

Original Article

Effects of optimized nursing on the prognosis of patients with acute myocardial infarction

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Abstract: Objective: This study aimed to explore the effects of optimized nursing process on the prognosis of patients with acute myocardial infarction (AMI). Methods: In total, 98 AMI patients treated in our hospital from January to December 2019 were divided into an Experimental Group (EG, n=53, with optimized nursing process from July to December 2019) and a Control Group (CG, n=45, without optimized nursing process from January to June 2019). The two groups were compared for time to triage evaluation, electrocardiogram (ECG), venous blood sampling, and intravenous administration, effects at 2 h after treatment, quality of life (QOL) score at 1 d after hospitalization and 2 weeks after nursing, and changes in self-efficacy score. Results: (1) For patients in the EG, the time to triage evaluation, ECG, venous blood sampling and intravenous administration was significantly shorter and the rates of chest pain relief, ST-segment resolution (STR) and myocardial enzyme spectrum resolution (MESR) at 2 h after treatment were significantly higher as compared with the CG ($P<0.05$). (2) The two groups demonstrated no statistical difference in QOL scores ($P>0.05$) at 1 d after hospitalization but achieved marked elevation at 2 weeks after nursing. As a result, the QOL scores of EG patients exceeded that of the CG patients ($P<0.05$). (3) While no statistical difference was found between the 2 groups for self-efficacy score at 1 d after hospitalization and 1 week after nursing ($P>0.05$), higher results were yielded in the EG as compared with the CG 1 at 2 weeks after nursing ($P<0.05$). Conclusion: Optimized nursing process can improve the quality of treatment, outcome, QOL, self-efficacy, and prognosis of AMI patients.

Keywords: Optimized nursing pathway, AMI, prognosis, effect analysis

Introduction

Acute myocardial infarction (AMI) is a myocardial necrotic symptom resulting from acute or persistent ischemia and hypoxia of the coronary artery. Most patients will experience persistent and severe retrosternal pain, which may involve the left arm or shoulder, occasionally, and can't be completely relieved by taking a rest or nitrates orally. During clinical trial, increase of muscle enzyme activity and the progressive change of ECG are often observed, while symptoms such as arrhythmia, shock or heart failure may occur in some cases, imposing a serious threat to the life and health of patients [1-3]. A WHO survey on cardiovascular disease points out that cardiovascular disease is the main cause of death in the world. At present, there are about 1.5 million patients reported with myocardial infarction in the United

States every year; while in China, the annual new cases are as high as 500,000, and the confirmed overall cases have reached 2 million. Besides, some studies have indicated an increasing trend of AMI incidences in recent years, as we are changing our lifestyle and adjusting dietary structure. Therefore, AMI intervention has become a major focus of medical workers [4-6].

In recent years, many studies have been conducted on the clinic nursing of AMI patients in China. The results show that the earlier the AMI patients are treated, the lower the degree of myocardial injury. Therefore, time is critical to the cardiac muscle and our life expectancy. Some studies have pointed out that the key to treatment of AMI patients lies in the early, timely and effective provision of reperfusion when patients have clinical symptoms as an available

means to prevent malignant arrhythmia, heart failure, sudden death and other complications, and also an important way to reduce the mortality and improve the prognosis of patients [7-9]. However, clinical practice has had a serious delay in the timely treatment of AMI patients, before hospitalization or in the hospital. The influencing factors of pre-hospital delay generally include patients' cognition of AMI, onset time and place, traffic conditions, etc., which are difficult to be controlled. In-hospital delay is directly affected by the hospital and medical staff, and can be shortened as far as possible through appropriate measures [10, 11].

Optimized nursing is defined as adjustments in the treatment process and system, so as to save time for patients as much as possible and improve nursing effectiveness. Specifically, for AMI patients, it can be summarized as optimized diagnosis, risk stratification and preliminary treatment [12, 13]. Compared with the traditional nursing mode, the optimized nursing pathway can effectively reduce the waiting time for patients with AMI and provide favorable conditions for the late rescue of dying myocardium. On the one hand, it can reduce the incidence of all kinds of dangerous events; on the other hand, it can improve the prognosis of patients and improve their quality of life. In this study, the optimized nursing is proved to be able to significantly improve the quality of treatment, disease outcome, QOL, self-efficacy, and prognosis of AMI patients.

Materials and methods

General materials

A total of 98 AMI patients treated in our hospital from January to December 2019 were recruited as the study subjects and they were divided into the EG (n=53, received optimized nursing from July to December 2019) and the CG (n=45, received treatment without optimized nursing from January to June 2019).

