ENVIRON SAFE, 2020, 208(15): 16-21.

[6] DORIEN B-G, LENNEKE, ET AL. Self-efficacy for health-related behaviour change in patients with TIA or minor ischemic stroke [J]. BRIT J HEALTH PSYCH, 2018, 33(12): 1490-501.

[7] LUVIZUTTO G J, MOLIGA A F, RIZZATTI G

R S, et al. Unilateral spatial neglect in the acute phase of ischemic stroke can predict long-term disability and functional capacity [J]. Clinics (Sao Paulo), 2018, 73: e131.

[8] TUSER I, BEKESIENE S, NAVRATIL J. Emergency management and internal audit of emergency preparedness of pre-hospital emergency care [J]. Qual Quant, 2020: 1-13.

[9] CREWDSON K, LOCKEY D, VOELCKEL W, et al. Best practice advice on pre-hospital emergency anaesthesia & advanced airway management [J]. Scand J Trauma Resusc Emerg Med, 2019, 27(1): 6.