The Influence of Rehabilitation Nursing Combined with Upper and Lower Limb Rehabilitation Training on Limb Function in Patients with Cerebral Infarction During the Rehabilitation Period

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Abstract: *Objective:* To explore the effect of conventional rehabilitation nursing combined with upper and lower limb rehabilitation training on patients in the rehabilitation period of cerebral infarction. *Method:* 76 patients in the rehabilitation period of cerebral infarction were selected and randomly divided into the control group (conventional rehabilitation care) and the observation group (conventional rehabilitation care combined with rehabilitation training of upper and lower limbs). The limb function, balance ability, activities of daily living and gait recovery of the patients were evaluated by FMA, BBS, MBI, gait analyzer, SAS and SDS. *Result:* After 3 months of nursing, the observation group was significantly better than the control group in FMA, BBS, MBI and gait recovery scores ($P < 0.05$). *Conclusion:* Conventional rehabilitation nursing combined with upper and lower limb rehabilitation training can significantly improve the motor, balance and daily activity abilities of patients in the rehabilitation period of cerebral infarction, and enhance the quality of life.

Keywords: Rehabilitation; Nursing; Rehabilitation training for upper and lower limbs; Cerebral infarction limb function

1. Introduction

Among cardiovascular and cerebrovascular diseases, cerebral infarction is a relatively common and frequently-occurring one. According to the results of epidemiological investigations, its incidence and disability rate are relatively high among the elderly over 65 years old, and the mortality rate of elderly patients over 80 years old is relatively high [1,2]. However, with the continuous development of the current medical level, the survival rate of

patients with cerebral infarction has been greatly improved. However, even so, a large number of patients will have varying degrees of limb dysfunction, which will have a relatively serious impact on the quality of life of patients [3]. This study aims to explore the influence of rehabilitation nursing combined with upper and lower limb rehabilitation training on limb function in patients with cerebral infarction during the rehabilitation period, with the expectation of providing a reference basis for clinical rehabilitation. The report is as follows.

2. Data and methods

2.1. General information

A total of 76 patients in the rehabilitation period of cerebral infarction who were hospitalized in the hospital from April 2022 to April 2024 were selected as the main research subjects. The inclusion criteria include: (1) Diagnosed with cerebral infarction; (2) In the recovery period with stable vital signs; (3) No other serious complications; (4) Sign the informed consent form. The exclusion criteria include: (1) Coexisting with other serious diseases; (2) Have mental disorders or cognitive impairments; (3) Unable to cooperate with rehabilitation training.

All the patients were entered into the Excel table and random numbers were generated. The patients were divided into the control group and the observation group according to the numbers, with 38 cases in each group. Among the patients in the control group, there were 21 males and 17 females. The age ranged from 45 to 78 years old, with an average age of (62.53 ± 8.41) years old. The disease course ranged from 1 to 6 months, with an average disease course of (3.51 ± 1.23) months. Among the patients in the observation group, there were 22 males and 16 females. The age ranged from 46 to 79 years old, with an average age of (63.14 ± 8.75) years old. The disease course ranged from 1 to 7 months, with an average disease course of (3.73 ± 1.32) months. The above basic data of the two groups of patients were statistically compared and analyzed, but they were not statistically significant $(P > 0.05)$ and were comparable.

2.2. Methods

A randomized controlled approach was adopted. Patients in the control group received conventional rehabilitation care, while those in the observation group received conventional rehabilitation care combined with upper and lower limb rehabilitation training. The specific implementation steps are as follows.

2.2.1. Routine rehabilitation nursing

(1) Basic care: Keep the ward clean and quiet, open Windows regularly for ventilation, and ensure the air in the ward is fresh. Assist the patient in turning over and patting their back to prevent pressure sores and lung infections. Monitor the vital signs of patients and record the changes in their conditions.

