



Effect of comprehensive nursing methods in postoperative ICU of children with CHD

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Original Article

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Abstract

To explore effect of comprehensive nursing in postoperative ICU of children with CHD. The subjects were 50 cases of children with CHD treated in our hospital: 25 cases in the control group: routine nursing, and 25 cases in the observation group: comprehensive nursing intervention. The effective rate of 92.00% in the observation group was significantly higher. The serum-free calcium value (1.07 ± 0.11) mmol/L of the observation group on the first day after surgery was significantly lower, and the observation group's creatine phosphate, the daily average dosage of creatine phosphate per unit body weight was significantly higher. 96.00% of patients in the observation group were significantly higher in nursing satisfaction. The complication rate of 8.00% in observation group was significantly lower. In order to successfully complete the operation schedule and improve the postoperative recovery effect of children, high requirements are placed on nursing staff. The comprehensive nursing method used in the postoperative ICU of children with CHD can reduce the incidence of postoperative complications and improve nursing satisfaction.

CHD is a common disease in clinic. It has been reported¹ that the incidence of CHD is 0.7–0.8%. At present, the main clinical use of surgical treatment. Most of the children with CHD are accompanied by pulmonary dysfunction. After surgical treatment, the degree of pulmonary function injury is aggravated, and ventilator also affects the respiratory function of the children. Postoperative treatment and care, if not timely, will not only affect the surgical effect but even lead to the death of the children.^{2–3} In the past, the main use of routine nursing intervention, routine nursing mode has certain limitations, the core of its care for “disease,” and ignore the disease is not a single individual, and copy a set of nursing model, so that the nursing effect is not ideal. Comprehensive nursing intervention is a new nursing model developed on the basis of conventional nursing intervention. At present, this kind of nursing model has been widely applied in clinical practice, with ideal nursing effect.⁴ For example, in the study of DE et al,⁵ comprehensive nursing intervention was used in the ICU airway care of children with CHD after extracorporeal circulation, and the research results showed that comprehensive nursing intervention can effectively promote the recovery of children. Because basic nursing measures failed to improve patients' treatment effects in a timely manner, it is critical to accelerate the improvement of comprehensive nursing measures' treatment effects on patients. This study explores the effect of comprehensive nursing methods in postoperative ICU of children with CHD and provides references for clinical nursing. The content is as follows.

Materials and methods

General information

The study period was from December 2017 to February 2020. The subjects were 50 cases of children with CHD treated in our hospital. They were divided into groups by the random number table method: 25 cases in the control group: routine nursing and 25 cases in the observation group: comprehensive nursing intervention. This study has been approved by the ethics committee of our hospital, and all patients signed an informed consent form.

Inclusion criteria: All the children met the diagnostic criteria for CHD.⁶ All the children had normal consciousness. All children were treated for CHD for the first time. There was no respiratory infection before operation.

Exclusion criteria: patients with dysfunction of liver, kidney and other organs; a previous history of mental illness. All children and their families agreed to participate in the study.

Research methods

25 cases in the control group: routine nursing, 25 cases in the observation group: comprehensive nursing intervention.

Routine care. The main contents include management of mechanical ventilation, management of analgesia, and maintenance of airway patency. Mechanical ventilation management: semi-recumbent posture, turn over 1 time in 2 hours, atomise inhalation, 3 times/day, use the ventilator humidifier to humidify the airway, clean the condensate in the breathing circuit in time, and adjust the breathing according to the patient's breathing Machine parameters.

Comprehensive nursing intervention. Psychological care: Explain to the child and the family of the child what may happen after the operation and the corresponding solutions, so that the family of the child can know what to do and actively cooperate with the treatment.

Airway care: For children with tracheal intubation, humidified respiratory tract, and patients with tracheal tube ventilation, use wet gauze to cover the catheter port and instil 3–5 drops of humidifying liquid with a humidified volume of more than 250 ml. If necessary, use drug atomisation. Reduce the frequency of sputum suction, reduce the chance of mucosal injury in children, airway care, using quantitative airway nursing score, ≤ 11 points: no airway suction treatment; ≥ 12 points and ≤ 16 points: give simple sputum suction 1 Times; > 16 points and < 24 points: give atomisation, knock back, and suction 1 time; ≥ 24 points: immediately suck sputum, atomise, turn over, knock back, and suck again.

Management of endotracheal tube: nurses need to replace the endotracheal tube regularly, and the selected model of endotracheal tube should be suitable for children, so as to avoid excessive pressure on children, thus increasing the damage to children. Prevention of infection: Blood and sputum culture should be given regularly, and antibiotics should be used for treatment. In the process of nursing, aseptic operation requirements should be strictly followed to reduce the incidence of infection.

