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Original Article

The effect of emergency nursing on the mental health and limb function recovery of myocardial infarction patients

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Abstract: Objective: To evaluate the effect of emergency care on the mental health and recovery of limb function in myocardial infarction (MI) patients. Methods: We recruited 106 MI patients consecutively admitted to the emergency center of our hospital from June, 2016 to January, 2019. Among them, 51 underwent routine care (the control group) and 55 underwent emergency care (the observation group). The rescue success rates, the pre-hospital times, the emergency rescue times, and the door-to-balloon times were recorded and compared. The patients' heart rates, respiratory frequencies, and blood pressure levels were monitored after the care. The self-rating anxiety scale (SAS) and the self-rating depression scale (SDS) were used to evaluate the patients' psychological states. The patients' limb function and activities of daily living (ADL) were evaluated using the Fugl-Meyer assessment (FMA) and the modified Barthel index (MBI), respectively. The incidences of complications were compared between the two groups. The Short-Form 36 Item Health Survey (SF-36) was used to evaluate the patients' quality of life (QOL), and a self-made satisfaction questionnaire was developed to evaluate the patient satisfaction. Results: After the emergency care, there was a higher rescue success rate and shorter pre-hospital times, emergency rescue times, and door-to-balloon times in the observation group. The heart rates, respiratory frequencies, and blood pressure levels in the observation group were more stable than they were in the control group. The patients in the observation group had lower SAS and SDS scores ($P<0.05$), lower FMA and lower MBI ($P<0.05$), as well as a lower incidence of complications ($P<0.05$). The QOL was greatly improved in the observation group after two weeks of care. The patients in the observation group were more satisfied with the nursing service than the patients in the control group ($P<0.05$). Conclusion: Emergency care contributes to the improvement of mental health and limb function, as well as MI patient prognosis, so it is well worthy of promoting.

Keywords: Emergency care, myocardial infarction, mental health, limb function, nursing

Introduction

Acute myocardial infarction (AMI), a common cardiovascular disease, is associated with myocardial necrosis induced by the occlusive blockage of coronary artery blood flow and ischemia and hypoxia in the myocardium [1, 2]. AMI progresses rapidly upon its onset, with a high mortality, posing a serious threat to patients' lives [3]. The acute nature of AMI underlines the importance of time-effective diagnosis and treatment, so timely and effective first aid is of great significance to saving patients' lives and promoting their rehabilitation [4].

With the development of technology and people's increasing awareness of care, it is believed that in addition to timely and effective clinical rescue, reasonable care delivery is conducive to successful rescue. Therefore, the selection of the nursing model has become a focus for AMI patients [5, 6]. Emergency care is a kind of intervention for the sudden attack of acute severe diseases. There is evidence showing that it effectively improves the rescue success rate and the prognoses of patients with acute cerebral ischemia and stroke [7]. Moreover, pre-hospital emergency care significantly contributes to pain relief and surgical success in

elderly patients with hip fractures after falling [8]. Also, the high efficacy of emergency care in AMI patients has been reported by Jánosi previously [9], but its impact on patients' psychological states and prognoses has not been evaluated.

Therefore, we recruited AMI patients treated in our hospital to investigate the influence of emergency care on their rescue efficacy, mental health, and recovery of limb function in this study.

Materials and methods

From June 2016 to January 2019, 106 AMI patients treated in our hospital were analyzed retrospectively, including 56 males and 50 females. They were divided into the control group (n=51 cases, routine nursing) and the observation group (n=55 cases, emergency nursing).

Inclusion criteria: patients who met the diagnostic criteria for AMI [11], patients who were admitted to the hospital within 12 hours of the onset of chest pain, and patients who signed the informed consent form.

Exclusion criteria: patients with malignant tumors or other severe organ diseases, patients with severe coagulation disorders or communication barriers, and patients who were uncooperative during the study.

Ethics approval was granted by our hospital's ethics committee (Ethical approval number: SZ2015BD102), and this study was carried out in accordance with the Declaration of Helsinki.

Nursing measures

In the control group, the patients strictly followed routine care pathways according to the provisions of the First Aid Process. Postural guidance was provided after their diagnosis, and their vital signs such as breathing, heart rate, and blood pressure were closely monitored. In addition, the preparations for the surgery and the patient transfers were carried out in advance.

