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Original Article

Effects of graded emergency nursing on resuscitation outcomes, prognosis, and nursing satisfaction in patients with acute myocardial infarction

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Abstract: Objective: This study was conducted to explore the effect of graded emergency nursing on the resuscitation outcomes, prognosis and nursing satisfaction of patients with acute myocardial infarction (AMI). Method: Ninety-five patients with AMI admitted to the emergency department of our hospital from May 2018 to May 2020 were enrolled as the study subjects and were randomly divided into the control group (n=47) and the experimental group (n=48). Patients in the control group received routine care, and patients in the experimental group received graded nursing. The two groups were compared in terms of resuscitation outcomes, prognosis and nursing satisfaction. Results: After intervention, the waiting time, door-to-triage time and treatment duration of the experimental group were significantly shorter than those of the control group (P<0.05). Patients in the experimental group had fewer complications such as shock, cardiac arrhythmia, chest pain, *etc*.; higher scores of Karnofsky Performance Scale (KPS) and quality of life (QOL) (P<0.05); and higher scores of nursing satisfaction than the control group (P<0.05). Conclusion: Graded nursing for AMI patients during emergency care can shorten the waiting and triage time, improve the success rate of resuscitation, reduce the incidence of complications, improve the prognosis and nursing satisfaction of patients.

Keywords: Graded nursing, emergency care, acute myocardial infarction, success rate of resuscitation

Introduction

Cardiovascular diseases (CVDs) have become a leading cause of morbidity and mortality worldwide [1]. For a majority of patients with CVDs, a cure can be achieved with timely and effective treatment [2]. Among all CVDs, heart attack is the main cause of death, and there is a rising incidence of CVDs in younger adults [3]. Acute myocardial infarction (AMI) is one of the most serious cardiovascular syndromes with sudden onset and high mortality rate in the acute phase [4]. According to statistics, more than one million patients die from heart attacks and their complications in China each year, and more than 600,000 new cases are diagnosed annually [5]. Patients with AMI often have symptoms such as chest pain, circulatory dysfunction, and heart failure and even face the risk of sudden death, which seriously endangers their lives [6]. Patients with AMI are resuscitated mainly through reperfusion of reversible ischemic tissues. Data show that the optimal time to rescue patients was within 2 h after the onset of the onset [7]. In reality, due to the delays in travel time and waiting time after admission to the hospital, patients have already missed the optimal time for resuscitation when receiving treatment. Therefore, researchers have turned their attention to providing efficient nursing to AMI patients to shorten the waiting time, improve the success rate of resuscitation, and save patients' lives [8].

Emergency nursing involves pre-hospital emergency nursing, in route transfer, in-hospital treatment, monitoring and nursing. Due to the special nature of the emergency department, a high patient volume and the complexity of their conditions, it is especially important for triage nurses to make accurate judgments regarding patients [9]. The graded emergency nursing model firstly makes accurate judgments and performs scientific triage according to the spe-

cific conditions of patients, and takes targeted rescue measures to ensure a smooth process [10]. In recent years, domestic and foreign scholars have applied the graded emergency nursing management methods to the treatment of acute pancreatitis, acute chest pain, acute abdomen and other critical illnesses; graded emergency nursing makes reasonable arrangements according to the patients' conditions, effectively shortens the waiting time, enables critical patients to receive effective treatment within the golden window time peorid, and improves the quality of treatment [9, 11].

The purpose of this study was to introduce graded nursing for the treatment of AMI patients and analyze its effects of on the treatment of AMI patients, the prognosis and their satisfaction with nursing care, thereby providing a theoretical basis for improving the treatment rate of AMI patients and the quality of prognosis.

Materials and methods

Baseline data

Ninety-five patients admitted to the Critical Care Medicine of our hospital from May 2018 to May 2020 were enrolled for the study, including 55 males and 40 females.

Inclusion criteria: patients aged 50-80 years and those who were diagnosed with AMI. Exclusion criteria were patients with recurrence and presence of co-infection, severe hepatic and renal dysfunction, cognitive dysfunction, malignancy, immune system diseases.

The 95 subjects were randomly divided into a control group (n=47) and an experimental group (n=48). Among them, there were 25 males and 22 females in the control group, with an average age of (65.33±11.19) years, and 30 males and 18 females in the experimental group, with an average age of (68.00±9.85) years, and the differences of the baseline data between the two groups were not significant (P>0.05), indicating the groups were comparable.

Personal files were established on the enrolled 95 patients while patient data was registered, informed consent was signed, and they committed to voluntary participation in the study. The study was approved by the Ethics Committee of the First People's Hospital of Fuyang Hangzhou (approval number [2020]-(011)).

