Original Article
Study on the effect of rehabilitation nursing on patients with cerebra ischemic stroke

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Abstract: Objective: This study aimed at exploring the clinical effect of rehabilitation nursing on patients with cerebral ischemic stroke (CIS). Methods: Eighty-four patients with CIS treated in our hospital were randomly divided into intervention group (n=42) and control group (n=42). The patients in the control group received conventional nursing, and those in the intervention group received rehabilitation nursing based on conventional nursing. The rehabilitation nursing program included psychological intervention, lying position training, language function recovery, brain function recovery, swallowing function recovery, activity function training and so on for one month. The Barthel index (BI), self-rating anxiety scale (SAS), self-rating depression scale (SDS), National Institute of Health stroke scale (NIHSS), Fugel-Meyer assessment (FMA) and nursing satisfaction were compared between the two groups. Results: After nursing, the scores of SAS, SDS, BI, NIHSS, FMA and nursing satisfaction in the intervention group were better than those in the control group (all P<0.01). Conclusion: Compared with conventional nursing, the rehabilitation nursing has a better intervention effect on patients with CIS, which can effectively improve the unhealthy psychological condition and benefit the prognosis and life quality of patients.

Keywords: Rehabilitation nursing, cerebral ischemic stroke, clinical effect, prognosis, psychologic condition

Introduction

Cerebral ischemic stroke (CIS) can also be referred to as ischemic cerebral infarction, and it mainly refers to the local acute cerebral ischemic necrosis or cerebromalacia caused by reduced cerebral blood circulation, ischemia, and hypoxia [1]. It is a common cerebrovascular disease in clinic. Epidemiological related statistics data show that more than 1.5 million adults die of acute cerebrovascular diseases in China every year, of which CIS accounts for about 75% of the incipient CIS [2, 3]. Besides, CIS has a high disability rate and fatality rate [4, 5].

Rehabilitation nursing is a professional concept that combines the knowledge of rehabilitation specialty and nursing specialty. Through the practical application of rehabilitation nursing, a series of adverse complications caused by long-term bed rest can be reduced as much as possible, and the prognosis of patients can be effectively improved [6, 7]. Some studies on

the clinical application of rehabilitation nursing have been reported. For example, Zhang et al. reported that early rehabilitation nursing can effectively improve the cardiac reserve capacity of patients with acute myocardial infarction after percutaneous coronary intervention, which can effectively improve the cardiac function and life quality of the patients [8]. Fan reported that the early rehabilitation nursing model has a significant effect on patients with hypertensive cerebral thrombosis, and can effectively improve the prognosis [9].

Due to the complex pathogenesis in the early onset, CIS will cause abnormal deficiency of blood supply of brain tissue, leading to brain tissue necrosis as the disease progresses [10]. Patients often have varying degrees of language, movement and perception disorders, which can seriously affect their psychological mood. At present, there are clinical treatment methods for CIS, aiming at relieving and stabilizing the condition and symptoms [11, 12].

Studies have shown that rehabilitation nursing programs can significantly improve the prognosis and the recovery of patients [13]. Through the multi-dimensional evaluation of the scores of Barthel index (BI), self-rating anxiety scale (SAS), self-rating depression scale (SDS), National Institute of Health stroke scale (NIHSS), Fugel-Meyer assessment (FMA) and nursing satisfaction, this study comprehensively analyzed the role of rehabilitation nursing in practical nursing work, aiming to explore the intervention effect of rehabilitation nursing on CIS patients.

Materials and methods

The baseline data

Eighty-four patients with CIS treated in Qinghai University Affiliated Hospital from July 2019 to July 2020 were randomly divided into control group (n=42) and intervention group (n=42) according to the random number table method. In the control group, there were 24 males and 18 females, with an average age of 65.5±2.7 years old, and with complications of diabetes mellitus (n=8), hypertension (n=28) and coronary heart disease (n=6). In the intervention group, there were 27 males and 15 females, with an average age of 65.0±3.7 years old, and with complications of diabetes mellitus (n=9), hypertension (n=24) and coronary heart disease (n=9). There was no significant difference in baseline data between the two groups. All the patients volunteered to participate in this study and signed the informed consent form. This study has been reviewed and approved by the Ethics Committee of Qinghai University Affiliated Hospital.

