

Application of Case Management Model in Cardiac Rehabilitation of Elderly Coronary Heart Disease Patients after Coronary Artery Bypass Grafting

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Abstract: To investigate the impact of case management model on cardiac rehabilitation in elderly coronary heart disease (CHD) patients undergoing coronary artery bypass grafting (CABG). Sixty-four elderly CHD patients who underwent CABG at our hospital from June 2023 to October 2024 were selected and randomly divided into two groups. One group received conventional nursing care (32 cases, control group), while the other group underwent a case management model (32 cases, observation group). Cardiac function levels, exercise endurance, and myocardial injury biomarkers were compared between the two groups. Post-intervention, the observation group exhibited significantly higher cardiac function levels and exercise endurance, along with lower myocardial injury biomarker levels compared to the control group (all $P < 0.05$). Implementing a case management model for elderly CHD patients post-CABG can enhance cardiac function, improve exercise tolerance, and facilitate recovery.

Keywords: Elderly Coronary Heart Disease; Coronary Artery Bypass Grafting; Case Management Model; Cardiac Rehabilitation

1. Introduction

Coronary artery bypass grafting (CABG) is a primary clinical treatment for coronary heart disease (CHD), effectively improving myocardial blood supply and restoring cardiac function. However, elderly patients often exhibit weakened physical constitution and comorbidities, resulting in reduced tolerance to surgical trauma and prolonged postoperative recovery [1-2]. To optimize postoperative recovery and cardiac function, tailored nursing

interventions are essential. The case management model, a patient-centered approach, provides individualized care based on comprehensive patient assessments. This study evaluates the efficacy of the case management model in cardiac rehabilitation for elderly CHD patients post-CABG.

2. Materials and Methods

2.1 General Information

Sixty-four elderly CHD patients who underwent CABG at our hospital from June 2023 to October 2024 were randomly allocated into two groups. The control group (32 cases, 17 males, 15 females; age range: 62-78 years, mean: 64.35 ± 1.45 years; CHD duration: 3-6 years, mean: 4.11 ± 1.15 years) received conventional nursing care. The observation group (32 cases, 18 males, 14 females; age range: 63-77 years, mean: 64.15 ± 1.45 years; CHD duration: 3-7 years, mean: 4.18 ± 1.25 years) underwent the case management model. No significant differences in baseline characteristics were observed between the groups ($P > 0.05$).

2.2 Methods

During the postoperative recovery period of the control group, all aspects of nursing operations of the nursing staff were carried out in accordance with the conventional mode, accurately assessing the changes of the patient's condition, and doing a good job of patient care. In strict accordance with the doctor's advice to assist patients with medication, and do a good job in early diet and posture management, combined with the patient's recovery in a timely manner to guide patients to carry out rehabilitation training. The observation group received case management mode during postoperative

recovery: (1) Patient assessment. The nursing staff should conduct a comprehensive assessment of all aspects of the patient's situation, establish case management files, and determine the management mode in combination with the actual situation of the patient. (2) Timing of cardiac rehabilitation. Combined with the surgical characteristics of these patients, the timing of cardiac rehabilitation can be divided into three stages, including stage I (in-hospital rehabilitation stage), stage II (1-3 months outside the hospital), and stage III (long-term recovery stage). The targeted cardiac rehabilitation program was set according to the different recovery stages of patients. (3) Implementation of cardiac rehabilitation training. Phase I. The patients mainly performed respiratory function exercise and limb function exercise. After the indicators in all aspects of the patients are stable after surgery, they can start to guide the patients to carry out early rehabilitation training. According to face-to-face guidance and the use of relevant video materials, we can help the patients to clarify the way of respiratory function exercise. And assist patients with early limb activities, 20min a single time, three times a day. After the patient reaches the condition of getting out of bed, it is necessary to assist the patient to get out of bed in time for exercise and help the patient recover from the damaged function. Phase II. Instruct patients to carry out aerobic exercise training (including Baduanjin, Taiji, etc.), once a day for 30min. Combined with the patient's recovery, resistance training should be gradually carried out, mainly using elastic bands or small dumbbells. Patients should be guided to follow the principle of step-by-step training to avoid overtraining. Phase III. In the long-term recovery process of patients, guide patients to actively carry out rehabilitation training in all aspects, and use wechat as a

platform to provide online nursing guidance for patients, and timely push relevant popular science materials about cardiac rehabilitation nursing for patients. Encourage patients to make daily exercise records and upload them in time, so that nursing staff can guide the rehabilitation training methods according to the actual situation of patients.