In the observation group, the patients also underwent emergency care. The specific measures were as follows: (1) The emergency nurses were well managed to ensure their full preparation. The in-hospital triage nurses got ready at the entrance of the emergency center to transport the critically ill patients by ambulance at any time. (2) After asking, observing, and touching by the emergency nurses, each patient's condition was assessed by the heart specialist, the attending nurse, and the relevant personnel of the department of clinical laboratory. The assessments included airway obstruction, breathing and pulse, and consciousness. In the airway blockage cases, foreign body removal, tracheotomy, or intubation was performed. The assessment was completed within 10 minutes to ensure its timeliness. (3) In addition to the disease assessment, the patients were administered emergency care measures. Their blood pressure and heart rates were monitored within two minutes, venous access was established within four minutes, and blood samples were collected. (4) The quality of the patient transfer was enhanced. After the diagnosis of the patient and the formulation of the corresponding treatment plan, relevant departments were notified, and preparations for interventional therapy and surgery were made. Because of the severe pain associated with AMI, the patients were likely to develop negative emotions. Therefore, appropriate psychological care was administered to encourage and comfort the patients and to increase their coordination. In addition, the emergency nurses actively communicated with the patients and their families, informed them of the processes and risks of the first aid and follow-up treatment, and instructed the families to sign the relevant documents.

Outcome measures

(1) The two groups' rescue success rates were compared. (2) The pre-hospital times (the time from symptom onset to hospital admission), the emergency rescue times (the time from the emergency room to the inpatient ward), and the door-to-balloon times (the time from entering the hospital to the beginning of balloon dilatation) were recorded. (3) The Self-rating Anxiety Scale (SAS) and Self-rating Depression Scale (SDS) [10] were used to assess the patients' negative emotions before and after the care. (4) The patients' heart rates, respiratory frequencies, and blood pressure levels were moni-

Table 1. General data

Factor	Observation group (n=55)	Control group (n=51)	χ^2	P
Sex			0.001	0.8982
Male	29 (52.73)	27 (53.94)		
Female	26 (47.27)	24 (47.06)		
Age (years)			0.038	0.846
≤68	28 (50.91)	25 (49.02)		
>68	27 (49.09)	26 (50.98)		
BMI (kg/m^2)			0.012	0.913
≤23	21 (38.18)	20 (39.22)		
>23	34 (61.82)	31 (60.78)		
History of smoking			0.004	0.947
Yes	32 (58.18)	30 (58.82)		
No	23 (41.82)	21 (41.18)		
Type of infarction			0.072	0.965
High lateral wall infarction	18 (32.73)	16 (31.37)		
Anterior wall infarction	20 (36.36)	18 (35.29)		
Inferior wall infarction	17 (30.91)	17 (33.33)		
History of alcoholism			0.007	0.934
Yes	22 (40.00)	20 (39.22)		
No	33 (60.00)	31 (60.78)		

Table 2. Comparison of the rescue success rates

Factor	Observation group (n=55)	Control group (n=51)	χ^2	P
Death toll	0	6 (11.76)		
rescue success rate (%)	100%	45 (88.24)	6.859	0.008

tored after the emergency treatment. (5) Any complications, including heart failure, arrhythmia and shock, were recorded. (6) The Fugl-Meyer assessment (FMA) [11] and the modified Barthel index (MBI) [12] were used to evaluate the limb function. Higher MBI scores a indicated better recovery of limb function. (7) The Short-Form 36 Item Health Survey (SF-36) [13] was used to investigate the patients' quality of life (QOL) after two weeks of care, including physical functioning, social functioning, role-emotional and role-physical. The higher the score, the higher the QOL. (8) A questionnaire was developed to assess the patient satisfaction with the care, and the scores were classified as highly satisfied, satisfied, or dissatisfied.

Statistical methods

SPSS 20.0 (Beijing NDTimes Science and Technology Co., Ltd.) and GraphPad Prism 8 (Shanghai Cabe Information Technology Co., Ltd.) were used for the data processing and the visualization respectively. The measurement data were expressed as the mean value ± standard deviation. The inter-group comparisons were performed with *t* tests, and the intra-group comparisons with paired *t* tests. Chi-square tests were used for the comparisons of the count data, which were expressed as n (%). A significant difference was set at P<0.05.

Results

First, we compared the patients' clinical data in the two groups. Through comparison, we found that there were no significant differences in terms of gender, age, or body mass index (BMI) between the control group and the observation group (all P>0.05) (**Table 1**).

Comparison of the rescue success rates

In this study, we compared the rescue success rate of patients between the two groups. Through comparison, we found that 46 patients were successfully rescued and 6 died in the control group, for a success rate of 88.24%. All the patients in the observation group were rescued successfully, so the success rate was 100%, significantly higher than the rate in the control group (*P*<0.05) (**Table 2**).

Comparison of pre-hospital times, emergency rescue times, and door-to-balloon times

We also compared the pre-hospital times, the emergency rescue times, and the door-to-balloon times between the two groups. Through our comparison, we found that the pre-hospital times, the emergency rescue times, and the door-to-balloon times in the observation group were significantly shorter than those in the control group, with significant differences (all P<0.001) (**Table 3**).

