Impact of Refined Nursing on Respiratory Function and Prognosis of Critically Ill Patients After Cardiac Surgery in ICU

Du Jiao, Ma Yaya, Ji Cui*
Shaanxi Provincial People's Hospital, Xi'an, Shaanxi, China
**Corresponding Author.*

Abstract: To observe the impact of refined nursing on respiratory function and prognosis of critically ill patients after cardiac surgery in ICU. Methods: A total of 86 critically ill patients who underwent cardiac surgery in ICU of our hospital from March 2024 to June 2025 were selected as research subjects and randomly divided into two groups (43 cases in each group: control group and observation group). The control group received routine nursing, while the observation group received refined nursing. Blood gas levels, respiratory function scores, and complications of the two groups were statistically analyzed. Results: After nursing, the partial pressure of oxygen (PaO_2) in the observation group was higher than that in the control group (P<0.05). The respiratory function of the observation group after treatment was better than that of the control group (P<0.05). The incidence of complications in the observation group was lower than that in the control group (P<0.05). Conclusion: Implementing refined nursing for critically ill patients after cardiac surgery in ICU helps improve patients' respiratory function and blood gas levels, reduce the incidence of complications, and promote patient recovery and prognosis.

Keywords: Refined Nursing; Critically Ill Cardiac Surgery in ICU; Respiratory Function

1. Introduction

Critically ill patients after cardiac surgery in ICU usually have severe conditions and suffer significant trauma during surgery, requiring a long recovery period after operation[1-2]. According to clinical practice, most of these patients have varying degrees of respiratory dysfunction in the early postoperative period, which directly affects their recovery and prognosis. In the nursing process of critically ill patients after cardiac surgery in ICU, it is necessary to accurately carry out various nursing work according to the characteristics of their conditions to improve their respiratory function[3-4]. Refined nursing is widely used in ICU nursing, aiming to provide multi-dimensional and refined nursing support based on patients' condition characteristics to help them recover. This study mainly observed the effect of refined nursing on critically ill patients after cardiac surgery in ICU.

2. Materials and Methods

2.1 General Data

A total of 86 critically ill patients who underwent cardiac surgery in ICU of our hospital from March 2024 to June 2025 were selected as research subjects and randomly divided into two groups (43 cases in each group: control group and observation group). The control group received routine nursing, while the observation group received refined nursing. In the control group, there were 23 males and 20 females, aged 44-68 years, with an average age of (52.33±1.83) years. In the observation group, there were 24 males and 19 females, aged 43-67 years, with an average age of (52.15±1.85) years. There was no significant difference in baseline data between the two groups (P>0.05).

2.2 Methods

The control group received routine nursing during ICU treatment, including accurately observing changes in patients' conditions, managing medication and respiratory tract, and other routine nursing work. The observation group received refined nursing during the postoperative recovery period, with the following nursing measures:

(1) Sputum suction nursing: During the postoperative recovery period, patients were given sputum excretion nursing accurately.

Sputum excretion was promoted by patting patients' backs or vibration sputum excretion, and patients' body positions were adjusted in a timely manner to promote rapid sputum excretion through gravity-assisted drainage. For patients with difficulty in sputum excretion, artificial sputum suction or atomization was performed in a timely manner to indirectly promote sputum excretion.

(2) Oxygen inhalation nursing: Nurses closely monitored changes in patients' blood oxygen saturation, provided accurate oxygen inhalation nursing to improve patients' blood oxygen levels, and reasonably controlled the oxygen flow rate according to changes in patients' indicators to avoid discomfort caused by excessively fast oxygen flow rate.

(3) Pain nursing: In the early postoperative period, patients usually experienced varying degrees of pain at the surgical incision. Nurses evaluated the pain level of patients based on their subjective complaints and facial expressions to understand their pain status. Analgesic drugs were administered in strict accordance with doctor's orders to relieve pain, and non-pharmacological analgesia was provided in a timely manner according to patients' characteristics, including massage and guiding patients to divert attention.

(4) Drainage nursing: During closed thoracic drainage, nurses accurately observed the drainage volume and characteristics of drainage fluid, analyzed for abnormalities in a timely manner, and reported to doctors immediately if any abnormalities were found.

(5) Incision nursing: Refined management was carried out for patients' surgical incisions. Changes in the incisions were analyzed in a timely manner, and dressings were replaced to ensure that the dressings at the incisions were always dry.

2.3 Observation Indicators

(1) Comparison of blood gas levels: Arterial blood samples were collected from both groups before and after nursing using special arterial blood collection needles. The needle was inserted at a 45° angle, and the blood collection device was automatically filled under arterial pressure, with a collection volume of about 2ml. The partial pressure of oxygen (PaO_2) and blood oxygen saturation (SpO_2) of patients were measured.

