

The Effect of Predictive Nursing Intervention on Cardiac Function and Clinical Outcomes in CCU Patients with Acute Myocardial Infarction After Interventional Therapy

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Abstract: *Objective:* To evaluate the impact of predictive nursing on the care of acute myocardial infarction (AMI) patients in the Coronary Care Unit (CCU) after interventional therapy. *Methods:* From September 2021 to September 2023, 84 AMI patients admitted to the CCU were randomly divided into two groups: the experimental group (42 patients) received predictive nursing, and the reference group (42 patients) received conventional nursing. Cardiac function and clinical outcomes were compared between the groups. *Results:* Before nursing, there was no difference in cardiac function between the two groups ($P > 0.05$). After nursing, the cardiac function of the experimental group was better than that of the reference group ($P < 0.05$). The clinical outcomes of the experimental group were better than those of the reference group ($P < 0.05$). Before nursing, there was no difference in psychological scores between the two groups ($P > 0.05$). After nursing, the psychological scores of the experimental group were lower than those of the reference group ($P < 0.05$). *Conclusion:* Predictive nursing can improve the cardiac function and clinical outcomes of AMI patients after interventional therapy and can also regulate patients' negative psychological states.

Keywords: Predictive nursing; CCU; Acute myocardial infarction; Interventional therapy; Cardiac function

Online publication: September 5, 2024

1. Introduction

The cause of acute myocardial infarction (AMI) is often coronary artery blockage, which leads to prolonged and sustained myocardial ischemia/hypoxia, resulting in infarction^[1,2]. Symptoms include chest tightness and crushing chest pain, with the incidence age becoming increasingly younger and a high risk of disease progression, necessitating early treatment. Interventional therapy is a common treatment for this condition, capable of removing infarct foci and achieving a better surgical prognosis. The Coronary Care Unit (CCU) is a specialized monitoring ward for cardiac disease patients, integrating monitoring, treatment, and nursing operations, characterized by its comprehensive and professional nature. However, many AMI patients after

interventional therapy experience decreased cardiac function and poor clinical outcomes, necessitating predictive nursing to assess potential risks and provide targeted preventive care^[3]. Therefore, this study selected 84 AMI patients after interventional therapy to evaluate the intervention effect of predictive nursing.

2. Materials and methods

2.1. General information

From September 2021 to September 2023, 84 AMI patients who underwent interventional therapy in the CCU were included in the study. They were randomly divided into two groups using a random number table: the experimental group consisted of 42 patients (27 males and 15 females) aged 41–83 years, with a mean age of 54.35 ± 2.18 years; the time from onset to admission ranged from 4–26 hours, with a mean time of 13.95 ± 2.13 hours. The reference group consisted of 42 patients (28 males and 14 females) aged 40–85 years, with a mean age of 54.38 ± 2.12 years; the time from onset to admission ranged from 3–24 hours, with a mean time of 13.81 ± 2.25 hours. There were no significant differences in the data between the groups ($P > 0.05$).

Inclusion criteria: Diagnosed with AMI by coronary angiography or imaging techniques; adult patients; stable vital signs; normal consciousness; suitable for interventional therapy.

Exclusion criteria: Presence of surgical contraindications; abnormal liver or kidney function; pregnancy or lactation; history of mental illness.

2.2. Methods

2.2.1. Reference Group

Routine nursing care was provided: preoperative explanation of the key points of interventional therapy and psychological counseling; intraoperative monitoring of vital signs, prompt identification and reporting of abnormalities, and preparation of emergency plans; postoperative dietary guidance, respiratory training, and psychological counseling.

