

The Preventive Effect of Comprehensive Nursing Intervention on Arteriovenous Fistula Failure in Patients in the Hemodialysis Room

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Abstract: *Objective:* To explore the preventive effect of comprehensive nursing intervention on arteriovenous fistula failure in patients in the hemodialysis room. *Methods:* 82 patients with arteriovenous fistula in the hemodialysis chamber treated in our hospital from July 2022 to October 2023 were selected as the research subjects. The random number table method divided them into a control group and an experimental group of 41 cases each. The control group received general nursing intervention measures, while the experimental group underwent comprehensive nursing intervention. The incidence of complications (internal fistula failure, bleeding, thrombosis, infection), psychological emotions (SAS scale, SDS scale), quality of life (physical pain, physiological function, emotional function, social function), and nursing satisfaction (very satisfied, basically satisfied, satisfied, dissatisfied) were compared between the two groups of patients. *Results:* The incidence of complications in the experimental group (4, 9.76%) was significantly lower than that in the control group (29, 70.73%); the SAS scores and SDS scores of the patients in the experimental group after intervention were both lower than those in the control group; the quality of life score (physical pain, physiological function, emotional function, and social function) was all higher than those of the control group; the post-intervention nursing satisfaction of the experimental group (40, 97.57%) was also significantly higher than that of the control group (29, 73.17%); and the listed differences were statistically significant ($P < 0.01$). *Conclusion:* For patients with hemodialysis ventricular arteriovenous fistula failure, comprehensive nursing intervention can reduce the incidence of complications, relieve anxiety and stress, improve quality of life and nursing satisfaction, and achieve better preventive effects.

Keywords: Comprehensive care; Patients in hemodialysis room; Arteriovenous fistula failure; Preventive effect

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1. Introduction

Hemodialysis (HD) is a common and important treatment method to maintain the lives of patients^[1]. Among them, arteriovenous fistula (AVF) is the most commonly used vascular access for hemodialysis patients, and its function directly affects the patient's quality of life and treatment effect^[2,3]. However, the AVF may lose its function due to various reasons, such as vascular disease, thrombosis, infection, and so on. This situation

is called an AVF failure. AVF failure will affect the patient's therapeutic effect and increase the patient's psychological and economic burden ^[4]. Therefore, preventing AVF failure has become an important research topic. In recent years, more and more studies have confirmed the important role of comprehensive nursing intervention in preventing AVF loss in patients in the hemodialysis room. Based on this, this article aims to explore the preventive effect of comprehensive nursing intervention on AVF loss in patients in the hemodialysis room to provide a clinical reference.

2. Materials and methods

2.1. General information

82 patients with arteriovenous fistula in the hemodialysis chamber treated in our hospital from July 2022 to October 2023 were selected as the research subjects based on the inclusion and exclusion criteria listed below.

Inclusion criteria:

- (1) The patient has clear consciousness and basic communication and understanding abilities.
- (2) The patient has received hemodialysis treatment and has established an arteriovenous fistula.
- (3) The patient agrees to participate in this study and signs an informed consent form.

Exclusion criteria:

- (1) Patients with severe cognitive impairment or mental illness who are unable to understand and cooperate with the research.
- (2) Patients with other serious systemic diseases, such as severe heart, lung, liver, and kidney dysfunction.
- (3) Patients who do not agree to participate or have difficulties signing the informed consent form for this study.

Using the random number table method, the selected patients were divided into a control group and an experimental group of 41 cases each, including 18 males and 23 females in the control group, with an average age of (50.28 ± 4.35) years, and 20 males and 21 females in the experimental group, with an average age of (51.25 ± 4.27) years old. There was no statistically significant difference in the general information of the two groups of patients ($P > 0.05$).

2.2. Method

The control group received general nursing intervention measures, while the experimental group received comprehensive nursing intervention. The specific intervention contents are as follows.

2.2.1. Psychological intervention

Patients with intraventricular arteriovenous fistulas undergoing hemodialysis are generally in poor physiological condition and are prone to excessive anxiety and tension. Based on this, nursing staff would communicate well with the patients and their families to explain the diagnosis, treatment methods, processes, prognosis, and so on, to alleviate tension and fear in the patient, while also teaching the patients some effective emotion management techniques to help them relieve anxiety and stress.