Table 3. Comparison of the pre-hospital times, the emergency rescue times, and the door-to-balloon times (minutes)

Factor	Observation group (n=55)	Control group (n=51)	t	P
Pre-hospital time	29.98±2.55	43.05±3.94	20.42	<0.001
Emergency rescue time	32.93±4.86	46.58±5.22	13.94	<0.001
Door-to-balloon time	75.31±9.28	96.73±10.28	11.27	<0.001

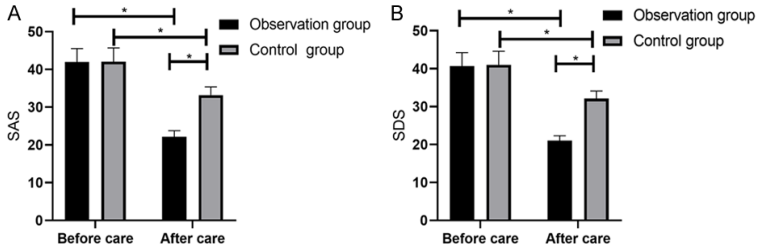

Figure 1. Comparison of the negative emotion scores. A. Self-rating Anxiety Scale (SAS); B. Self-rating Depression Scale (SDS). *P<0.05.

Assessment of negative emotions

Negative emotions have an impact on patients' recoveries. In this study, we also compared the changes in the SAS and SDS scores between the two groups before and after the nursing. Through our comparison, we found that there were no significant differences in the SAS and SDS scores between the observation group and the control group before the nursing (P> 0.05). After the nursing, SAS and SDS scores in the observation group were significantly lower than they were in the control group, with significant differences (P<0.05) (**Figure 1**). This revealed that the negative emotions in the two groups were significantly relieved after the nursing, and the relief achieved in the observation group was greater than the relief achieved in the control group.

Comparison of heart rates, respiratory frequencies, and blood pressure levels

In this study, the improvements in the heart rates, respiratory rates, and blood pressure levels were also compared between the two groups after the emergency treatment. Through our comparison, we found that the improvements in heart rate, respiratory frequency, and blood pressure levels in the observation group were evidently better than they were in the control group after the emergency care, and the differences were statistically significant (all P<0.001) (**Table 4**).

Comparison of FMA and MBI

In this study, we also evaluated the patients' FMA and MBI scores after the nursing. Through our comparisons, we found that the FMA and MBI scores in the observation group were 86.12±6.98 and 58.24±5.12 respectively after the nursing, which were significantly increased compared with the corresponding scores in the control group (65.38± 5.06 and 42.06±4.38). This revealed that emergency nursing can increase patients' personal mobility (P<0.05) (**Figure 2**).

Comparison of the complications

In this study, we also counted the patients' complications after the nursing. Through our analysis, we found that there were 2 cases of heart failure and 1 case of arrhythmia in the observation group, for a complication rate of 7.27%, and there were 4 cases of heart failure, 5 cases of arrhythmia, and 4 cases of shock in the control group, for a complication rate of 21.31%, indicating that the incidence of adverse reactions in the observation group was significantly lower compared with the incidence of complications in the control group (P<0.05) (**Table 5**).

Evaluation of the QOL

In this study, the patients' QOL scores were also analyzed after the nursing. Through our analysis, we found that the physical functioning, social functioning, role-emotional, and role-physical scores of the patients in the observation group were significantly higher than they were in the control group, suggesting that the QOL of the patients undergoing emergency treatment was better than it was in the control group (all P<0.001) (**Table 6**).

Comparison of patient satisfaction

At the end of the study, we compared the patients' nursing satisfaction levels. Through

Table 4. Comparison of the heart rates, respiratory frequencies, and blood pressure levels

Factor	Observation group (n=55)	Control group (n=51)	t	P
Heart rate (beats/min)	90.46±5.21	105.48±6.91	12.69	<0.001
Respiratory frequency (breaths/min)	21.06±3.34	28.19±4.57	9.22	<0.001
Blood pressure (mmHg)	125.43±10.79	148.36±12.52	10.12	<0.001

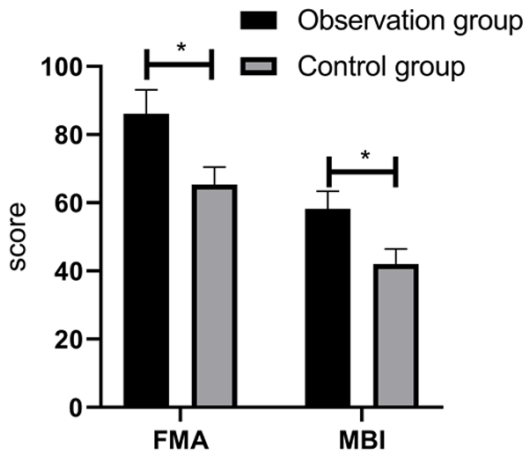

Figure 2. Comparison of the FMA and MBI. *P<0.05.

our comparison, we found that 42 patients in the observation group were highly satisfied with the care services, 12 were satisfied, and 1 was dissatisfied, for a satisfaction rate of 98.18%, remarkably higher than the 72.55% (24 highly satisfied, 13 satisfied, and 14 dissatisfied) in the control group. This revealed that emergency nursing can improve patients' nursing satisfaction (P<0.001) (**Table 7**).