Haemorrhage nursing: nurses need to closely observe the amount of sputum aspiration of children and the colour of sputum aspiration, especially to observe whether there is infiltration of gauze phenomenon, if there is haemorrhage, immediately notify the doctor for treatment.

Dietary care: postoperative vomiting is easy to break the electrolyte disorder in the body, thus affecting the absorption of nutrients. Gastrointestinal protection measures are adopted, such as cimetidine, etc. In addition, children are actively encouraged to provide calcium-rich food and control foods with high phosphorus.

Observation index

The nursing efficiency, nursing satisfaction, perioperative indicators (extracorporeal circulation time, ventilator support time, preoperative serum total calcium level, serum-free calcium value on the first day after surgery, creatine phosphate within 24 hours, daily unit weight phosphocreatine) were observed in the two groups. The incidence of postoperative complications (increased muscle tone, pulmonary infection, atelectasis, pneumothorax, etc.) was observed.

Effective nursing. Obvious effect: the pain degree of the children was significantly relieved, and the incidence of complications was significantly reduced. Effective: the pain degree of the children was basically eliminated, and the incidence of complications decreased. No effect: the pain degree of the children showed no significant relief, and the incidence of complications did not decrease significantly, or even increased. Nursing efficiency = (number of obvious cases + number of effective cases)/total cases $\times 100\%$.

Table 1. Comparison of general information of the two groups of patients [n(%), ($\bar{x} \pm s$)].

Project	Control group	Observation group	P
Average age (years)	59.07 \pm 7.72	60.12 \pm 6.75	0.429
Gender(Male/Female)	26/34	25/35	0.853
Education			
Junior high school and below	31 (51.67)	33 (55.00)	0.781
High school	17 (28.33)	15 (25.00)	
College degree and above	12 (20.00)	12 (20.00)	
COPD course (years)			
5–9	11 (18.33)	12 (20.00)	0.579
10–19	32 (53.33)	34 (56.67)	
20–30	17 (28.33)	14 (23.33)	
Lung function classification			
Grade II	43 (71.67)	45 (75.00)	0.680
Grade III	17 (28.33)	15 (25.00)	
Location of bronchiectasis			
Right lung	34 (56.67)	36 (60.00)	0.620
Left lung	22 (36.67)	22 (36.67)	
Lungs	4 (6.67)	2 (3.33)	

Nursing satisfaction. It mainly includes satisfaction, basic satisfaction and dissatisfaction. Nursing satisfaction = (number of satisfied cases + basic satisfied cases)/total number of cases $\times 100\%$.

Statistical analysis

SPSS26.0 statistical software was used, counting data was represented by %, and comparison between the two groups was performed by 2 test. Measurement data were represented by ($\bar{x} \pm s$), comparison between the two groups was performed by t-test, and $P < 0.05$ was considered statistically significant.

Results

General information

The general data of the two groups were compared in terms of gender, age, and ICU stay time, and the difference was not statistically significant ($P > 0.05$). Table 1.

Comparison of the effective rate of care between the two groups

The effective rate of 92.00% in the observation group was significantly higher than that in the control group ($P < 0.05$). Table 2.