2.2.2. Dietary care intervention

Patients would be encouraged to eat a high-protein, high-calorie, low-salt, and low-fat diet to maintain an adequate nutritional supply. Patients would be guided to control their water intake based on their urine output and edema to avoid overburdening the heart. Patients would also be encouraged to consume foods rich in iron, folic acid, vitamin B12, and other trace elements to promote healthy hematopoietic function ^[5].

2.2.3. Postural nursing intervention

After surgery, the patient would be guided to adopt an appropriate posture according to the doctor's advice, turn over their body regularly, and perform local massage and functional exercises such as fisting and elbow flexion to promote blood circulation and avoid pressure or distortion of the internal fistula; otherwise, it may cause pressure nevus and thrombus.

2.2.4. Complication nursing intervention

The patient's general condition and surgical site would be closely observed for bleeding, oozing, and so on, to prevent shock caused by bleeding. The pulsation of the patient's internal fistula is also observed, and if thrombosis is found, thrombolytic treatment is promptly performed as directed by the doctor. Patients are checked for symptoms such as chest tightness and chest pain to prevent the occurrence of pulmonary embolism. The patient's surgical site is kept clean and dry by changing dressings regularly to avoid infection, and if signs of infection are found, they are treated promptly with antibiotics.

2.3. Observation indicators

- (1) The incidence of complications after intervention between the two groups of patients.
- (2) Psychological emotions of the two groups of patients.
- (3) The quality of life of the two groups of patients.
- (4) The nursing satisfaction of the two groups of patients.

The specific evaluation indicators are shown in **Table 1**.

Table 1. Observation indicators

Observation indicators	Specific indicators	Score and expression	Interpretation of scores
Complication	(1) Internal fistula failure (2) Bleeding (3) Thrombus (4) Infection	The incidence rate is expressed in %.	-
Psychological emotions	(1) SAS scale (2) SDS scale [6]	There are 20 items each, with a total score of 100 points.	The higher the score, the more severe the anxiety and depression.
Quality of life	(1) Physical pain (2) Physiological function (3) Emotional function (4) Social function	There are 20 items each, with a total score of 100 points.	A higher score means a higher quality of life.
Nursing satisfaction	(1) Very satisfied (2) Basically satisfied (3) Generally satisfied (4) Not satisfied	The satisfaction rate is expressed in %.	-

2.4. Statistical methods

Research data were entered into SPSS 22.0 software for statistical analysis. Measurement data are expressed as mean \pm standard deviation (SD), the *t*-test is used for comparison; count data are expressed as rate (%), and the χ^2 test is used for comparison between groups. $P < 0.05$ indicates that the difference is statistically significant.

3. Results

3.1. Comparison of the incidence of complications between the two groups of patients

The comparison found that the incidence of complications in the experimental group (4, 9.76%) was

significantly lower than that in the control group (29, 70.73%), and the difference was statistically significant ($P < 0.01$). See **Table 2**.

Table 2. Comparison of the incidence of complications between the two groups of patients [n (%)]

Group	n	Internal fistula failure	Bleeding	Thrombus	Infection	Overall incidence
Control group	41	9 (21.95%)	5 (12.20%)	6 (14.63%)	9 (21.95%)	29 (70.73%)
Experimental group	41	2 (4.88%)	1 (2.44%)	0 (0.00)	1 (2.44)	4 (9.76%)
χ^2	-	-	-	-	-	31.695
P	-	-	-	-	-	0.000

3.2. Comparison of psychological and emotional conditions between the two groups of patients before and after intervention

The comparison found that the SAS and SDS scores of the patients in the experimental group after intervention were lower than those in the control group, and the difference was statistically significant ($P < 0.01$). See **Table 3**.

Table 3. Comparison of psychological and emotional conditions between the two groups of patients before and after intervention (mean \pm SD)

Psychological and emotional indicators	Control group ($n = 41$)		Experimental group ($n = 41$)	
	Before intervention	After intervention	Before intervention	After intervention
SAS score	64.49 \pm 6.55	47.57 \pm 4.81	64.52 \pm 6.48	40.15 \pm 4.25 ^①
SDS score	65.69 \pm 6.78	49.27 \pm 4.91	65.87 \pm 6.58	41.21 \pm 4.15 ^②

Note: Compared with the SAS score after nursing in the control group, ^① $t = 7.402$, $P < 0.01$; compared with the SDS score after nursing in the control group, ^② $t = 8.028$, $P < 0.01$.