Inclusion criteria: All patients included complied with the AMI diagnosis criteria established by the American Heart Association and American College of Cardiology, and were definitely diagnosed based on the ECG and laboratory examination. They were clearly conscious and able to cooperate with the investigation

and have provided informed consent to participate in the study as approved by the Ethics Committee of the Second Affiliated Hospital of Nanchang University.

Exclusion criteria: Some patients were excluded as they were complicated with mental disorders, malignant tumors, severe liver and kidney dysfunction or other severe diseases, or as they were not compliant with the treatment, or pregnant or lactating.

Removal criteria: Patients who demanded withdrawal according to their unwillingness, or whose conditions worsened during the intervention, rendering continuous participation in the investigation impossible, were removed.

Methods

For AMI patients in the CG, routine treatment and nursing measures were provided, including timely monitoring of vital signs and treatment after admission, rest in bed, and regular administration of medication, etc.

Patients in the EG were intervened with the optimized emergency pathway with the following measures. (1) Optimized reception pathway: Patients were assisted to lie on their back after hospitalization and treated by doctors in the resuscitation room. (2) Optimized evaluation: Patients were preliminarily evaluated by the nurses before treatment, including examination of consciousness, complexion, breathing and posture in 30 s, on-the-spot inquiry of chest suppression and pain, onset time, pain intensity, living habit, existing medical history, and related materials which were properly documented. After that, the degree of pathological changes was further identified through ECG for doctor's reference when confirming the patient's conditions. (3) Optimized treatment process: In the mode of "a fixed person in charge, fixed position, fixed responsibility and fixed time", patients were supplied with oxygen within 2 min, measured for blood pressure and oxygen level within 3 min, established a venous channel and preliminarily ECG screened within 5 min. A normal AMI rescue team was set up with 1 doctor, 1 cardiologic nurse, and 1 assistant nurse who were required to be on duty around the clock. Responsibilities and posts were clearly divided between the 2 nurses who carried out rescue for the patient. The cardio-

Table 1. Comparison between the 2 groups for general clinical materials ($\bar{x} \pm s$)/[n (%)]

Material		EG (n=53)	CG (n 45)	t/X ²	P
Gender	M	30	25	0.011	0.917
	F	23	20		
Mean Age (y)		59.98±2.98	60.18±2.88	0.336	0.738
Educational Background	Illiterate	5	3	0.761	0.187
	Primary school	14	11		
	Junior middle school	28	26		
	Senior middle school or higher	6	5		
Marital status	Married	40	39	1.952	0.162
	Unmarried	13	6		
History of Hypertension	Y	32	27	0.001	0.97
	N	21	18		
History of Diabetes	Y	29	25	0.007	0.934
	N	24	20		
History of Smoking	Y	34	29	0.001	0.976
	N	19	16		

logic nurse was responsible for establishment of venous channel and ECG screening, while the other nurse took charge of oxygen supply and measurement of blood pressure and oxygen as well as assisting the doctor, etc. (4) Optimized transfer process: Patients were transferred to the Department of Cardiology as long as their conditions stabilized. Whether an interventional therapy was performed was determined on a case-to-case basis. For patients demanding interventional therapy, the intervention room staff and doctors of the Department of Cardiology were notified, and patients' vital signs were closely and continuously monitored with portable monitors during transfer to ensure their safe arrival at the interventional room. For patients for whom interventional therapy was not necessary, they were transferred by the nurses from the Department of Cardiology after handover formalities, during which, they laid on their back with little effort exerted. (5) High-quality nursing mode: Traditional passive nursing mode was replaced with active nursing mode to improve the outcome of patients. For AMI patients who may be accompanied with anxiety and depression, proper psychological intervention was conducted, including frequent exchange to understand their conditions and status, and were helped to build confidence. Analgesics were used as appropriate to relieve patients from pain in addition to nursing for posture and constipation. Furthermore, to improve the patient's self-management and self-nursing ability and

reduce the incidence of complications, proper guidance was given on rehabilitation.

Observation indexes and evaluation criteria treatment Indices of the 2 groups

The time to triage evaluation, ECG, venous blood sampling and intravenous medication administration was measured and compared between the 2 groups.

Effects at 2 h after treatment in the 2 groups

The rates of chest pain relief, STR and MESR in the two groups was calculated 2 hours after admission and compared between the 2 groups for any difference. The relief of chest pain was mainly based on the patient's chief complaint, and the patient's chief complaint was a chest pressing sensation and radiating pain and whether it significantly improved or disappeared. A total of 50% of the fall rate of ST segment is set as effective, and the fall rate of ST segment = (before treatment te of ST segment is set abefore surgery nt te of. The regression standard of MESR was that the level of creatine kinase (CK) returned to the normal level after treatment, and the regression rate = the number of cases/the total number of cases 100.