Discussion

AMI, the most severe coronary heart disease, is an acute abdominal disease and a common critical illness. If not treated within 24 hours of onset, patients may develop a series of complications, ultimately resulting in death [14, 15]. Prompt and effective treatment can significantly reduce patient mortality. Therefore, it is necessary to comprehensively utilize disease monitoring, nursing care, basic treatment and targeted treatment in the clinical treatment of AMI, so that the symptoms can be effectively alleviated, and the safety and health of patients can be guaranteed [16].

Based on the clinical care approaches, the emergency care formulates targeted care and treatment measures according to the AMI patients' conditions, which actively stimulates the medical staff's initiative, saves the lives of patients to the greatest extent from the perspective of the patients, and completes the first aid task with high quality [17]. In this study, the effects of routine care and emergency care in AMI were compared. First, the implementation of emergency care improved the rescue success rate. Also, the pre-hospital times, the emergency rescue times, and the door-to-balloon times were shortened. There is evidence showing that emergency care contributes to the standardization of emergency behaviors and provides scientific and effective emergency measures, shortening the pre-hospital time, thus preventing disease deterioration [18]. A series of high-quality emergency care measures were taken in the study according to the patients' conditions, and they played a key role in the rescue success. Second, we compared the psychological states, the heart rates, the blood pressure levels, and other indicators after each successful rescue. This revealed that the negative emotions of all the patients were improved after the rescue, especially for those in the observation group. Moreover, the vital signs such as heart rate, respiratory frequency, and blood pressure in the observation group were more stable than they were in the control group. This suggests that emergency care is conducive to the stabilization of a patient's mood and vital signs. Myocardial infarction patients usually suffer not only from physical pain, but also from fear and anxiety, which are detrimental to patients' rescue and prognosis [19]. During the implementation of emergency care, we conducted frequent appeasement and encouragement to ease patients' negative emotions and increase their cooperation, thereby improving the rescue efficacy.

Subsequently, we noticed that the incidence of complications in the observation group was remarkably lower than it was in the control

Table 5. Comparison of the complications

Complication	Observation group (n=55)	Control group (n=51)	χ^2	P
Heart failure	2 (3.64)	4 (7.84)	-	-
Arrhythmia	1 (1.82)	5 (9.81)	-	-
Shock	1 (1.82)	4 (7.84)	-	-
Overall complication rate	4 (7.27)	13 (21.31)	4.557	0.033

Table 6. Comparison of the QOL

Factor	Observation group (n=55)	Control group (n=51)	t	P
Physical functioning	16.28±1.26	10.06±1.19	26.08	<0.001
Social functioning	15.46±1.34	10.55±1.21	19.75	<0.001
Role-emotional	15.92±1.59	11.06±1.25	17.40	<0.001
Role-physical	14.89±1.39	10.84±1.35	15.20	<0.001

Table 7. Comparison of the patient satisfaction [n (%)]

Group	Observation group (n=55)	Control group (n=51)	χ^2	P
Highly satisfied	42 (76.36)	24 (47.06)	-	-
Satisfied	12 (21.82)	13 (25.49)	-	-
Dissatisfied	1 (1.82)	14 (27.45)	-	-
Patient satisfaction	54 (98.18)	37 (72.55)	14.31	<0.001

group. Disease awareness and prediction, as well as advance preparation for the next step of treatment can reduce the risk of complications in patients [20, 21]. Also, we assessed the prognosis of patients, and found significant improvement of limb function and QOL in the observation group. Finally, higher patient satisfaction was found in the observation group. In the present study, we always adhered to the people-oriented concept that has been reported previously to reduce care disputes and improve patient satisfaction with care measures [22].

However, there are still some limitations to this study. As a retrospective study, there may be bias in the data. And the sample data is small, which may affect the results. Therefore, we hope to conduct prospective randomized controlled trials in subsequent studies to verify the results of this study.

To sum up, emergency care is feasible and effective at increasing rescue success rates, improving patients' psychological states and prognoses, and promoting the recovery of limb function in AMI, so it is worth popularizing.

Disclosure of conflict of interest

None.

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