Inclusion and exclusion criteria

Inclusion criteria: (1) After admission, the patients met the relevant content in the standard of the 4th National Academic Conference on Cerebrovascular Diseases (1995) after brain MRI and CT examinations, and all of them were diagnosed as CIS [14]. (2) All vital signs tended to be stable; (3) All patients had not received rehabilitation nursing and other related training before. Exclusion criteria: (1) Patients who had sequelae of nervous system diseases and history of mental illness; (2) Patients who were unable to participate in the completion of this study as accompanied by other systemic dis-

eases; (3) Patients with disturbance of consciousness, complete impaired speech and eating function.

Nursing methods

Patients in the control group were given conventional nursing. Patients themselves and their families were introduced of the disease mechanism and hospital system. The baseline and diseases condition were evaluated, the routine medication plan was described and the relevant contents of the conventional nursing were explained for the patient and their families. According to the recommendations of the nutrition department, the patients were given dietary guidance (routine medication, dietary guidance, etc.) to carry out conventional psychological nursing for one month. On the basis of conventional nursing in the control group, the intervention group received a rehabilitation nursing according to the patients' physical signs. The specific steps are as follows: 1. Psychological intervention: after admission, the patients were given psychological counseling by the nursing staff. Patients and their families were told to actively cooperate with the hospital staff for the treatment in the process of rehabilitation. The common sense of the disease was briefly described to make the patients understand the importance of a good prognosis, so as to help them to build confidence in restoring their daily life and self-care ability. The patient's family members were communicated with every day to ensure that they were full of confidence in the process of treatment and rehabilitation. 2. Training in the supine position: (1) Patients were maintained in the supine position with their feet inserting into the suspension ring to keep the lower limbs at an angle of 30° to the bed surface. The patient was told to raise the buttocks to keep both lower limbs buttocks and torso as straight as possible, and maintain the stability of the lower limbs without shaking for 10 seconds. (2) In the lateral recumbent position, one knee joint was inserted into the suspension ring and keep the lower limb at a 30° angle to the bed surface. The specific operation was the same as the previous step. (3) The training in the supine position was conducted three times a week for 30 minutes each time. 3. Recovery of language function: patients of cerebral apoplexy often have language disorders, so the language rele-

vant trainings must be strengthened, which include open mouth training, vocal, etc., and the whole recovery process should not be too hasty, but gradually from words to sentences. 4. Recovery of brain function: patients were communicated initiatively by the accompanies of nurse staff and family member. Patients' memory ability and normal logical thinking ability were recovered by listening to music, reading newspapers, etc. 5. Recovery of swallowing function: liquid food was taken as the main food to help patients to perform swallowing function training, and solid food was gradually added according to the patient's recovery function. 6. Activity function training: daily function training was carried out including simple dressing, eating, urination, etc. With the gradual improvement of the patient's condition, standing balance training, transfer training and sitting training were carried out according to the situation, and training was also carried out in the form of climbing stairs.

Outcome measures

NIHSS, SAS score, SDS score, prognosis evaluation (BI score), limb motor function (FMA) and nursing satisfaction were evaluated before and after nursing. (1) Evaluation standard of psychological status: the psychological status of patients was evaluated by SAS and SDS [15]. The evaluation criteria of SAS scoring are as follows: Those with total anxiety score below 50 are considered as normal, a score of 50-60 as mild anxiety, a score of 61-70 as moderate anxiety, and those with a score of 70 or higher as severe anxiety. Evaluation standard of SDS score: Those with a score of 53-62 are considered as mild depression, a score of 63-72 as moderate depression, and a score of 73 or higher as severe depression. (2) The NIHSS was used for evaluation, and the degree of nerve injury was aggravated with the score increased [16]. (3) Prognostic evaluation: the BI was used for evaluation, and the higher the score, the better the prognosis [17]. (4) Evaluation of limb motor function: the FMA rating scale was used for evaluation of limb motor function, and the higher the score, the better the motor function of the affected limb (a total score of 100) [18]. (5) Nursing satisfaction evaluation: the nursing satisfaction survey questionnaire with a full score of 100 made by our hospital was used for evaluation. The score

≥90 points is considered as very satisfied, 70-89 points as satisfactory, 60-69 as general satisfaction, and <60 points as dissatisfaction. The nursing satisfaction (%) = (total number of cases-number of unsatisfactory cases)/total number of cases × 100%.