(2) Dietary care: Provide a low-salt, low-fat, high-fiber and high-protein diet. Arrange more fresh vegetables and fruits for the patient, avoid spicy and stimulating foods, and adjust the amount and structure of the diet according to the patient's condition to ensure balanced nutrition.

(3) Rehabilitation nursing: The nursing team elaborately explains to the patient the importance of rehabilitation exercises, rehabilitation goals and their significance in clinical practice, and at the same time educates the

patient's family on how to correctly provide daily joint massage care for the patient.

2.2.2. Rehabilitation training for upper and lower limbs

(1) Upper limb rehabilitation training

(A) Shoulder joint training: Perform forward flexion, backward extension, adduction, and abduction movements on the shoulder joints of all patients. Repeat each movement 10–15 times, 2–3 times a day.

(B) Elbow joint training: Perform flexion and extension exercises on the elbow joints of all patients. Repeat each movement 10 to 15 times, 2 to 3 times a day.

(C) Wrist joint and finger training: Perform dorsiflexion, palmar flexion, radial deviation, ulnar deviation movements for the wrist joint, as well as flexion, extension, and finger alignment exercises for the fingers. Repeat each movement 10 to 15 times, 2 to 3 times a day.

(2) Lower limb rehabilitation training

(A) Hip joint training: Perform hip flexion, extension, adduction and abduction exercises. Repeat each movement 10 to 15 times, 2 to 3 times a day.

(B) Knee joint training: Perform knee flexion and extension exercises. Repeat each movement 10 to 15 times, 2 to 3 times a day.

(C) Ankle joint training: Perform ankle dorsiflexion and plantar flexion exercises. Repeat each movement 10 to 15 times, 2 to 3 times a day.

2.3. Observation indicators

Set several observation indicators to evaluate the rehabilitation effects of the two nursing models.

(1) Limb motor function and balance ability: The Fugl-Meyer Motor Function Score (FMA) scale was used to score the motor functions of the upper and lower limbs of the patients before receiving care and 3 months after the care. The total score was 100 points, and the higher the score, the better the motor function.

(2) Activities of daily living: The modified Barthel Index (MBI) scale was used to assess the patients' self-care abilities (washing, dressing, and eating) and activity abilities (going up and down stairs and walking) before receiving care and three months after the care. The scale consists of a total of 10 items, with a total score of 100 points. The higher the score, the stronger the ability of activities of daily living.

(3) Gait recovery: Through the gait analyzer, gait detection and scoring were conducted for the patients before they received care and three months after the care. Evaluate the patient's walking ability, including step length (one step span in cm) and step frequency (how many cm to walk per second).

2.4. Statistical methods

All data were processed and analyzed using SPSS 22.0 software. Among them, the measurement data were presented in the form of mean ± standard deviation (SD), and the t-test was used for comparison between groups. Counting data were expressed as frequency and percentage (%), and the chi-square test was used for intergroup comparison. $P < 0.05$ indicates that the difference is statistically significant.

3. Result

3.1. Comparison of limb motor function and balance ability

From the assessment results of limb motor function and balance ability, before receiving nursing care, there was no significant difference in the scores of upper limb FMA, lower limb FMA and balance ability between the two groups of patients ($P > 0.05$). Three months after receiving nursing intervention, compared with the patients in the control group, the FMA and BBS scores of the patients in the observation group were significantly higher ($P < 0.05$) (**Table 1**).

Table 1. Comparison of limb motor function and balance ability scores of patients in each group (mean ± SD, points)

Groups	Upper Extremity FMA Score		Lower Extremity FMA Score		BBS rating	
	Pre-nursing	After nursing	Pre-nursing	After nursing	Pre-nursing	After nursing
Control group	32.53 ± 6.82	40.24 ± 7.51	28.44 ± 5.96	35.14 ± 6.48	28.57 ± 5.62	38.23 ± 6.37
Observation group	33.13 ± 7.21	52.82 ± 8.03	29.13 ± 6.25	46.07 ± 7.13	29.14 ± 5.95	46.74 ± 6.83
t-value	0.762	8.647	0.903	7.801	0.634	5.476
p-value	> 0.05	< 0.05	> 0.05	< 0.05	> 0.05	< 0.05

3.2. Comparison of activities of daily living

From the assessment results of activities of daily living, before receiving nursing care, there was no significant difference in the scores of activities of daily living between the two groups of patients ($P > 0.05$). Three months after receiving nursing intervention, the scores of all aspects of the patients in the observation group were significantly higher compared with those in the control group ($P < 0.05$) (**Table 2**).