(2) Comparison of respiratory function: The modified Medical Research Council (mMRC) dyspnea scale was used to assess the degree of dyspnea in patients during recovery, with a score range of 0-4 points (higher scores indicating more severe dyspnea). Assessments were conducted before and after nursing.

(3) Statistical analysis of complications: The incidence of respiratory tract infection, pulmonary infection, and atelectasis during recovery was statistically analyzed in both groups.

2.4 Statistical Methods

Relevant data in the study were analyzed using SPSS 25.0 software. Measurement data (including blood gas levels and respiratory function) were expressed as mean ± standard deviation ($\bar{x}\pm s$), and enumeration data were expressed as percentages (%). Chi-square test was used for comparison. A P value <0.05 was considered statistically significant.

3. Results

3.1 Blood Gas Levels

After nursing, the PaO_2 in the observation group was higher than that in the control group (P<0.05), as shown in Table 1.

Table 1. Comparison of Blood Gas Levels Between the Two Groups ($\bar{x}\pm s$)

Group	Number of Cases	Partial Pressure of Oxygen (mmHg)		Blood Oxygen Saturation (%)	
		Before Nursing	After Nursing	Before Nursing	After Nursing
Observation	43	52.45±2.34	81.36±2.15	71.25±2.11	91.36±2.15
Control	43	52.65±2.11	75.58±2.36	72.42±2.63	82.68±3.66
t	-	0.585	26.425	0.4255	9.634
P	-	0.415	<0.001	0.962	<0.001

3.2 Comparison of Respiratory Function

After treatment, the respiratory function of the observation group was better than that of the control group (P<0.05), as shown in Table 2.

Table 2. Analysis of Factors Influencing Vaccination Behavior

Group	Number of Cases	Before Nursing	After Nursing
Observation	43	3.05±0.22	2.05±0.15

Control	43	3.04±0.17	2.99±0.22
t	-	1.245	24.425
P	-	0.215	<0. 001

3.3 Statistical Analysis of Complications

There were 2 cases of complications in the observation group and 6 cases in the control group. The comparison showed χ^2=12.002, P=0.001.

4. Discussion

Critically ill patients after cardiac surgery in ICU have severe conditions, and their respiratory system function is impaired to varying degrees in the early postoperative period, which directly affects their postoperative recovery and may even increase the incidence of common postoperative complications, affecting the comprehensive effect of surgical treatment for these patients[5-6]. During the postoperative recovery period of these patients, it is necessary to accurately carry out various nursing work according to the characteristics of their conditions to indirectly help them recover.

Based on routine postoperative nursing, refined nursing provides multi-dimensional nursing support for patients during the postoperative recovery period. Targeted nursing support is provided from multiple dimensions such as sputum suction nursing, oxygen inhalation nursing, and drainage nursing, which can help patients recover, promote the rapid improvement of their respiratory system function, and assist in their recovery[7]. According to the observation in this study, under the effect of refined nursing, the blood gas levels and respiratory function of patients in the observation group improved rapidly during postoperative recovery, and the incidence of postoperative complications was significantly reduced. This indicates that the implementation of this nursing model can help restore patients' damaged respiratory function, promote recovery, and improve prognosis.

In conclusion, refined nursing can be implemented in the nursing process of critically ill patients after cardiac surgery in ICU to help patients recover respiratory function and improve prognosis.

References

[1] Gao Bing, Wang Lei, Wang Yun. Distribution characteristics of pathogenic bacteria in postoperative pulmonary infection of cardiac surgery patients and investigation of related influencing factors [J]. Journal of Pathogen Biology, 2025, 20(09): 1184-1188.

[2] Fei Xiu, Liu Changhong, Li Minghui, et al. Application of predictive nursing combined with enhanced recovery after surgery concept in elderly patients during the perioperative period of cardiac surgery [J]. Practical Journal of Clinical Medicine, 2025, 22(05): 129-133.

[3] Ma Lingling, Cheng Lijun, Liu Yuanyuan. Effect of comprehensive nursing intervention on cardiac surgery patients and its impact on postoperative pain [J]. Smart Healthcare, 2025, 11(21): 150-153.

[4] Wang Ying. Effect of diverse nursing in operating room during pacemaker implantation and its impact on complications [J]. Journal of Aerospace Medicine, 2025, 36(07): 886-889.

[5] Deng Minjun, Wang Yonglin, Song Yamin. Application effect of continuous quality improvement strategy based on FOCUS-PDCA model in thirst nursing of cardiac surgery patients with orotracheal intubation [J]. Journal of Medical Frontiers, 2025, 15(17): 100-104.

[6] Xing Xiaoxiang. Application effect of enhanced recovery after surgery concept nursing in cardiac surgery patients [J]. Chinese Journal of Civil Medicine, 2025, 37(09): 172-174.

[7] Yue Aihua, Liu Wenbin, Zhang Weihua. Application of nursing management based on Protection Motivation Theory in cardiac surgery patients [J]. Qilu Journal of Nursing, 2024, 30(07): 51-55