QOL scores before and after treatment

The WHOQOL-BREF was used to evaluate both groups' QOL at 1 d and 2 weeks after hospitalization. The scale consisted of 6 dimensions,

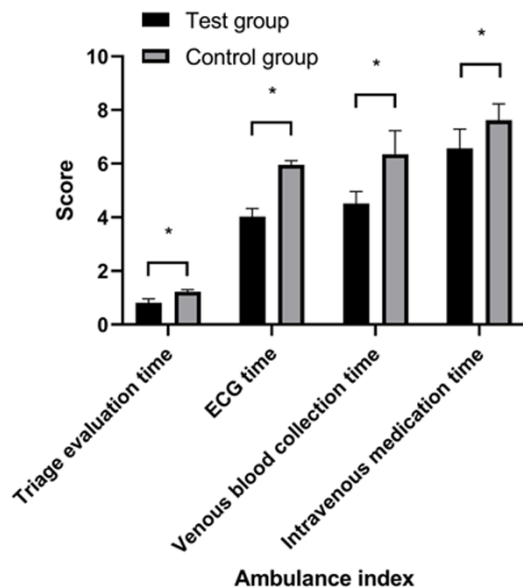
Table 2. Comparison between the 2 groups for treatment indices ($\bar{x} \pm s$) (min)

Group	N	Time to triage evaluation	Time to ECG	Time to venous blood sampling	Time to intravenous administration
EG	53	0.81±0.11	4.03±0.21	4.51±0.32	6.57±0.51
CG	45	1.23±0.05	5.96±0.11	6.35±0.62	7.62±0.43
<i>t</i>	-	23.612	55.497	18.86	10.905
<i>P</i>	-	<0.001	<0.001	<0.001	<0.001

Table 3. Comparison between the 2 groups for effects at 2 h after treatment [n (%)]

Group	n	Chest pain relief	STR	MESR
EG	53	26 (49.06)	32 (60.38)	31 (58.49)
CG	45	13 (28.89)	11 (24.44)	16 (35.56)
χ^2	-	4.132	12.761	5.129
<i>P</i>	-	0.042	<0.001	0.024

options with a score between 1 and 4 points. The sum of the points for the 10 items is the final score which indicates low confidence if between 1 and 10, comparatively low confidence if between 10 and 20, high confidence if between 20 and 30, and very high confidence if between 30 and 40 [15].

**Figure 1.** Comparison between the 2 Groups for Treatment Indexes. The time to triage evaluation, ECG, venous blood sampling and intravenous administration was shorter in the EG as compared with the CG ($P < 0.05$). * $P < 0.05$ vs CG for the same index.

i.e., physiological function, psychological function, independence, social relations, environment and spirit. By summing up the points of the 6 dimensions, the total score was obtained and positively associated with patients' QOL [14].

Self-efficacy before and after treatment

A 10-item GSES was used to evaluate the 2 groups' self-efficacy at 1 d and 2 weeks after hospitalization. For each question there are 4

Statistical analysis

Statistical analysis was performed with SPSS 19.0. In case of nominal data expressed as [n (%)], intergroup and intragroup comparison studies were carried out through chi-squared test. In case of numerical data expressed as Mean $\pm$ Standard Deviation, intergroup and intragroup comparison studies were carried out through *t* test; for all statistical comparisons, significance was defined as $P < 0.05$ [16].

Results

General clinical materials

Through comparison and analysis, the 2 groups' general clinical data, such as proportions of gender, distribution of age, marital status, educational background, history of hypertension, diabetes and smoking were not statistically different ($P > 0.05$) but comparable (Table 1).

Comparison between the 2 groups for treatment indexes

By comparing records, patients in the EG were found to have a shorter time to triage evaluation, ECG, venous blood sampling and intravenous administration than those in the CG ($P < 0.05$) (Table 2).

