

Analysis on Emotional Control and Life Quality of Patients with Continuous Blood Purification and Catheter-Related Bloodstream Infection by Cluster Nursing Model combined with Psychological Intervention

Fan Sun
Xuan Cao
Tingwen Ke
Qian Ding
Jingjing Wang

To study the effect of cluster nursing model combined with psychological intervention on emotional control and life quality of patients with continuous blood purification (CBP) and catheter-related bloodstream infection (CRBSI). 126 patients with CBP catheterization treated in our hospital (November 2018-November 2019) were chosen as the study subjects, and randomly split into group A and group B, 63 cases in each group. Group B adopted routine nursing while group A received cluster nursing model with psychological intervention to compare the emotional control level and life quality between the two groups. No obvious differences in sex ratio, age, BMI, smoking history, drinking history, marital status, disease types, catheter indwelling time and catheter position were found between the two groups ($P>0.05$). After nursing intervention, MPV and CD62-P in group A were obviously lower while PLT value was obviously higher compared with group B ($P<0.001$). CRBSI occurred later in group A compared with group B after intervention ($P<0.001$), and CRBSI duration was shorter compared with group B ($P<0.001$). The CECS scores in both groups after intervention were obviously higher, and CECS score in group A after nursing intervention was obviously higher compared with group B ($P<0.001$). SF-36 scores in both groups after nursing intervention were obviously higher, and SF-36 score in group A after intervention was higher compared with group B ($P<0.001$). The total nursing satisfaction in group A was obviously higher compared with group B ($P<0.05$). Cluster nursing model combined with psychological intervention can enhance emotional control level of patients with CBP catheterization, shorten the CRBSI duration, improve the life quality and nursing satisfaction, with obvious effect, deserving reference and promotion.

Keywords: cluster nursing, psychological intervention, continuous blood purification, bloodstream infection, emotional control, life quality

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Fan Sun Department of Blood purification center, Huangshi central Hospital (Affiliated Hospital of Hubei Polytechnic University); Edong healthcare group, Huangshi 435000, Hubei Province, China, Xuan Cao Department of Blood purification center, Huangshi central Hospital (Affiliated Hospital of Hubei Polytechnic University); Edong healthcare group, Huangshi 435000, Hubei Province, China, Tingwen Ke Department of Blood purification center, Huangshi Hospital of Traditional Chinese Medicine (Municipal Infectious Disease Hospital). Edong healthcare group, Huangshi 435000, Hubei Province, China, Qian Ding Office of Infection Control, Huangshi Hospital of Traditional Chinese Medicine (Municipal Infectious Disease Hospital); Edong healthcare group, Huangshi 435000, Hubei Province, China, Jingjing Wang* Department of Blood purification center, Huangshi Hospital of Traditional Chinese Medicine (Municipal Infectious Disease Hospital). Edong healthcare group, Huangshi 435000, Hubei Province, China, *Corresponding author: Jingjing Wang: Department of Blood purification center, Huangshi Hospital of Traditional Chinese Medicine (Municipal Infectious Disease Hospital). Edong healthcare group, Huangshi 435000, Hubei Province, China.

Blood purification is widely used in treating kidney diseases. Abnormal renal function leads to

the inability to discharge water and metabolic waste in the body, resulting in internal

environment disturbance. Blood purification can timely discharge the accumulated harmful substances in patients and promote the recovery of renal function¹⁻³. Continuous blood purification (CBP) is suitable for patients with chronic and irreversible renal damage for the continuity and different purification modes set according to the condition without changing the hemodynamic of patients⁴⁻⁶. However, the treatment method will increase the incidence of catheter-related bloodstream infection (CRBSI) and affect the treatment. Due to long-term blood purification, patients with CBP are prone to adverse emotions such as irritability and depression, affecting the life quality. Therefore, scientific and effective nursing intervention measures during the treatment of patients are of positive significance for reducing the incidence of CRBSI and improving the clinical efficacy⁷⁻⁹. Cluster nursing model, an evidence-based nursing concept, aims to provide high-quality medical nursing services to patients, which has been widely used abroad but needs more exploration in China¹⁰. Based on this, to further explore the effect of cluster nursing model combined with psychological intervention on emotional control and life quality of patients with CBP and CRBSI, 126 patients with CBP catheterization were chosen as the study subjects, summarized and reported as below.