3.3. Comparison of quality of life between the two groups of patients

The comparison found that after the intervention, the quality-of-life scores (physical pain, physiological function, emotional function, and social function) of the patients in the experimental group were all higher than those in the control group, and the difference was statistically significant ($P < 0.01$). See **Table 4**.

Table 4. Comparison of quality of life between the two groups of patients after intervention (mean \pm SD)

Quality of life indicators	Control group ($n = 41$)	Experimental group ($n = 41$)	t	P
Physical pain	66.58 \pm 6.75	76.21 \pm 7.56	6.084	0.000
Physiological function	66.12 \pm 6.57	75.16 \pm 7.98	5.600	0.000
Emotional function	68.29 \pm 6.87	79.11 \pm 7.49	6.817	0.000
Social function	68.17 \pm 6.58	77.21 \pm 7.56	5.775	0.000

3.4. Comparison of nursing satisfaction between the two groups of patients

The comparison found that the patients in the experimental group were significantly more satisfied with nursing care (40, 97.57%) than the control group (29, 73.17%), and the difference was statistically significant ($P < 0.01$). See **Table 5**.

Table 5. Comparison of patient care satisfaction between the two groups [*n* (%)]

Group	Very satisfied	Basically satisfied	Satisfied	Dissatisfied	Overall satisfaction	χ^2	<i>P</i>
Control group (<i>n</i> = 41)	13 (31.71%)	9 (21.95%)	8 (19.51%)	11 (26.83%)	29 (73.17%)	11.061	0.001
Experimental group (<i>n</i> = 41)	20 (48.79%)	14 (34.15%)	6 (14.63%)	1 (2.43%)	40 (97.57%)		

4. Discussion

An arteriovenous fistula is a vascular access used for hemodialysis treatment [7,8]. It connects an artery and a vein through surgery so that blood from the artery can flow into the vein [9,10]. This surgery is usually performed on the patient's non-dominant arm because it has more blood vessels and allows for better blood flow. The advantage of arteriovenous fistula is that it can provide a stable and reliable blood supply in the long term and does not require frequent replacement of vascular access, so the patient's daily life and dialysis treatment will not be greatly affected [11]. In addition, arteriovenous fistula can improve the patient's hemodialysis, quality of life, and treatment effect. However, arteriovenous fistulas also have potential risks and complications, such as surgical site infection, thrombosis, vascular stenosis, etc. [12]. Therefore, comprehensive postoperative nursing intervention is essential. Comprehensive nursing intervention includes psychological care, dietary care, postural care, complication care, and other aspects [13].

Many studies have shown that comprehensive nursing interventions can achieve good failure prevention effects in caring for patients with arteriovenous fistulas. For example, Xiao conducted a comprehensive nursing intervention on hemodialysis patients and compared the incidence of arteriovenous fistula complications and nursing satisfaction between the two groups of patients [14]. The results found that comprehensive nursing intervention can reduce the occurrence probability of complications from arteriovenous fistula and improve nursing satisfaction. Zhang found that implementing all-around care for uremia patients can avoid the occurrence of internal fistula occlusion, improve nursing effectiveness, and establish a good nurse-patient relationship [15]. These are consistent with the findings of this article. This article believes that the incidence of complications in the experimental group (4/9.76%) was significantly lower than that in the control group (29/70.73%). The SAS scores and SDS scores of the patients in the experimental group after intervention were both lower than those in the control group, indicating that patients undergoing all-around intervention are less likely to suffer from depression, anxiety, and other negative emotions. The quality of life scores of patients in the experimental group are higher than those in the control group, indicating that the quality of life of patients after all-round intervention is higher. The satisfaction of the patients in the experimental group with post-intervention care (40/97.57%) was also significantly higher than that of the control group (29/73.17%), which also indicated that comprehensive nursing intervention is also conducive to the establishment of a good nurse-patient relationship.

However, the current study may have an insufficient sample size, so it may not fully reflect the actual preventive effect of comprehensive nursing intervention on arteriovenous fistula failure in patients in the hemodialysis room. Therefore, it is necessary to expand the research sample size further and conduct more long-term and rigorously controlled experiments in the future to verify the reliability of its conclusions.

Disclosure statement

The authors declare no conflict of interest.

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