Comparison between the 2 groups for effects at 2 h After treatment

Records showed that at 2 h after treatment, the rates of chest pain relief, STR and MESR

Effects of optimized nursing

Table 4. Comparison between the 2 groups for QOL scores before and after treatment ($\bar{x} \pm s$)

Group	n	Physiological function		Psychological function		Social function		Environmental function	
		At 1 d after hospitalization	At 2 weeks after hospitalization	At 1 d after hospitalization	At 2 weeks after hospitalization	At 1 d after hospitalization	At 2 weeks after hospitalization	At 1 d after hospitalization	At 2 weeks after hospitalization
EG	53	45.03±5.11	68.51±2.63	50.16±6.32	68.71±3.62	46.51±3.22	69.61±3.66	46.55±3.62	59.86±3.66
CG	45	44.98±5.21	53.16±2.98	49.88±6.95	60.51±3.61	46.39±3.91	60.43±2.15	46.21±4.01	51.89±2.88
<i>t</i>	-	0.048	27.085	0.209	11.189	0.167	14.791	0.441	11.824
<i>P</i>	-	0.962	<0.001	0.835	<0.001	0.868	<0.001	0.66	<0.001

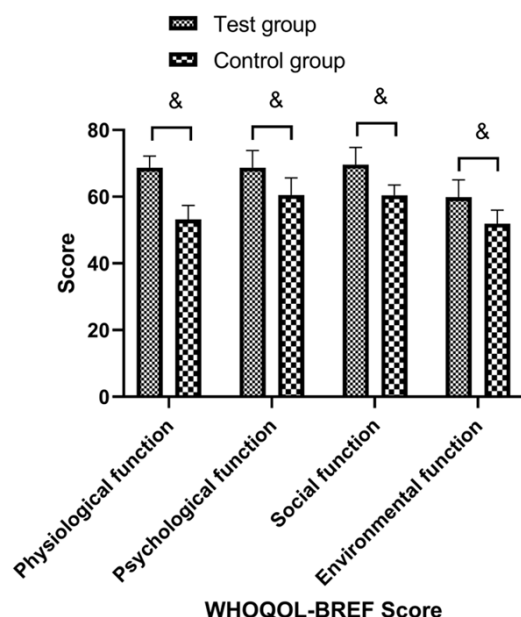


Figure 2. Comparison between the 2 groups for post-treatment QOL scores. As compared with patients in the CG, patients in the EG had higher scores for physiological function, psychological function, social function and environmental function at 2 weeks after intervention ($P < 0.05$). & $P < 0.05$ vs CG for the same index.

were significantly higher in the EG ($P < 0.05$) (Table 3 and Figure 1).

Comparison between the 2 groups for QOL scores before and after treatment

According to records, the 2 groups demonstrated no statistical difference in QOL scores at 1 d after hospitalization ($P > 0.05$). At 2 weeks after treatment, the QOL scores rose significantly in both groups ($P < 0.05$), and rose to a higher level in the EG as compared with the CG ($P < 0.05$) (Table 4 and Figure 2).

Comparison between the 2 groups for self-efficacy before and after intervention

Through evaluation and comparison, at 1 d after hospitalization and 1 week after intervention, there was no statistical difference between the 2 groups for the self-efficacy score ($P > 0.05$). At 2 weeks after hospitalization, the self-efficacy score of the EG was significantly higher than that of the CG ($P < 0.05$) (Table 5 and Figure 3).

Discussion

Following the increase of the incidence of cardiovascular events in recent years, is people's

greater attention to this kind of disease, and emerging interventions which can effectively reduce the mortality of patients with cardiovascular issues [17]. Myocardial infarction is a common critical disease found in clinical practice. AMI patients suffer from severe pain, arrhythmia, shock, heart failure and other symptoms due to myocardial ischemia and hypoxia. If no timely intervention is provided, patients are often in danger [18]. A survey on AMI patients in Xiamen from 2005 to 2014 shows a mortality rate of 21.73/100,000. Heart disease has always been in the top three causes of death in Xiamen. The survey also points out that the median age of patients dying of AMI is 78, and the mortality rate rises rapidly after 55 [19]. It can be inferred that with the gradual aging of our society, AMI will become a major factor affecting the QOL.

Timely diagnosis and nursing provide a guarantee for the improved prognosis of AMI patients. Effective nursing is an ideal tool to maximally save patients' heart functions and survival [20, 21]. However, clinical practices in recent years have discovered that the traditional nursing mode is unable to satisfy the nursing demands of AMI patients because of its backward and passive attributes. For this sake, it is urgent to reshape the traditional nursing mode [22]. Some studies have revealed that timely and effective treatment after hospitalization could build a solid foundation for subsequent treatment and significantly cut down on the mortality of AMI patients [23]. The results of this study demonstrated that through optimized emergency pathway treatment, the time for AMI patients to go through triage evaluation, ECG, venous blood sampling and intravenous administration can be significantly reduced. Referring to clinical practices, the key to rescue AMI patients in the early stage lies in saving the dying cardiac muscle, for which, shortening the rescue time is one of the most effective ways. Such a view was supported by the fact in this study at 2 h after treatment, patients in the EG yielded higher rates of chest pain relief, STR and MESR. A literature on the optimized pathway of emergency nursing process shows that compared with general emergency nursing process, the optimized pathway of emergency nursing process can significantly improve the success rate of rescuing AMI patients, and reduce the mortality from 12.90% to 0.00% [24]. In addition, it is also pointed out in some studies that compared with general nursing, opti-

