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Research Article

Effect of Infrared Irradiation Combined with External Application Nursing on Maintenance of Vascular Access in Hemodialysis Patients

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Abstract: ***Objective:*** This paper mainly analyzes the effect of infrared radiation combined with external application nursing on maintenance of vascular access in hemodialysis patients. ***Methods:*** A total of 150 hemodialysis patients in our hospital from December 2019 to September 2020 were divided into the conventional group and the study group, 75 cases in each group. The conventional group was given external application nursing alone, and the study group was given infrared radiation combined with external application nursing, and the effect on the maintenance of vascular access was counted. ***Results:*** After the intervention, the indexes of URR, kt / V and human albumin in the study group were higher than those in the routine group, and the indexes of β2-mg and MIS in the study group were lower than those in the routine group, $P< 0.05$;The improvement of vascular elasticity and quality of life in the study group was higher than that in the conventional group, and the incidence of complications was lower than that in the conventional group, $P < 0.05$. ***Conclusion:*** Infrared radiation combined with external application of nursing care in hemodialysis patients with vascular access maintenance effect is significant, can effectively improve vascular elasticity.

Keywords: Infrared radiation; External application nursing; Hemodialysis; Vascular access maintenance

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1 Introduction

As an effective method in renal replacement therapy, hemodialysis is also an effective method to maintain the survival time of patients with renal failure. Arteriovenous fistula is a very important vascular access in the process of hemodialysis, and its normal degree can directly affect the first application and application life of hemodialysis[1]. According to the previous data, good blood access can ensure that patients get sufficient dialysis treatment, and improve the quality of life of patients. Therefore, in the process of hemodialysis, we must timely do the relevant nursing intervention to improve the effect of hemodialysis. External application nursing is one of the traditional nursing intervention methods, but it is difficult to achieve the desired effect. Infrared radiation is one of the physical therapy, which can effectively dilate blood vessels, improve blood circulation and improve immune function. Based on this, this paper explores the effect of combined intervention of infrared radiation and external application nursing.

2 Material and methods

2.1 Basic data

This time, 150 hemodialysis patients in our hospital from December 2019 to September 2020 were selected as the research objects; Inclusion criteria: All patients were confirmed as end-stage renal disease patients by clinical examination, all patients used arteriovenous fistula as vascular access, all patients could have normal dialysis every week, informed and voluntarily signed the study consent. Exclusion criteria: Patients with severe mental illness, cognitive impairment and cancer were excluded. The patients were randomly divided into the conventional group

and the study group, 75 cases in each group. The proportion of male and female in the conventional group was 40:35, and the age range was 35-75 years old, with an average of (50.46 ± 2.31) years old; The proportion of male and female in the study group was 41:34, and the age range was 36-74 years old, with an average of (50.51 ± 2.15) years old; There was no significant difference in age and gender between the two groups (P> 0.05).

2.2 Methods

The routine group was given external application nursing alone, and the gauze was immersed in 50% concentration of 45 ℃ magnesium sulfate solution. After the gauze was completely soaked, the patients were given external application at arteriovenous fistula, 2 hours each time, 3 times a day[2].

The study group was intervened by infrared irradiation and external application, and the external application nursing method was the same as that of the conventional group. After that, the lsdt-2 infrared lamp produced by Suzhou Keteng Medical Technology Co., Ltd. was used to give accurate irradiation to the vascular access of the patients. Each irradiation time should be controlled at 25 minutes, twice a day, and the irradiation distance was 20cm, based on the patients' warm feeling.

2.3 Observation indexes

The indexes of dialysis adequacy before and after the intervention were analyzed, including urobilin reduction rate (URR), urea clearance index (kt/V) and β 2-microglobulin (β2-mg); At the same time, human serum albumin index was detected, and malnutrition inflammation score (MIS) was used to evaluate the nutritional status. The higher the level of human serum albumin and MIS index, the better the nutritional status of patients.

The vascular elasticity of the two groups was evaluated statistically. If there was slight pain in the vascular pressure of internal fistula, the vascular elasticity was poor, and the actual blood flow did not exceed the set blood flow, the vascular elasticity was rated as light; If the patient's internal fistula has tenderness, there is induration less than 1 cm in diameter around the blood vessels, and the actual blood flow is 95% lower than the set blood flow, it is medium-sized; If there is strong tenderness in the internal fistula vessels, the diameter of perivascular induration is greater than 1cm, and the actual blood flow is 90% lower than the set blood flow, it is severe.

The quality of life of patients was evaluated by kdta and SF-36. The kdta score scale can effectively evaluate the impact of daily life of patients, and SF-36 score scale can improve the general health quality of life of patients. The higher the score, the higher the life of patients[3].