2.2.2. Experimental Group

Predictive nursing care was provided:

- (1) Nursing team formation: The head nurse served as the team leader, responsible for unified theoretical and practical training, and collective assessment of team members. Senior nurses and experienced nurses served as team members, responsible for carrying out nursing practices, identifying nursing problems, and providing improvement measures.
- (2) Nursing measures formulation: Team members collected nursing cases from the department over the past three years and summarized nursing problems. Literature was collected from databases such as CNKI and VIP, and nursing measures were summarized. Based on clinical nursing experience and current nursing conditions, nursing plans suitable for departmental needs and disease characteristics were formulated, and detailed implementation guidelines were listed to ensure feasibility.
- (3) Nursing Implementation:
 - (a) Preoperative care: Conducted knowledge lectures and disease seminars, distributed educational brochures or played instructional videos, detailed the common causes, symptoms of AMI, interventional procedures, and cooperation during surgery, emphasizing the expected efficacy, characteristics, and advantages of interventional therapy to boost patient confidence in surgical treatment. Introduced the department environment and medical staff qualifications to alleviate

patient concerns. Enhanced environmental nursing by maintaining the ward temperature at 18–24°C, disinfecting the ward twice daily, and regularly ventilating to ensure air circulation.

- (b) Postoperative care: Informed patients to rest in bed, consume liquid food, and gradually diversify their diet as their condition stabilized. Conducted psychological assessments through one-on-one conversations to understand the patient's educational level, personality traits, and inner concerns, then evaluated their psychological state for differential care. For patients with fear, maintained the comfort of the CCU ward, inquired about their ward experience, and adjusted the temperature and humidity reasonably, changing bed linens daily. Encouraged reading and listening to music to relax. For patients with agitation or anxiety, diverted attention through TV programs, reading, or meditation. For patients with depression, suggested writing a diary to record daily positive experiences or mood changes, complemented with deep breathing exercises and Baduanjin training to regulate negative emotions. Implemented complication care by increasing morning ward rounds to prevent complications such as arrhythmias. Monitored ECG changes dynamically, formulated preventive measures, and responded immediately to any abnormalities. Also implemented exercise nursing: on the first day post-surgery, performed passive and active limb movements in bed, such as flexing and extending the elbows and knees for 10–15 minutes per session, 1–2 sessions per day. On the second day, performed sitting-up exercises and resistance training for the ankles and wrists, with the same session duration and frequency. On the third day, practiced sitting up beside the bed for 5 minutes, standing if not fatigued or dizzy, with each standing session lasting 5–10 minutes, 1–2 sessions per day. On the fourth day, practiced walking with support for 50–100 meters per session, 2–3 sessions per day. On the fifth day, practiced walking 100–200 meters and stair climbing, 1–2 sessions per day. On the seventh day, practiced outdoor walking or Tai Chi for 15–20 minutes per session, 2–3 sessions per day.

2.3. Observation indicators

- (1) Cardiac function: Measured left ventricular ejection fraction (LVEF) using echocardiography; drew venous blood and used a two-way immunoassay to measure N-terminal pro-B-type natriuretic peptide (NT-pro BNP) and B-type natriuretic peptide (BNP); conducted a 6-minute walk test (6MWT) on a flat surface, recording the distance walked within 6 minutes.
- (2) Clinical outcomes: Evaluated cardiovascular events as outcome indicators, including angina, arrhythmia, heart failure, recurrent myocardial infarction, stent thrombosis, and stroke.
- (3) Psychological scores: Used the Self-Rating Anxiety Scale (20 items, standard score of 50) and the Self-Rating Depression Scale (20 items, standard score of 53), with higher scores indicating more severe negative emotions.

2.4. Statistical analysis

Data were processed using SPSS 28.0 software. Measurement values were compared using *t*-tests, and count values were compared using chi-squared tests. Statistical significance was set at $P < 0.05$.

3. Results

3.1. Comparison of cardiac function between the two groups

Before nursing, there was no difference in cardiac function between the two groups ($P > 0.05$). After nursing,

the cardiac function of the experimental group was better than that of the reference group ($P < 0.05$), as shown in **Table 1**.