MATERIALS AND METHODS

General Information

126 patients with CBP catheterization treated in our hospital (November 2018-November 2019) were chosen as the study subjects, and randomly split into group A and group B, 63 cases in each group.

Inclusion Criteria

(1) All the patients were treated with CBP; (2) The patients had a history of immune or infectious diseases; (3) The patients had clear consciousness and good communicative language competences; (4) This study got approval of the hospital ethics committee, and the patients and

their families were informed of the purpose and process of this study and signed the informed consent.

Exclusion Criteria

(1) The patients had malignant tumors; (2) The patients had organic lesions such as brain, heart and lung; (3) The patients had severe infection; (4) The patients had mental and other cognitive impairment or refused to cooperate with the experiment.

Methods

Group B received routine nursing through strict adherence to aseptic operation, disinfection of the patients' skin, puncture and catheterization, dressing replacement, physiological intervention, etc. Group A received cluster nursing model with psychological intervention, with the specific steps as follows. (1) Cluster nursing teams were established, which were composed of the head nurses of the department and nurses with rich clinical experience of more than 4 years. The head nurses served as the team leaders, who were responsible for checking the daily work of other members, organizing them to carry out cluster-related knowledge training and learning the treatment methods, clinical first aid measures and operation ability, clinical nursing quality and working attitude according to *Guidelines for CRBSI Prevention*¹¹. (2) The nursing staff conducted a comprehensive assessment according to the specific catheter position and blood vessels of the patients, recorded the possible clinical adverse reactions of the patients after receiving CBP treatment and took relevant emergency measures to fundamentally reduce the incidence of dangerous events. (3) During the catheterization, the nursing staff needed to wear neat, strictly adhere to aseptic operation, coat patients with aseptic towels and completely disinfect the skin around the puncture place with disinfectant to reduce infection. (4) The nursing staff timely changed the dressings on the puncture points, observed the clinical situation of patients and recorded the changes in the dressings which

needed to be replaced immediately if they were loose or moist¹². Catheters were washed regularly, and heparin was used to block the gaps during dialysis. Extubation should be performed immediately if patients experienced discomfort during treatment. (5) Psychological intervention. Since CBP patients had many concerns complicated with various psychological problems such as uncontrolled emotion, nursing staff should conduct targeted psychological intervention according to the patient's own needs through teaching patients to eliminate their inner depression, establishing good nurse-patient relationship and listening carefully to the patients' utterance to keep them in a good mental state during treatment¹³.

Observation Indexes

3ml of fasting venous blood was collected from the two groups of patients after nursing intervention, and an automatic blood count analyzer (manufacturer: Wuhan Corda Medical Technology Co., Ltd) was used to measure various platelet parameters, including platelet count (PLT), platelet CD62-P and mean platelet volume (MPV). The CRBSI occurrence time and duration were recorded in both groups of patients.

The Chinese version of *The Courtauld Emotional Control Scale (CECS)*¹⁴ was used to evaluate the emotional control level in both groups of patients before and after nursing intervention. A higher score represented better

emotional control.

*The MOS 36-Item Short form Health Survey (SF-36)*¹⁵ was used for evaluating the life quality in both groups before and after intervention. A higher score represented better life quality.

The self-designed *Patient Clinical Nursing satisfaction Questionnaire* by the department was used to evaluate the nursing satisfaction in both groups, with a total score of 100 points (score ≥ 85 as fully satisfied, 65-84 as satisfied and ≤ 64 as dissatisfied).

Statistical Methods

All experimental data were statistically analyzed and processed by SPSS21.0 software, and GraphPad Prism 6 (GraphPad Software, San Diego, USA) was used to draw pictures of the data. The count data were tested by χ^2 , expressed by [n(%)], and the measurement data were measured by t test, expressed by ($\bar{x} \pm s$). The difference was statistically significant when $p < 0.05$.

RESULTS

Comparison of Clinical Data

No obvious differences in sex ratio, age, BMI, smoking history, drinking history, marital status, disease types, catheter indwelling time and catheter position were found between the two groups ($P > 0.05$; Table 1).