Table 5. Comparison Between the 2 Groups for Self-efficacy Before and After Intervention ($\bar{x} \pm s$)

Group	n	At 1 d after hospitalization	At 1 week after intervention	At 2 weeks after hospitalization
CG	45	11.23±1.26	14.98±1.16	20.68±0.26
		11.34±1.34	14.57±1.12	16.51±0.22
t	-	0.373	1.771	84.836
P	-	0.71	0.08	<0.001

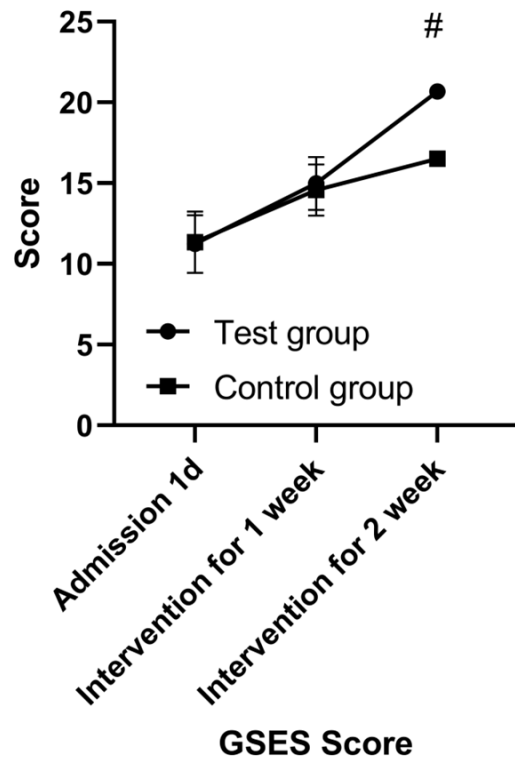


Figure 3. Comparison Between the 2 Groups for Self-efficacy Before and After Intervention. No statistical difference was found between the 2 groups for GSES scores at 1 d after hospitalization and 1 week after intervention ($P>0.05$). At 2 weeks after intervention, the GSES score of the EG was significantly higher than that of the CG ($P<0.05$). # $P<0.05$ vs CG at the same time point.

mized nursing process can shorten the time in bed and length of hospital stay of AMI patients, reduce the medical cost and the incidence of various cardiovascular and cerebrovascular events such as malignant arrhythmia and cardiogenic shock in the later follow-up, showing relevant significance for improving the long-term treatment effect [25].

Furthermore, in some studies, postoperative recovery is considered as an important factor affecting prognosis as the cardiac muscle cells

in AMI patients are severely damaged. By applying optimized nursing intervention on AMI patients, this study found that appropriate nursing intervention can markedly raise the QOL scores and self-efficacy of AMI patients as it carries forward evidence-based interventions, begins with normal complications, and targets the patients; during which, the nursing concept of being patient-centered is thoroughly implemented. In some studies, it is pointed that optimized nursing emphasizes patients' subjective feelings more as compared with the traditional ones and that it is easier to motivate their desire for self-nursing. As a result, the outcome is improved, length of stay and bed time are shortened on the one hand, and patients build self-nursing capacity on the other hand, laying a solid foundation for better nursing [26].

In conclusion, the optimized nursing process can be popularized in the clinic based on its advantages of significantly improving AMP patients' treatment quality, patient outcome, QOL, self-efficacy and prognosis. However, in this retrospective study, scale evaluation was frequently adopted during material collection to test the intervention effects, but the results were subject to individual subjective factors. In the meantime, the treatment processes for both groups will be further improved, including enhanced training of medical staff, regular discussion and summarization to make sure the intervention means are more scientific and rigorous. At last, the study will be based on larger sample size and longer follow-up cycles to include the long-term intervention effects into the results analysis. Through those measures, more scientific and representative theoretical support will be provided for the clinical nursing of AMI patients, in order to practically improve their prognosis.

Disclosure of conflict of interest

None.

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