Table 1. Comparison of cardiac function between the two groups before and after care (mean \pm SD)

Subgroups	LVEF (%)		NT-pro BNP (pg/mL)		BNP (pg/mL)		6MWT (m)	
	Before	After	Before	After	Before	After	Before	After
Experimental group ($n = 42$)	4.22 \pm 0.36	8.69 \pm 1.38	395.61 \pm 28.74	105.26 \pm 13.37	561.39 \pm 35.61	274.15 \pm 15.32	83.59 \pm 9.74	236.62 \pm 25.41
Reference group ($n = 42$)	4.24 \pm 0.32	6.11 \pm 1.22	394.16 \pm 28.63	122.68 \pm 13.94	561.02 \pm 36.31	315.39 \pm 16.81	83.16 \pm 9.70	177.19 \pm 23.53
<i>t</i>	0.269	9.077	0.232	5.845	0.047	11.751	0.203	11.121
<i>P</i>	0.789	0.000	0.817	0.000	0.963	0.000	0.840	0.000

3.2. Comparison of clinical outcomes between the two groups

Table 2 shows that the clinical outcomes (incidence of cardiovascular events) of the experimental group were better than those of the reference group ($P < 0.05$).

Table 2. Comparison of clinical outcomes between the two groups [n (%)]

Subgroups	Angina	Arrhythmia	Heart failure	Recurrent myocardial infarction	Stent thrombosis	Stroke	Incidence rate
Experimental group ($n = 42$)	1 (2.38)	1 (2.38)	1 (2.38)	0	0	0	3 (7.14)
Reference group ($n = 42$)	3 (7.14)	2 (4.76)	1 (2.38)	2 (4.76)	1 (2.38)	1 (2.38)	10 (23.81)
χ^2	-	-	-	-	-	-	4.390
<i>P</i>	-	-	-	-	-	-	0.036

3.3. Comparison of psychological scores between the two groups

As shown in **Table 3**, BEFORE nursing, there was no difference in psychological scores between the two groups ($P > 0.05$). After nursing, the psychological scores of the experimental group were lower than those of the reference group ($P < 0.05$).

Table 3. Comparison of the psychological scores of the two groups before and after care (mean \pm SD; points)

Subgroups	Anxiety		Depression	
	Before	After	Before	After
Experimental group ($n = 42$)	44.36 \pm 2.81	24.65 \pm 2.39	45.29 \pm 2.91	26.75 \pm 3.12
Reference group ($n = 42$)	44.31 \pm 4.75	28.91 \pm 2.43	45.37 \pm 2.86	30.13 \pm 3.15
<i>t</i>	0.059	8.100	0.127	4.941
<i>P</i>	0.953	0.000	0.899	0.000

4. Discussion

The risk of AMI is relatively high, with triggers including hypertension, long-term smoking, advanced age,

and coronary heart disease. The incidence is trending towards younger populations and has a high mortality rate. Interventional therapy is a common treatment for AMI, known for its minimally invasive nature and high safety [4,5]. However, the restenosis rate post-intervention is about 30%, affecting the surgical prognosis. After intervention, patients need to be transferred to the CCU for continued monitoring of various vital signs. During CCU monitoring, patients may experience changes in ECG or extreme fluctuations in multiple physiological indicators, which in severe cases can lead to arrhythmias or shock [6]. Therefore, additional nursing interventions are required to improve clinical outcomes after AMI intervention.

Predictive nursing involves anticipating and addressing patient conditions in advance, observing various vital signs, inquiring about and monitoring psychological changes, and then formulating preventive measures and emergency plans [7]. This type of nursing is based on clinical nursing experience, the current state of nursing in the department, and the specific needs of disease care. Information can be queried in major databases, and nursing cases can be integrated to formulate highly effective and professional nursing measures. Additionally, predictive nursing is carried out in a team format, ensuring the orderly implementation of nursing plans and the traceability of nursing responsibilities. Its goal is to reduce adverse events and improve clinical outcomes. This type of nursing can anticipate and identify nursing risks early and handle them promptly, often used in the care of sudden acute conditions [8].