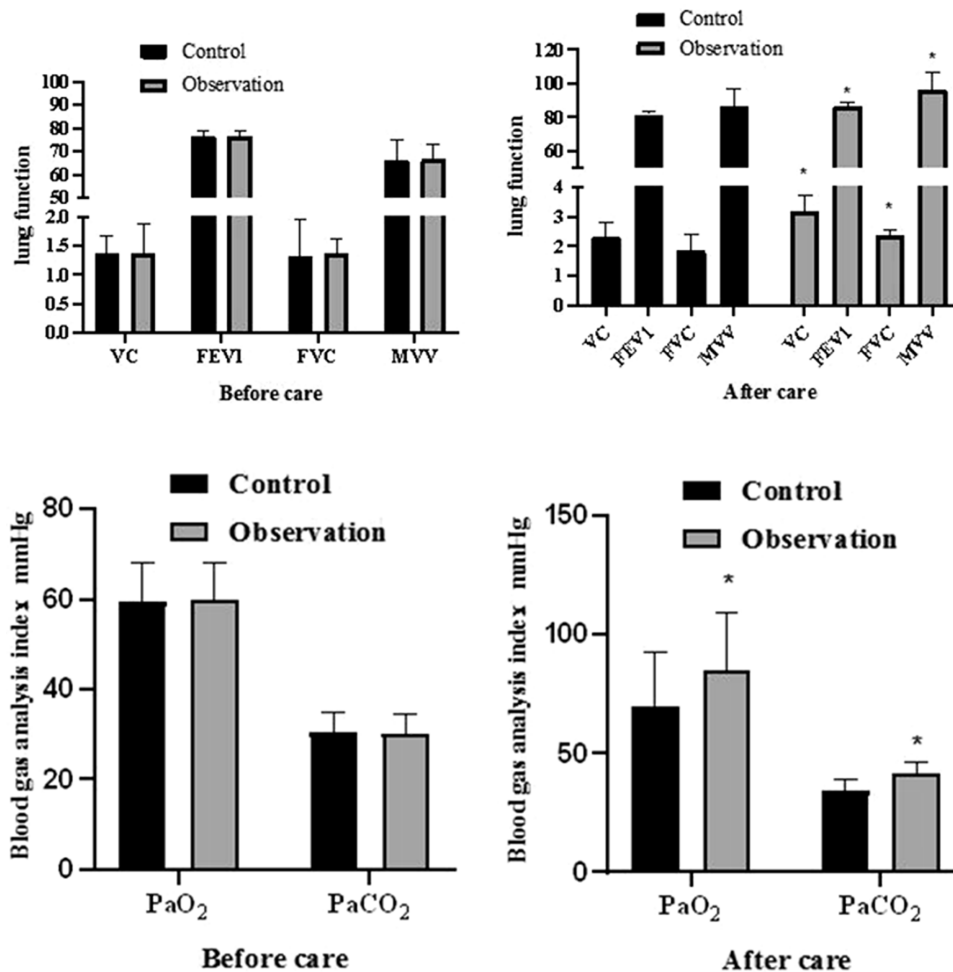
Comparison of perioperative indicators between the two groups

The serum-free calcium value (1.07 ± 0.11) mmol/L of the observation group on the first day after surgery was significantly lower than that of the control group (1.22 ± 0.07) mmol/L, and the observation group's creatine phosphate (2.08 ± 0.54), the daily average

Table 2. Comparison of lung function indexes between the two groups ($\bar{x} \pm s$).

Group	n	Time	VC(L)	FEV1(%)	FVC(L)	MVV(L/min)
Control group	60	Before care	1.38 ± 0.29	76.51 ± 2.64	1.32 ± 0.63	66.32 ± 8.57
		After care	2.32 ± 0.46*	81.48 ± 2.37*	1.85 ± 0.55*	86.39 ± 10.32*
Observation group	60	Before care	1.36 ± 0.52	76.54 ± 2.56	1.37 ± 0.26	66.52 ± 6.51
		After care	3.15 ± 0.56*Δ	86.36 ± 2.56*Δ	2.34 ± 0.23*Δ	96.37 ± 10.12*Δ

Compared with before nursing, *P < 0.05; Compared with control group, ΔP < 0.05.

**Figure 1.** Comparison of the improvement of lung function between the two groups of patients before and after nursing.**Figure 2.** Comparison of blood gas analysis indexes of the two groups of patients before and after nursing.

dosage of creatine phosphate per unit body weight (0.132 ± 0.046) was significantly higher than that of the control group ($P < 0.05$). Figures 1–2, Table 3.

Comparison of nursing satisfaction between the two groups of patients

96.00% of patients in the observation group were significantly higher in nursing satisfaction than those in the control group ($P < 0.05$). Figure 3, Table 4.

Comparison of the incidence of complications between the two groups

The complication rate of 8.00% in the observation group was significantly lower than that in the control group ($P < 0.05$). Figure 4, Table 5.

Discussion

In order to successfully complete the operation schedule and improve the postoperative recovery effect of children, high requirements are placed on nursing staff.⁷ Under normal circumstances, multiple complications may occur after cardiopulmonary bypass surgery, such as catheter detachment, catheter blockage, and cardiac tamponade. Therefore, ICU nurses need to closely observe the changes in the vital signs of the child after surgery to reduce complications. Occurred, effectively promoting the recovery speed of children.⁸

In order to further explore the use of comprehensive nursing intervention in the postoperative ICU of children with CHD, the results of the study restrict the observation group's nursing efficiency and nursing satisfaction, which are significantly better than those of the control group, further suggesting the comparison with conventional nursing intervention. Comprehensive nursing

Table 3. Comparison of blood gas analysis indexes of the two groups before and after nursing ($\bar{x} \pm s$, mmHg).