Table 1 Comparison of clinical data

Category	Group A (n=63)	Group B (n=63)	χ^2/t	P
Gender			0.131	0.717
Male	36(57.14%)	38(60.32%)		
Female	27(42.86%)	25(39.68%)		
Average age (years old)	64.32 $\pm$ 3.21	64.29 $\pm$ 3.24	0.052	0.958
BMI(kg/m ²)	21.25 $\pm$ 1.21	21.23 $\pm$ 1.23	0.092	0.927
Smoking history			0.127	0.721
No	29(46.03%)	31(49.21%)		
Yes	34(53.97%)	32(50.79%)		
Drinking history			0.128	0.721
No	28(44.44%)	30(47.62%)		
Yes	35(55.56%)	33(52.38%)		
Marital status			0.151	0.697
Unmarried	3(4.76%)	4(6.35%)		
Married	60(95.24%)	59(93.65%)		

Disease types			0.129	0.720
Acute renal failure	36(57.14%)	34(53.97%)		
Chronic glomerulonephritis	27(42.86%)	29(46.03%)		
Average indwelling time (months)	3.21±0.53	3.23±0.51	0.216	0.830
Catheter position			0.032	0.859
Internal jugular vein catheterization	32(50.79%)	33(52.38%)		
Femoral vein catheterization	31(49.21%)	30(47.62%)		

Comparison of Platelet Parameter Values after Nursing Intervention

After nursing intervention, the MPV and CD62-P of patients in group A were obviously

lower compared with group B ($P<0.05$), and the PLT value in group A was obviously higher compared with group B ($P<0.05$; Table 2).

Table 2 Comparison of platelet parameter values after nursing intervention($\bar{x}\pm s$)

Group	n	PLT($\times 10^9$)	MPV(fl)	CD62-P($\mu\text{g/L}$)
Group A	63	196.23±11.24	11.64±1.34	17.84±0.74
Group B	63	172.63±11.32	12.87±1.37	18.96±0.68
t		11.742	5.094	8.846
P		0.000	0.000	0.000

Comparison of Crbsi Occurrence Time and Duration after Nursing Intervention

CRBSI occurred later in group A compared

with group B after intervention ($P<0.05$), and the CRBSI duration was shorter compared with group B ($P<0.05$), as shown in Table 3.

Table 3 Comparison of CRBSI occurrence time and duration after nursing intervention ($\bar{x}\pm s$, d)

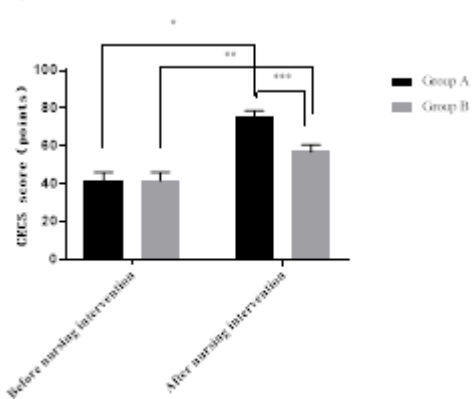
Group	CRBSI occurrence time	CRBSI duration
Group A(n=63)	17.32±1.85	9.64±1.13
Group B (n=63)	11.42±1.92	14.31±1.25
t	17.564	21.998
P	0.000	0.000

Comparison of Cecs Scores

The CECS scores of both groups after intervention were obviously higher than those before nursing intervention ($P<0.05$), and the

CECS score in group A after nursing intervention was obviously higher compared with group B($P<0.05$; Figure 1).

Figure 1 Comparison of CECS scores ($\bar{x}\pm s$)



Note: The abscissa represents before nursing intervention and after nursing intervention, and the ordinate represents CECS score (points).

The CECS score of patients in group A was (38.52±6.32) before nursing intervention and (72.24±5.27) after nursing intervention. The CECS score of patients in group B was (38.54±6.34) before nursing intervention and (54.26±5.33) after nursing intervention.

* indicated an obvious difference in CECS scores of group A before and after nursing intervention (t=32.525, P=0.000);

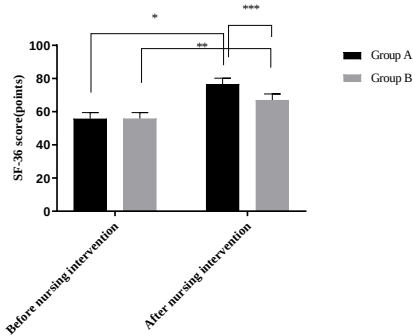
** indicated an obvious difference in CECS scores of group B before and after nursing intervention (t=15.064, P=0.000);

*** indicated an obvious difference in CECS scores between the two groups after nursing intervention (t=19.040, P=0.000).