2.4 Statistical analysis

SPSS 23.0 was used to calculate the data, and T and χ^2 tests were performed, which were expressed as ($\bar{x} \pm s$) and (n /%). If P< 0.05, there was a difference in the data.

3 Results

2.1 Statistics of vascular elasticity after intervention

After the intervention, the patients with mild, medium and severe vascular elasticity in the study group were less than those in the conventional group, all P< 0.05.

Table 1. Statistics of improvement of vascular elasticity ($\bar{x} \pm s$) in the two groups

Group	N (example)	Light	Medium-sized	Heavy
Routine group	75	24	18	10
Research Group	75	10	5	3
χ^2		7.4544	8.6785	4.1269
P		0.0063	0.0032	0.0422

3.2 Statistics of dialysis adequacy index

There was no significant difference between the two groups before intervention; After the intervention, the URR and kt / V indexes of the study group were higher than those of the conventional group, and the β2-mg indexes were lower than those of the conventional group, P< 0.05(Table 2).

Table 2. Statistics of dialysis adequacy index ($\bar{x} \pm s$) of the two groups

Group	URR(%)		Kt/V(%)		β_2-MG(mg/L)	
	Before intervention	After intervention	Before intervention	After intervention	Before intervention	After intervention
Routine group (n = 75)	75.35±3.17	83.64±4.06	75.12±3.71	76.47±4.12	47.52±3.69	43.23±2.91
Research Group (n = 75)	75.18±3.09	94.58±4.87	75.23±3.85	90.64±4.53	47.45±3.52	38.12±2.85
t	0.3326	14.9428	0.1782	20.0407	0.1189	10.8648
P	0.7399	0.0000	0.8588	0.0000	0.9055	0.0000

3.3 Statistics of nutritional improvement of patients

As shown in Table 3, there was no significant difference in nutritional indexes between the two groups before the intervention. After the intervention, the serum albumin of the study group was higher than that of the conventional group, and the MIS score was lower than that of the conventional group, $P< 0.05$.

3.4 The quality of life of the two groups was statistically analyzed

As shown in the following Table 4, there was no significant difference in the scores of kdta and SF-36 between the two groups before the intervention. After the intervention, the scores of kdta and SF-36 in the study group were higher than those in the conventional group, $P < 0.05$.

Table 3. Statistics of nutritional indexes ($\bar{x} \pm s$) of the two groups

Group	Human albumin		MIS score	
	Before intervention	After intervention	Before intervention	After intervention
Routine group	35.13±1.62	37.25±2.03	10.27±1.98	9.71±1.31
Research Group	35.21±1.61	41.97±2.16	10.31±1.85	5.34±1.43
t	0.3033	13.7900	0.1278	19.5146
P	0.7621	0.0000	0.8985	0.0000

Table 4. Statistical evaluation of quality of life ($\bar{x} \pm s$)

Group	KDTA		SF-36	
	Before intervention	After intervention	Before intervention	After intervention
Routine group	51.36±3.95	61.74±5.23	53.34±3.72	62.35±5.24
Research Group	50.71±3.86	72.11±5.84	53.45±3.67	72.43±4.69
t	1.0192	11.4556	0.1823	12.4134
P	0.3097	0.0000	0.8556	0.0000

4 Discussion

Hemodialysis, as a renal replacement therapy, can effectively remove harmful components in patients' blood under the treatment of diffusion, filtration and convection, and reasonably correct the acid-base balance and electrolyte disorder of patients. Arteriovenous fistula is a major vascular access in the maintenance process of hemodialysis, and also an important lifeline of hemodialysis patients, which has many advantages Effective guarantee of arteriovenous fistula usually can provide an important guarantee for the smooth and continuous hemodialysis, so effective intervention must be carried out in time[4].

Because of the long-term use of arteriovenous fistula, there may be a high risk of complications, which not only increases the difficulty of clinical nursing intervention, but also increases the medical burden of patients. According to relevant studies, infrared irradiation plays an important role in maintenance of hemodialysis. This method can reasonably use resonance, resonance and thermal reaction between absorption and molecules, which can improve the situation of patients with high venous pressure and insufficient blood flow of internal fistula. At the same time, infrared irradiation can also effectively reduce the pain and swelling of patients;After irradiation, it can also help patients perspire to reduce the burden of the body, and can effectively repair the vascular intima, which is conducive to the rapid healing of fistula puncture site[5-8]. At the same time, it can increase the protection of vascular integrity and improve the effect of hemodialysis. The results showed that the nutritional indexes and dialysis adequacy indexes of the study group were better than those of the conventional group, the improvement effect of vascular elasticity was better than that of

the conventional group, and the quality of life of the study group was higher than that of the conventional group.

In conclusion, infrared radiation combined with external application nursing application in hemodialysis patients with vascular access maintenance effect is significant, can improve vascular elasticity.

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