Intervention methods

Patients in the control group received routine care. After admission to the hospital, their families registered and waited for consultation according to the normal procedures.

Patients in the experimental group received graded nursing.

Determination of the grading method: On the basis of the Canadian Test and Apprehension Scale (CTAS) [12], the patients were classified into grades I-V according to their conditions.

Level I (blue arm patch): life-threatening, requiring immediate resuscitation and cardiopulmonary resuscitation.

Level II (red arm patch): critical condition requiring first aid within 10 min.

Level III (yellow arm patch): temporarily non-life-threatening, waiting for treatment, and should be treated within 30 min.

Level IV, (green arm patch): patients with mild clinical symptoms and should be assessed hourly for their condition.

Level V (white arm patch): no indication of emergency and can be treated within 2 h or referral to outpatient care recommended.

Establishment of professional teams: The head nurse organized the training centering for AMI by nursing staff with rich clinical experience. They learned the method of graded nursing, after which they would be assessed.

Specific intervention methods: After receiving their consultation, the nursing staff would promptly send the patient to the emergency room through the green channel, observe the patient's complexion and state of consciousness on the way, query the patient's family about the condition, monitor the patient's vital signs, and check the patient's condition, which provided a basis for putting on the arm patches of the corresponding color.

For grades I and II patients, patients were instructed to take the appropriate position as soon as possible, thrombolysis was carried

out, transvenous channels were established, and patients with chest pain were given nitroglycerin.

For grades III and grade IV patients, the changes of vital signs were monitored, and if their condition was stable, they sought medical consultation in order; if their condition suddenly worsened, the grading and treatment time was adjusted in time to offer effective first aid measures.

For patients with grade V, if their vital signs did not worsen within 2 h, it was recommended that they be transferred to an outpatient department to ensure full utilization of emergency resources.

Outcome measurements

Resuscitation outcomes: The shorter the waiting and triage time, the more efficient the triage proved to be, and the more likely the patient was to receive timely treatment and be cured [13].

The diagnostic accuracy and the success rate of the resuscitation of patients in the two groups were recorded. The higher the diagnostic accuracy, the more accurate the triage proved to be, and the higher the resuscitation success rate, the lower the mortality rate [14].

Complications: The incidence of postoperative complications such as shock, arrhythmias, and chest pain was recorded in both groups of patients [15]. A lower rate of postoperative complications and a better prognosis of the patients indicated a more successful and appropriate resuscitation and nursing of the patients.

Functional status: After intervention, the Karnofsky Performance Scale (KPS) scoring method was used to evaluate the ability of the two groups to maintain normal body function in a non-static state on a scale of 0-100. The higher the score, the better the patient's health, the more likely they were to tolerate the side effects of the treatment and therefore the more likely they were to receive thorough treatment [16].

Nursing satisfaction: The nursing satisfaction questionnaire was compiled by the hospital, which included four items such as nursing staff's disease knowledge, nursing attitude, timely treatment, and operational skills, *etc*. The questionnaire was scored on a 4-point Likert scale, with 1 point representing dissatisfaction, 5 points representing great satisfaction, and 25 points for each item, totaling 100 points. A higher score represented a better patient satisfaction with nursing.

Quality of life: The quality of life (QOL) was evaluated after intervention by the QOL scale, which covered four dimensions: physical health, psychological health, social relationships, and environment, with higher scores indicating better QOL [17, 18].

Statistical methods

Data analysis was performed using SPSS 26.0 software. Statistical graphs were made using GraphPad Prism 8.0 software. The measurement data were expressed as mean ± standard deviation ($\bar{x} \pm s$), and comparisons between groups were made using the t-test. Count data were expressed as percentages and compared using the χ^2 test. $P<0.05$ indicated significant differences.

Results

Comparison of differences in baseline data

Patients in both the control and experimental groups were comparable in terms of baseline data such as sex, age and weight, group means showed no significant differences ($P>0.05$) (**Table 1**).

Analysis of the effects of first-aid

The waiting time, triage time, and resuscitation time of patients in the experimental group were shorter than those in the control group ($P<0.05$) (**Figure 1**). The results showed that the waiting and triage time for patients with AMI could be shortened by graded nursing, which was able to prevent the worsening of the disease due to delayed treatment and reduce longer resuscitation time for patients.

