Effect of MEWS-based Anticipatory Care in Cardiac Arrest Patients and Its Effects on Neurological Function after ROSC

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Abstract: Objective: To explore the effect of predictive care based on MEWS guidance in patients with cardiac arrest and its effect on neurological function after ROSC. Methods: 86 cardiac arrest patients were selected between March 2023 and March 2024 and divided into observation group and control group according to random single blind method, 43 patients each. The control group was given routine emergency care, while the observation group used anticipatory care based on MEWS guidance. Results: Heart rate, oxygen saturation and mean arterial pressure stability in the observation group were better than the control group, the NIHSS score was lower than the control group, and the ROSC rate was higher than the control group (P <0.05). Conclusion: Foretive nursing based on NEWS is effective in cardiac arrest, effectively stabilizing heart rate and arterial pressure and improving ROSC nerve function.
***Keywords*:** Improved early warning score; Predictable care; Cardiac arrest; Neurological function

1. Introduction

Cardiac arrest (CA), as a severe and critical condition in the emergency department, is extremely fatal and often takes patients by surprise. When CA occurs, the heart ejection function will stop instantly, arterial pulsation and heart sound will disappear, resulting in exposure to severe hypoxia and ischemia in the key organs including the brain, and then the patient quickly lose his life, which is called sudden death in clinical practice[1]. The modified Early Warning Score (MEWS) rapidly captures key physiological indicators such as consciousness, systolic blood pressure, respiratory rate, heart rate, and body temperature, so as to more accurately assess the severity of the disease. Based on these evaluation results, it can provide more targeted nursing measures for patients, effectively improve the quality of nursing, and help patients recover and discharge at an early date[2]. This study will explore the effect of the application of MEWS-guided anticipatory care on neurological function after autonomic circulatory recovery (ROSC) in CA patients, as reported below.

2. Information and methods

2.1 Information

86 CA patients admitted to our hospital from March 2023 to March 2024 were selected as the study subjects and were grouped into 2 groups by randomized single blindness. In the control group, 25 males and 18 females; age 22-69 years, mean (45.49 ± 13.08) years; observation group, 26 males and 17 females; age 23-70 years, mean (46.24 ± 12.56) years. Inclusion criteria: ① as per the American Heart Association Cardiopulmonary resuscitation and Cardiovascular Emergency Guidelines Interpretation (2020 edition)[3] Diagnostic criteria; ② CA not trauma; ③ CPR <10min; ④ patient or family consent and informed letter. Exclusion criteria: ① Unable to determine the time of CA; ② with mental illness or malignancy; ③ voluntarily abandoned first aid or treatment; ④ confirmed death during medical admission. The two groups of general data were compared, and the difference was meaningless (P> 0.05). Both groups of patients were reviewed and approved by the Association of Medical Ethics Members of our hospital.

2.2 Methods

The control group should use the condition assessment combined with routine emergency care. According to the actual condition of the patient, the nursing staff in the emergency department comprehensively monitored the vital signs, and reported the data in time. After comprehensively considering the clinical experience and specialist consultation results, the patients condition was diagnosed, and the corresponding treatment plan was formulated, and recorded the nursing process in detail.

The observation group was based on the predictive care guided by MEWS. ① used MEWS score to assess patients consciousness clarity, heart rate, body temperature level, respiratory rate and systolic blood pressure data, and made

corresponding interventions according to the scores. ② MEWS score (0-3) indicates that the risk factor of CA patients is low, the responsible nurse marks the patient green and rescores the CA patient status every 4h; the MEWS score (4-7) indicates the high risk of CA patients, the responsible nurse marks the patient yellow and rescores the CA patient status every 1h; the MEWS score (8) indicates the high risk of CA patients, and the responsible nurse marks the patient in red and scores the CA patients every 30min, and prepares corresponding first-aid items and equipment. ③ In view of the critical condition of CA patients, the responsible nurse should be highly alert, especially in high-risk periods, strengthen the frequency of patient condition monitoring, increase the number of ward visits, and record the nursing process in detail. If any abnormality is found, they should immediately notify the doctor to take emergency medical measures. ④ Strengthen health education, actively establish effective communication with patients and their families, deeply understand the psychological state and actual needs, and take personalized psychological intervention measures during the drug treatment. Responsible nurses should pay great attention to patients' feedback, observe the changes of their vital signs and emphasize the importance of following medical advice; ensure that CA patients can obtain adequate nutritional support, and the responsible nurse makes a scientific and personalized diet according to the specific condition of each patient