Statistical methods

SPSS 20.0 software was used for data analysis. Data conformed to the normal distribution and homoscedasticity were expressed by mean ± standard deviation ($\bar{x}$ ± sd). The comparison between groups was performed by two independent samples t test, and the comparison between groups before and after treatment was performed by paired samples t test. The enumeration data was expressed as %/cases, and the chi-square test (χ^2) was used for comparison between groups. P<0.05 indicates that the difference is statistically significant.

Results

The baseline data

There was no significant difference in gender, age, BMI, smoking history, complications (hypertension, diabetes, coronary heart disease), stroke location and other baseline data of patients in the two groups (all P>0.05). See **Table 1**.

Comparison the scores of anxiety and depression in patients

Before nursing, there was no significant difference in SAS score and SDS score between the two groups (all P>0.05). After nursing, the SAS score of patients in both groups decreased significantly, and the score in the intervention group was significantly lower than that in the control group, (all P<0.001). After nursing, the SDS scores of patients in both groups decreased significantly, and the score in the intervention group was significantly lower than that in the control group (all P<0.001). The results are shown in **Table 2**.

Comparison of the quality of daily life of patients

Before nursing, there was no significant difference in the scores of BI between the two groups (all P>0.05). After nursing, the score of BI

Table 1. The baseline data ($\bar{x} \pm sd$; n, %)

Baseline data	Control group (n=42)	Intervention group (n=42)	t/χ^2	P
Male (n, %)	24 (57.14%)	27 (64.29%)	0.449	0.503
Age (years)	65.5±2.7	65.0±3.7	0.635	0.528
BMI (kg/m^2)	23.17±3.06	23.78±2.93	0.929	0.355
Smoking history (n, %)	18 (42.86%)	20 (47.62%)	0.192	0.661
Stroke site cerebellum	3	5	1.425	0.964
Corona radiata	8	6		
Thalamus	9	7		
Brain stem	4	5		
Cerebral hemisphere	6	7		
Basal ganglia	9	8		
Other sites	3	4		
Conservative treatment	10	6	1.239	0.538
Thrombectomy treatment	14	16		
Thrombolytic therapy	18	20		
Hypertension (n, %)	28 (66.67%)	24 (57.14%)	0.967	0.617
Coronary heart disease (n, %)	6 (14.29%)	9 (21.43%)		
Diabetes (n, %)	8 (19.05%)	9 (21.43%)		
Hyperuricemia	8	11	0.612	0.434
Atrial fibrillation	19	18	0.048	0.826
Carotid artery stenosis	13	10	0.539	0.463

Note: BMI: body mass index.

Table 2. Comparison of SAS and SDS scores

Group	Control group (n=42)	Intervention group (n=42)	t	P
SAS scores				
Before nursing	41.82±2.71	42.01±2.58	0.335	0.739
After nursing	36.53±2.90	32.52±3.03	6.185	<0.001
t	8.546	13.365		
P	<0.001	<0.001		
SDS scores				
Before nursing	44.50±2.88	44.77±3.27	0.403	0.688
After nursing	40.47±3.16	35.07±2.19	9.100	<0.001
t	6.311	17.242		
P	<0.001	<0.001		

Note: SAS: Self-rating anxiety scale; SDS: Self-rating depression scale.

in the intervention group was significantly higher than that in the control group, (all P<0.001). See **Table 3** and **Figure 1**.

Comparison of functional scores of patients

Before nursing, there was no significant difference in FMA score and NIHSS score between the two groups (all P>0.05). After nursing, the FMA score of patients in both groups increased significantly, and the score in the intervention group was significantly higher than that in the control group (all P<0.001). After nursing, the NIHSS score of patients in both groups decreased significantly, and the score in the intervention group was significantly lower than that in the control group (all P<0.001). The results are shown in **Table 4**.

Comparison of nursing satisfaction

The nursing satisfaction of the intervention group was significantly higher than that of the control group (97.62% vs. 78.57%, P<0.01). See **Table 5** for details.