Group	Number of cases	PaO ₂		t	P	PaCO ₂		t	P
		Before care	After care			Before care	After care		
Control group	60	59.46 ± 8.65	69.44 ± 23.11	3.132	0.002	30.50 ± 4.55	34.04 ± 4.80	4.146	0.000
Observation group	60	59.72 ± 8.35	84.51 ± 24.58	7.397	0.000	30.04 ± 4.62	41.44 ± 4.63	13.501	0.000
t	—	0.168	3.460	—	—	0.549	8.594	—	—
P	—	0.867	0.001	—	—	0.584	0.000	—	—

Table 4. Comparison of the quality of life (nursing satisfaction) of the two groups of patients after nursing ($\bar{x} \pm s$, fraction).

Group	Number of cases	Body mass	Mental state	Social function	Affective function	Total score
Control group	60	53.52 ± 3.33	60.63 ± 3.42	63.41 ± 5.22	60.81 ± 5.82	60.12 ± 2.11
Observation group	60	62.32 ± 4.51	66.91 ± 4.73	70.21 ± 3.32	68.53 ± 4.32	65.35 ± 4.55
t	—	12.159	8.334	8.514	8.250	8.077
P	—	0.000	0.000	0.000	0.000	0.000

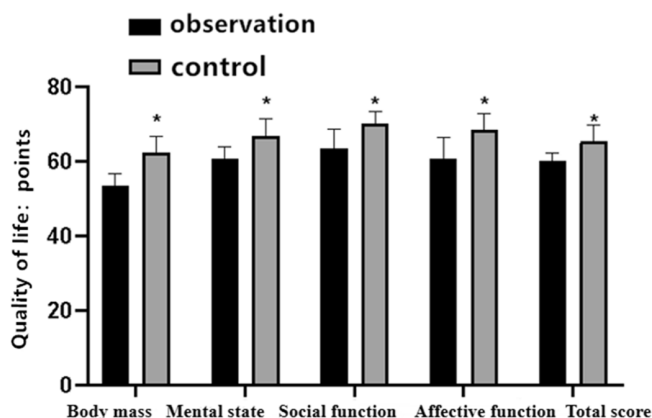


Figure 3. Comparison of the quality of life of the two groups of patients after nursing.

intervention can significantly improve the effectiveness of children’s care and the satisfaction of their families with nursing staff. The main reason is that comprehensive nursing intervention can effectively alleviate the anxiety and tension of the children’s family members through psychological care of the children and their families, increase the care and love for the children, and enable the children and children to actively cooperate in the treatment. In addition, airway care, airway catheter care, complication care, and diet care are carried out. The nursing content is more detailed and thoughtful, which not only improves the efficiency of care but also avoids the occurrence of nurse-patient conflicts, thereby effectively improving the risk The satisfaction of the children’s family with the nursing staff.⁹⁻¹⁰ The results of this study are consistent with those of Kulik et al.¹¹

In this study, we further observed changes in perioperative indicators (extracorporeal circulation time, ventilator support time, preoperative serum total calcium level, serum-free calcium value on the first day after surgery, creatine phosphate within 24 hours, daily average body weight phosphate creatine dosage) etc, found that the observation group of patients on the first day after the operation of serum-free calcium, creatine phosphate within 24

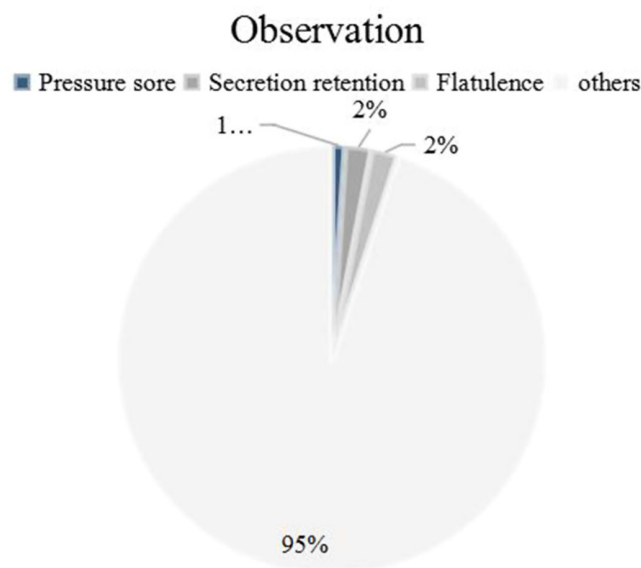
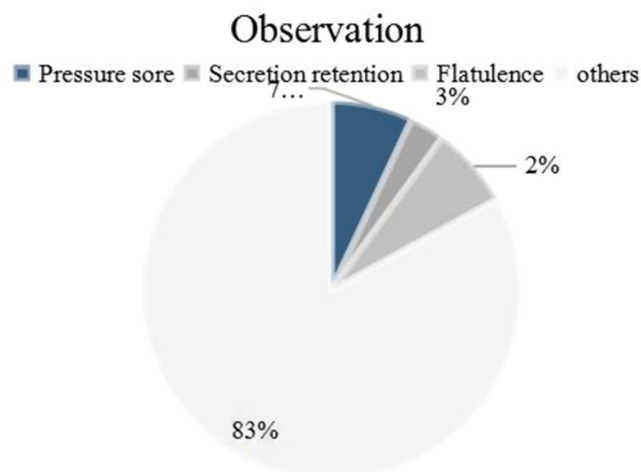