The diagnostic accuracy and successful resuscitation rate of the experimental group were higher than those of the control group ($P<0.05$) (**Table 2**), indicating that graded nursing could accurately classify patients according to

Table 1. Comparison of baseline data ($\bar{x}$ ± s)/[n (%)]

General data		Control group (n=47)	Experimental group (n=48)	t/X^2	*P*
Sex	Male	25	30	-0.111	0.930
	Female	22	18		
Average age (years)		65.33±11.19	68.00±9.85	-0.872	0.392
Average weight (kg)		61.38±9.51	61.87±10.33	-0.316	0.755

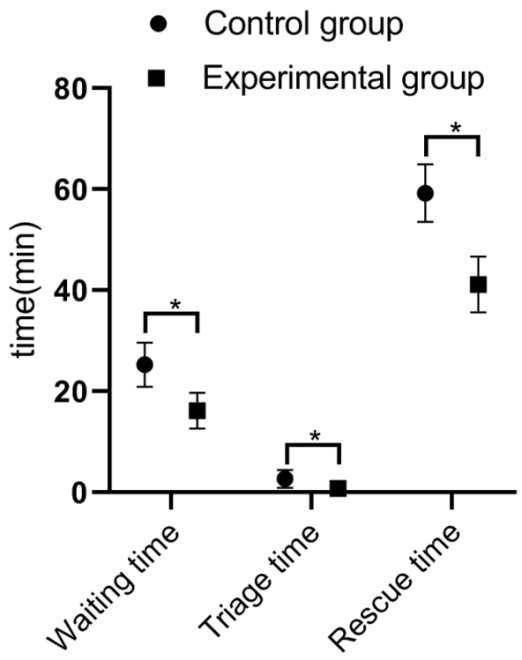

Figure 1. Analysis of the effect of first aid after intervention. Note: *P<0.05 compared with the control group.

their conditions, improve the efficiency of treatment, and reduce the risk of death.

The incidence of complications

After intervention, the incidence of complications related to shock, arrhythmia, and chest pain in the experimental group was lower than that in the control group, and the overall incidence of complications in the experimental group (27.66%) was lower than that in the control group (6.25%) (*P*<0.05) (**Table 3**), indicating that graded nursing could reduce the risk of infarct complications, suggesting a good prognosis.

Analysis of the functional status scores

The KPS scores of the experimental group (80.23±5.02) were significantly higher than that of the control group (65.36±5.77) (*P*<0.05) (**Figure 2**). The results indicated that graded nursing could improve the condition of patients.

Analysis of patient satisfaction

The level of satisfaction in the experimental group was significantly higher than in the control group (*P*<0.05) (**Figure 3**).

Analysis of the QOL of patients

After intervention, the scores of QOL in the experimental group were significantly higher than those of the control group (*P*<0.05) (**Figure 4**).

Discussion

With the increasing pace of life, a heavy workload and irregular meal times, modern life can be stressful and these stresses can easily lead to sudden heart attack [19]. If patients are not treated effectively within 1 h after onset, the prognosis of the patient is poor, causing death in some cases [20]. Therefore, it is crucial for the survival of patients with AMI to receive timely and effective treatment and nursing after admission to the hospital. Studies worldwide have shown that improving the nursing efficiency of the emergency department can significantly reduce the missed diagnosis rate of patients with AMI, shorten the time needed from the onset to receiving treatment, and improve the prognosis of patients [21]. The Emergency department is overcrowded every day, and the medical resources are insufficient. The conditions of most patients are acute and critical. However, due to the fact that hospital wards are often overloaded, many patients can only receive treatment in the corridor, and do not even receive medical treatment within a short time after admission, which triggers the deterioration of their condition and endangers their lives [22, 23]. Therefore, conventional emergency services cannot meet the needs of patients, and it is particularly important to improve the ability and skills of nurses in dealing with emergencies.

The graded emergency nursing requires nursing staff to be able to triage patients scientifi-

Table 2. Comparison of diagnostic accuracy and success rate of resuscitation [n (%)]

	Control group (n=47)	Experimental group (n=48)	t/X^2	*P*
Diagnostic accuracy rate	35 (74.5)	46 (95.8)	9.876	<0.001
Success rate of resuscitation	32 (68.1)	45 (93.8)	6.621	<0.001

Table 3. Comparison of complication rate [n (%)]

Complication	Control group (n=47)	Experimental group (n=48)	t/X^2	*P*
Shock	5 (10.64)	1 (2.08)	-	-
Arrhythmia	4 (8.51)	0 (0)	-	-
Chest pain	4 (8.51)	2 (4.17)	-	-
Overall incidence	13 (27.66)	3 (6.25)	8.855	0.031