2.3 Observing indicators

① Comparing the two groups of ROSC.② Observe the clinical parameters of heart rate, oxygen saturation and mean arterial pressure in both groups, and use the National Health Study Stroke Scale (NIHSS)[4] For the two groups of patients, the scale included: optimal gaze, consciousness level, limb ataxia, inattention and regression, etc., a total of 42 points, and the scores were proportional to the degree of neurological damage.

2.4 Statistical treatment

According to SPSS 26.0 software statistics, ROSC rate line $\chi 2$ test expressed as (n,%); Perform t-test on prognostic clinical indicators and NIHSS score, represented by (false). $\alpha=0.05$ is the testing level.

3. Results

3.1 Compare the ROSC situations

The ROSC rate was higher in the observation group than in the control group ($P<0.05$). As shown in Table 1.

Table 1. Comparison of ROSC between the two groups (n, %)

group	n	ROSC rate
observation group	43	36（83.72）
control group	43	25（58.14）
x^2	-	6.823
p	-	0.008

3.2 Comparison of clinical indicators and NIHSS scores

Heart rate, oxygen saturation and mean arterial pressure stability were better than the control group, and the NIHSS score was lower than the control group ($P<0.0\ 5$). As shown in Table 2.

Table 2. Outprognosis clinical indicators and NIHSS scores of the two groups ($\bar{x} \pm s$)

group	n	Heart rate (beats/min)	Blood oxygen saturation (%)	Mean arterial pressure (kPa)	NIHSS score (points)
observation group	43	101.11±3.01	82.38±7.76	9.12±1.08	5.06±1.03
control group	43	83.69±3.52	77.64±7.54	7.46±0.89	7.21±1.45
t	-	24.664	2.872	7.778	7.926
p	-	＜ 0.001	0.005	＜ 0.001	＜ 0.001

4. Discussion

CA is usually closely related with ventricular fibrillation, once happened, must be immediately emergency rescue, after CA events, due to neuronal excitotoxicity, calcium ion balance disorder and protease chain reaction of complex physiological mechanism, patients with cerebrovascular may be damaged, increased resistance, and cause serious complications such as cerebral edema. Although the routine emergency care process plays an important role in the initial treatment of CA patients, the process lacks attention and attention to recovery in the post-resuscitation recovery stage of patients[5].

The results of this study showed that the ROSC rate was higher in the observation group and higher than the control group, and the improvement of arterial pressure, oxygen saturation, heart rate, and NIHSS score was better than the control group, suggesting that predictable care based on MEWS guidance can improve neurological function, improve ROSC recovery rate, and stabilize the heart rate and blood oxygen level. CA related warning signs, such as respiratory acceleration, arrhythmia, blood pressure fluctuations, and arterial oxygen saturation drop, can be detected before the condition deteriorsharply. Early warning signal can be captured in time and is crucial for the improvement of neurological function in CA patients after recovery in ROSC. Using effective treatment measures and nursing intervention, based on early warning signals, can significantly improve the prognosis effect of patients. MEWS as a comprehensive evaluation system, through the quantitative patients with physiological indicators to judge the severity, for the condition and prognosis fast, scientific evaluation, not only can quickly and accurately predict the risk status, patients can also assist team in response to critical severe patients to make more accurate prediction and processing decisions, ensure the safety of patients and the quality of care[6].

In conclusion, predictive care based on MEWS guidance has significant results, which can effectively improve the ROSC recovery rate and promote neurological recovery.

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