Figure 4. Comparison of the incidence of complications between the two groups.

Table 5. Comparison of the incidence of complications between the two groups [n (%)]

Group	Number of cases	Pressure sore	Secretion retention	Flatulence	Total incidence
Control group	60	4 (6.67)	2 (3.33)	4 (6.67)	10 (16.67)
Observation group	60	1 (1.67)	1 (1.67)	1 (1.67)	3 (5.00)
χ^2	—	1.878	0.342	1.035	4.227
<i>P</i>	—	0.171	0.559	0.309	0.040

hours, daily average creatine phosphate dosage per body weight compared with the control group, the differences were statistically significant ($P < 0.05$). In addition, in terms of the incidence of complications, there were only two patients in the observation group with increased muscle tone. The common causes of increased muscle tone were neurological dysfunction and electrolyte disorders. In this study, there were two patients in the observation group with increased muscle tone. Children may be related to the large dosage of creatine phosphate within 24 hours. Creatine phosphate is a cardiovascular drug that can protect the damaged myocardial tissue. However, the use of creatine phosphate drugs in large doses will affect the body's calcium absorption has an impact. Therefore, this study believes that two children in the observation group have increased muscle tone, which may be related to the intake of creatine phosphate drugs, which will affect the children's calcium metabolism. It may be related to cardiopulmonary bypass time, blood transfusion, and ventilator support. The observation group had no complications such as lung infection, atelectasis, and pneumothorax. In the control group, there was one case of lung infection and one case of lung. Atelectasis, five cases of pneumothorax, and one case of increased muscle tone have a higher overall incidence of complications. The occurrence of atelectasis may be related to insufficient airway care. In addition, the occurrence of lung infection may be due to insufficient nursing work. There may be transitional airway care, increasing airway stimulation, affecting children's rest, and in general increasing the risk of lung infection and pneumothorax in children.^{12–13} The above research results further indicate that the effect of conventional nursing care is not ideal. The contents of nursing care mainly include mechanical ventilation management, analgesia management, and maintaining airway patency. During the nursing process, it is not considered that the disease occurs in every individual. Personalised nursing makes the nursing effect unsatisfactory. The comprehensive nursing method has detailed nursing content, and the core lies in the "patient." The nursing plan is formulated strictly according to the patient's disease condition, which is personalised, and makes up for the routine to some extent. It can be seen that for children with CHD who enter the ICU after cardiopulmonary bypass surgery, the use of comprehensive nursing methods to intervene can effectively promote the recovery of the children to a certain extent, and the application value is relatively high. Entering the ICU after cardiopulmonary bypass may still face many risk factors and many negative emotions. Thus, for children with CHD surgery ICU, adopt comprehensive nursing way, promote effectively the postoperative recovery, high application value, but in children with CHD surgery to enter to the ICU, may face a lot of risk factors, nursing staff need to closely observe children's vital signs change, found that the occurrence of complications as soon as possible, strengthen the concern and care for the children, and promote disease

recovery.¹⁴ The results of this study are consistent with those of Hom et al.¹⁵

Conclusion

In conclusion, the comprehensive nursing method used in the postoperative ICU of children with CHD has ideal nursing effect, it can significantly reduce the incidence of postoperative complications and improve nursing satisfaction. It is worthy of promotion and application.

Conflict of Interest. The authors declare that they have no competing interest.

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Author contributions. Shaoyan Lin was dedicated to the study concepts, study design, manuscript preparation, and manuscript editing; Shaoyan Lin, Qiong Gao, and Xiaoxia carried out the clinical studies and experimental studies; Xiaoxia focused on the data acquisition, data analysis, and statistical analysis; Zhirong Zhao was contributed to the manuscript review. All authors have read and approved this article.

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