Comparison of Life Quality Scores

The SF-36 scores of both groups after nursing intervention were obviously higher than those before nursing intervention (P<0.05), and the SF-36 score in group A after intervention was higher compared with group B (P<0.05; Figure 2).

Figure 2 Comparison of SF-36 scores ($\bar{x}\pm s$)



Note: The abscissa represents before nursing intervention and after nursing intervention, and the ordinate represents SF-36 score (points).

The SF-36 score of patients in group A was (53.26±5.13) before nursing intervention and (74.05±5.08) after nursing intervention. The SF-36 score of patients in group B was (53.28±5.15) before nursing intervention and (64.51±5.11) after nursing intervention.

* indicated an obvious difference in SF-36 scores of group A before and after nursing intervention (t=22.856, P=0.000);

** indicated an obvious difference in SF-36 scores of group B before and after nursing intervention (t=12.286, P=0.000);

*** indicated an obvious difference in SF-36 scores between the two groups after nursing intervention (t=10.509, P=0.000).

Comparison of Clinical Nursing Satisfaction between the Two Groups of Patients

group A was obviously higher compared with group B (P<0.05), as shown in Table 4.

The total nursing satisfaction of patients in

Table 4 Comparison of clinical nursing satisfaction [n (%)]

Group	n	Fully satisfied	Satisfied	Dissatisfied	Total satisfaction
Group A	63	31(49.21%)	29(46.03%)	3(4.76%)	95.24%(60/63)
Group B	63	23(36.51%)	30(47.62%)	10(15.87%)	84.13%(53/63)
X ²					4.203
P					0.040

DISCUSSION

As an advanced preventive medical treatment scheme, blood purification can separate the pathogenic factors from the blood and return the purified blood to the body, thus treating diseases. Clinical studies have confirmed that this treatment can effectively remove chronic inflammatory factors, heavy metals and environmental toxins from the blood of patients and improve the liver detoxification function, making it a safe and reliable physical therapy¹⁶⁻¹⁸. CRBSI is a common complication in the treatment of CBP. The risk factors leading to CRBSI are mainly divided into endogenous factors and exogenous factors, the former from the patients' own reasons, including their condition, age, etc., and the latter mainly from operating techniques, treatment methods, etc.^{19,20}. Therefore, enhancing the evaluation of patients before catheterization, implementing aseptic operation and changing dressings regularly are the keys to effectively prevent CRBSI. In this study, cluster nursing model combined with psychological intervention was implemented through the establishment of nursing teams, strict adherence to aseptic operation, disinfection of the patients' skin around the puncture place before catheterization, observation of the dressings, etc., which effectively reduced the incidence of CRBSI. This study found that CECS score in group A after nursing intervention was obviously higher compared with group B ($P < 0.001$), suggesting that cluster nursing model combined with psychological intervention can improve the emotional control level of patients with CBP and facilitate treatment. CECS scale is a classic tool to measure the tendency of emotion suppression. Some scholars have found that emotion suppression may be associated with the occurrence of diseases, which may be an important factor contributing to their occurrence and affect the prognosis²¹⁻²³.

Kawasaki et al.²⁴ believed that the effect of the cluster nursing model was related to the executive ability of relevant medical and nursing workers. In their study, a survey of 240 hospitals found

that about 52% of the hospitals formulated the corresponding cluster nursing measures while only 34 % of them were fully implemented, and the items with lower compliance mainly included catheter maintenance and the selection of optimal catheter position. In this study, nursing teams were established to monitor the daily work of each team member by the head nurses to improve the execution. Besides, this study found that SF-36 score in group A after intervention was higher compared with group B ($P < 0.001$), which was speculated to be related to the implementation of targeted psychological intervention during the treatment of patients, so as to release the patients' adverse emotions, improve the treatment confidence and improve the life quality. Takahiro Kawaji et al.²⁵ pointed out in the study that after the implementation of cluster nursing intervention for patients with early lung cancer, the SF-36 score (73.21 ± 5.39) was obviously higher than (63.28 ± 5.42) in group B, indicating that cluster nursing model can obviously improve life quality and prognosis. This study also has some shortcomings such as the small number of selected cases, which may lead to bias in the experimental results. Therefore, the number of samples should be expanded in the future to increase the reliability of research results.

In conclusion, cluster nursing model combined with psychological intervention can effectively shorten the CRBSI duration in patients with CBP, improve the emotional control level and life quality, with obvious effect, deserving promotion and application.

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