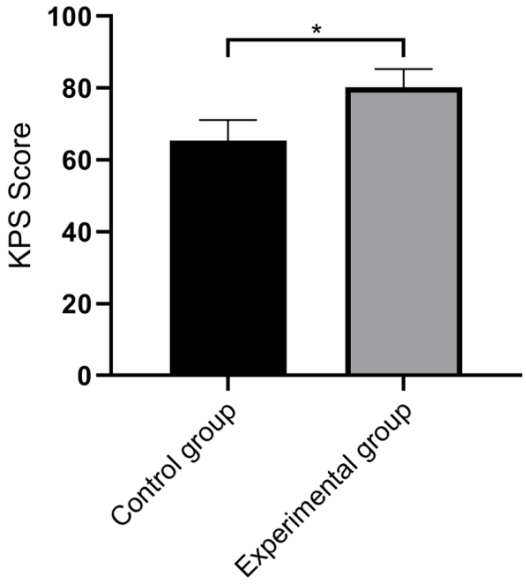

Figure 2. Analysis of changes in KPS scores after intervention. Note: *P<0.05 compared with the control group.

cally and promptly based on their clinical symptoms, and complaints, adjust the order of consultation according to the patient's condition, and keep an eye on changes in the patient's condition during the nursing process to ensure that patients receive effective treatment in the shortest time possible [24, 25].

This study adopted a graded nursing model on the basis of routine emergency nursing by grouping patients according to their conditions. The results showed that after intervention, the waiting time, triage time and resuscitation time of the experimental group were significantly shorter than those of the control group (P<0.05). The experimental group also showed higher diagnostic accuracy and success rate of resuscitation period, fewer complications, and higher KPS as well as QOL scores than the control group. Its nursing satisfaction was also high. In previous studies, scholars classified patients with AMI as emergency patients, and as such the patients received more effective treatment, which is consistent with the conclusion of this study [26-28].

In summary, graded emergency nursing can shorten the treatment time, improve treatment efficiency, improve the prognosis of patients, reduce the incidence of complications, improve the functional status and QOL of patients, and improve nursing satisfaction in patients with AMI, which is worthy of clinical promotion. The innovation of this study is the use of graded nursing, where patients are treated first according to their conditions, and priority is given to the resuscitation of critically ill patients to prevent death caused by delayed treatment.

The shortcomings of this study are as follows: (1) Only 95 patients were included, as such the sample size was small, and the results lacked universality. (2) Insufficient follow-up time on patient prognosis. A study with a larger sample size and longer follow-up time will be conducted, so as to provide a more detailed theoretical basis for the care of AMI patients.

Disclosure of conflict of interest

None.

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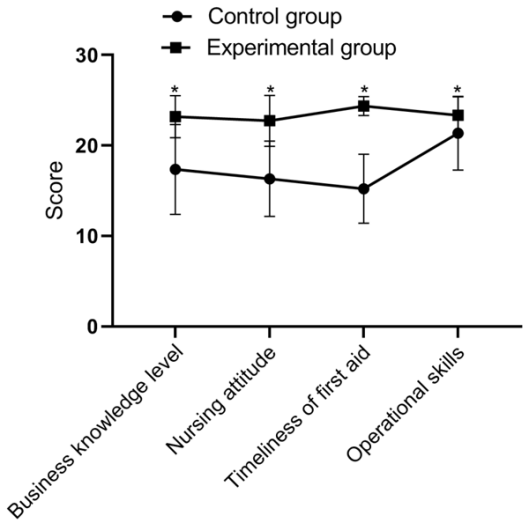

Figure 3. Analysis of changes in post-intervention nursing satisfaction scores. Note: $^{*}P<0.05$ compared with the control group.

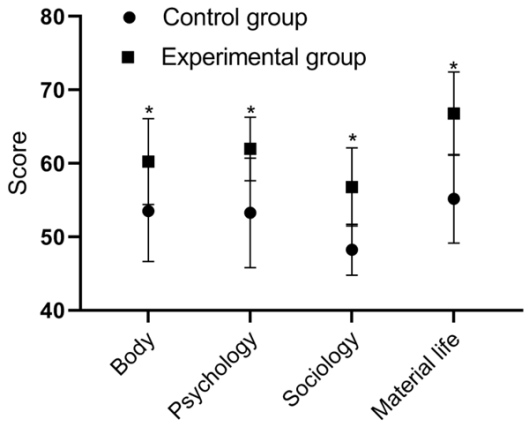

Figure 4. Analysis of changes in quality of life after intervention. Note: $^{*}P<0.05$ compared with the control group.

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