The results showed that after nursing, the cardiac function of the experimental group was better than that of the reference group, clinical outcomes were better, and psychological scores were lower ($P < 0.05$). This is because preoperative nursing can increase patients' knowledge of the disease and surgical procedures, enabling them to fully understand the advantages of surgery and actively cooperate with the treatment. Additionally, introducing the environment and staff qualifications can increase patients' trust in surgical treatment, alleviating anxiety or tension. Postoperative nursing includes dietary guidance, psychological care, complication prevention, and exercise guidance [9]. Dietary guidance aims to improve the patient's physical function, enhancing their constitution and thus improving clinical outcomes. Psychological care provides individualized psychological support, increasing patients' psychological resilience and reducing negative emotions. Complication prevention maximizes the prevention of adverse events such as arrhythmias, resulting in better clinical outcomes [10]. Exercise guidance significantly restores patients' exercise endurance, improving their cardiac function. Moreover, predictive nursing measures are comprehensive and detailed, providing targeted care based on the characteristics of AMI intervention and the nursing requirements of the CCU, thus ensuring high-quality nursing.

In conclusion, implementing predictive nursing for AMI intervention patients can improve their cardiac function, achieve better clinical outcomes, and alleviate their psychological state.

Disclosure statement

The authors declare no conflict of interest.

References

- [1] Zhu W, Zhang Y, Niu Y, 2022, The Effect of Psychological Nursing on Adverse Psychological Outcomes and Prognosis in Acute Myocardial Infarction Patients Undergoing Interventional Surgery in the CCU. *Medical Diet and Health*, 20(18): 127–130.
- [2] Liu X, Chu D, 2023, The Impact of Collaborative Nursing Combined with Early Cardiac Rehabilitation Nursing on Cardiac Function and Self-management Ability in Post-PCI Myocardial Infarction Patients. *Clinical Medical*

Research and Practice, 8(6): 134–136.

- [3] Han Y, 2024, The Effect of Progressive Phased Rehabilitation Nursing on the Rehabilitation and Cardiac Function of Acute Myocardial Infarction Patients Post-PCI. *Modern Health*, 24(7): 535–537.
- [4] Wei C, 2021, The Effect of Implementing Vitality Nursing During the Perioperative Period of Interventional Treatment for Acute Myocardial Infarction. *Chinese Community Doctors*, 37(29): 139–140.
- [5] Zhang S, Hao Z, Xing Y, 2022, The Effect of Predictive Nursing Model on Psychological State and Complication Risk in Acute STEMI Patients Post-Intervention. *Journal of Shenyang Medical College*, 24(1): 72–75.
- [6] Wang Y, Ge Y, Liang X, 2020, The Effect of Early Cardiac Rehabilitation Nursing in Patients with Acute Myocardial Infarction Post-Intervention. *Chinese Medical Guide*, 18(11): 199–200.
- [7] Xu M, Xu M, Zhou X, et al., 2024, Application of Network-based Cox Health Behavior Interaction in Post-Intervention Acute Myocardial Infarction Patients. *Modern Clinical Medicine*, 50(3): 183–186.
- [8] Yang Y, 2021, The Effect of Early Individualized Cardiac Rehabilitation Nursing on Clinical Outcomes in Post-Emergency PCI Myocardial Infarction Patients. *Chinese Journal of Integrative Medicine on Cardio-/Cerebrovascular Disease*, 28(1): 95–98.
- [9] Niu Z, Zhang F, Zhang M, et al., 2024, The Effect of PERMA Model Nursing Intervention on Exercise Fear and Psychological Resilience in Post-Emergency PCI Patients. *Journal of Binzhou Medical College*, 47(2): 133–136.
- [10] Li Z, 2022, Observation of the Effect of Predictive Nursing in Clinical Care of Acute Myocardial Infarction Patients Complicated with Arrhythmia. *Aerospace Medicine Journal*, 33(12): 1499–1502.

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