The two groups of patients continued to carry out nursing support for 3 months.

2.3 Observation Index

Cardiac Function: Left ventricular ejection fraction (LVEF), left ventricular end-diastolic diameter (LVEDd), and left ventricular end-systolic diameter (LVESd) were measured using echocardiography (Xuzhou Kaier Medical Instrument Co, China; Registration No.: Su Xie Zhun 20172061388).

B-type Natriuretic Peptide (BNP) and 6-Minute Walking Distance (6MWD): Venous blood samples (6 mL) were centrifuged (4,000 rpm, 10 minutes), and BNP levels were analyzed via fluorescence immunoassay.

2.4 Statistical Methods

Data were analyzed using SPSS 22.0. Continuous variables were expressed as mean \pm standard deviation ($\bar{x} \pm s$) and compared via t-tests. Categorical data were analyzed using chi-square tests. Statistical significance was set at $P < 0.05$.

3. Result

3.1 Comparison of Negative Emotions

Post-intervention, the observation group demonstrated significantly improved LVEDd (51.05 ± 1.65 mm vs. 55.63 ± 1.75 mm, $P < 0.001$) and LVESd (42.34 ± 1.88 mm vs. 48.63 ± 1.68 mm, $P < 0.001$) compared to the control group. See Table 1.

Table 1. Comparison of BAI and BDI Scores ($\bar{x} \pm s$)

Group	Cases	LVEDd(mm)		LVESd(mm)	
		Before Nursing	After Nursing	Before Nursing	After Nursing
Observation	32	58.63 ± 2.15	51.05 ± 1.65	52.45 ± 2.11	42.34 ± 1.88
Control	32	58.96 ± 2.35	55.63 ± 1.75	52.64 ± 2.25	48.63 ± 1.68
<i>t</i>	-	1.725	11.758	1.682	14.478
<i>P</i>	-	0.436	0.001	0.315	0.001

3.2 Comparison of Quality of Life

The observation group exhibited lower BNP

levels (370.05 ± 2.36 ng/L vs. 461.64 ± 3.11 ng/L, $P < 0.001$) and greater 6MWD (372.05 ± 3.74 m vs. 305.45 ± 3.67 m, $P < 0.001$)

post-intervention. See Table 2.

Table 2. Comparison of Quality of Life Scores ($\bar{x} \pm s$)

Group	Cases	BNP (ng/L)		6MWD (m)	
		Before Nursing	After Nursing	Before Nursing	After Nursing
Observation	32	631.45 \pm 3.45	370.05 \pm 2.36	289.85 \pm 3.63	372.05 \pm 3.74
Control	32	632.62 \pm 3.66	461.64 \pm 3.11	290.74 \pm 3.86	305.45 \pm 3.67
<i>t</i>	-	1.824	14.725	1.778	16.427
<i>P</i>	-	0.615	0.001	0.515	0.001

4. Discussion

CABG remains a cornerstone treatment for elderly CHD patients, yet postoperative recovery is often protracted due to comorbidities and reduced physiological reserve^[3]. The case management model, by integrating phased rehabilitation protocols and personalized care, addresses these challenges effectively. Structured interventions, including early mobilization and remote monitoring, enhance patient adherence and functional outcomes. Our findings align with prior studies demonstrating improved cardiac function and reduced myocardial stress biomarkers with case management^[4].

In conclusion, the case management model significantly enhances cardiac rehabilitation outcomes in elderly CABG patients, promoting functional recovery and long-term health.

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