Table 2. Comparison of activities of daily living scores of patients in each group (mean ± SD, points)

Groups	Self-management		Motility	
	Pre-nursing	After nursing	Pre-nursing	After nursing
Control group	39.87 ± 7.24	52.36 ± 11.43	31.48 ± 9.62	45.12 ± 14.31
Observation group	40.06 ± 8.13	68.21 ± 9.87	30.97 ± 10.03	65.88 ± 12.53
t-value	0.403	8.463	0.680	13.427
p-value	> 0.05	< 0.05	> 0.05	< 0.05

3.3. Comparison of Gait recovery

From the assessment results of gait detection, before receiving nursing care, there was no significant difference in the scores of step frequency and step length between the two groups of patients ($P > 0.05$). Three months after receiving

nursing intervention, the scores of all aspects of the patients in the observation group were significantly higher compared with those in the control group ($P < 0.05$) (**Table 3**).

Table 3. Comparison of Gait recovery in each group of patients (mean ± SD)

Groups	Step rate (cm/s)		Step length (cm)	
	Pre-nursing	**After nursing**	**Pre-nursing**	**After nursing**
Control group	23.14 ± 5.06	28.09 ± 6.78	21.89 ± 3.37	26.18 ± 5.16
Observation group	23.67 ± 6.72	34.46 ± 6.20	22.13 ± 4.03	29.76 ± 4.68
t-value	0.403	8.463	0.680	13.427
p-value	> 0.05	< 0.05	> 0.05	< 0.05

4. Discussion

Cerebral infarction is a common acute neurological disease in clinical practice. After treatment in the acute stage, patients enter the rehabilitation period, but they will face problems such as limb motor function disorders [4]. Nursing and training during the rehabilitation period are crucial for the patient's recovery. The main goal is to improve the patient's limb motor function, restore their ability to take care of themselves daily, and avoid secondary injuries caused by long-term bed rest [5,6]. First, from the perspective of FMA and BBS scores, after receiving 3 months of nursing intervention, the scores of patients in the observation group in this aspect were significantly better compared with those in the control group ($P < 0.05$). It is indicated that the combined rehabilitation training of upper and lower limbs can effectively improve the motor coordination and limb function of patients [7]. This is because the observation group added more targeted rehabilitation training for the upper and lower limbs based on conventional rehabilitation care. Conventional care only helps patients maintain their physiological state through support such as basic care [8,9]. Rehabilitation training for the upper and lower limbs enhances the movements of the patient's shoulder joint, elbow joint, wrist joint, etc., enabling the patient to gradually regain the ability of autonomous movement [10–12]. Meanwhile, the combined training of lower limb functions such as the hip joint, knee joint and ankle joint with walking training and balance training can improve the gait of patients to a certain extent and accelerate the recovery of walking ability [13–15].

5. Conclusion

To sum up, conventional rehabilitation nursing combined with upper and lower limb rehabilitation training has shown significant advantages in the functional recovery of patients with cerebral infarction during the rehabilitation period. It can effectively enhance the patient's motor ability, balance ability and daily activity ability, thereby improving their quality of life. Therefore, in clinical nursing, comprehensive exercise training should be considered to be included in the rehabilitation nursing plan for patients with cerebral infarction, to achieve the best rehabilitation effect.

Disclosure statement

The author declares no conflict of interest.

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