Discussion

Stroke is a clinically common cerebrovascular disease; the incidence is increasing with a trend of rejuvenation [19]. The CIS incidence is relatively high with a certain degree of disability, causing the dysfunctional of nervous system, motor function and so on, which may lead the anxiety, depression and other bad emotions in patients [20, 21]. This study aimed at exploring the effect of rehabilitation nursing in patients with CIS. The CIS patients often suffer from post-stroke emotional disorders, which is mainly characterized by post-stroke anxiety and depression [22, 23]. In addition, the motor dysfunction, disability and other adverse symptoms caused by this disease often lead to psychological disorders of patients. Rehabilitation nursing can eliminate the bad mood of patients to a certain extent. Liu et al. have conducted a grouping test on 98 patients with stroke complicated with sequelae, in which the control group received the con-

Table 3. Comparison of Barthel index scores

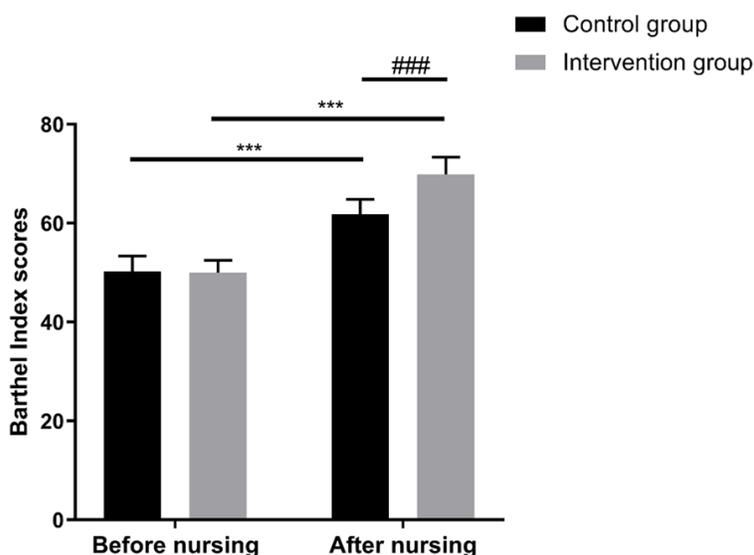|	Before nursing	After nursing	t	P
Control group (n=42)	50.25±3.11	61.82±3.01	-20.041	<0.001
Intervention group (n=42)	50.00±2.52	69.88±3.49	-25.493	<0.001
t	0.405	11.328		
P	0.687	<0.001		

Figure 1. Comparison of Barthel index scores. ***P<0.001, when compared between before and after nursing; ###P<0.001, when compared between the control group and intervention group.

Table 4. Comparison of functional scores of patients

Group	Control group (n=42)	Intervention group (n=42)	t	P
FMA score				
Before nursing	49.28±3.52	48.81±4.04	0.564	0.574
After nursing	59.96±2.67	69.10±3.16	14.329	<0.001
t	-14.755	28.119		
P	<0.001	<0.001		
NIHSS score				
Before nursing	23.82±2.72	24.01±2.58	0.335	0.739
After nursing	16.00±1.01	11.44±0.94	21.354	<0.001
t	15.683	30.250		
P	<0.001	<0.001		

Note: NIHSS: National Institute of Health stroke scale; FMA: Fugel-Meyer assessment.

anxiety SAS and depression SDS were better than those in the control group. The results of this study showed that after nursing, the SDS and SAS scores of the patients in the intervention group were significantly lower than those in the control group, which were consistent to previous studies. It is indicated that the rehabilitation nursing plays an important role in improving patients' poor psychological state and helping them regain their confidence in rehabilitation.

Rehabilitation nursing for stroke patients is mainly through restoring the patient's ability of daily activities, helping them to restore their limbs and language function. Studies have found that after early rehabilitation nursing for stroke patients, the BI score was significantly better than that of the conventional nursing group, showing a great benefit to improving the ability of daily living of stroke patients [25, 26]. The results of this study showing that after nursing, the BI score in the two groups was both improved, and the BI score of the patients who received rehabilitation nursing was significantly higher than that of the control group, were basically consistent with the results of the above study. It is suggested that rehabilitation nursing can help patients to restore their ability of limb movement, making them adapt to daily life as soon as possible with the improvement of the quality of life.

ventional nursing, and the intervention group received rehabilitation nursing based on the control group [24]. The results showed that the psychological state of the patients in the intervention group recovered well, and the scores of

CIS is prone to blood-brain barrier dysfunction, which makes the pathogenesis of neurovascular injury more complex, and the resulting neurological impairment and degeneration will reduce the limb movement and sensory func-

Table 5. Comparison of nursing satisfaction (n)

Groups	Very satisfied	Satisfied	Generally satisfied	Dissatisfied	Nursing satisfaction
Control group (n=42)	12	11	10	9	33 (78.57%)
Intervention group (n=42)	23	12	6	1	41 (97.62%)
χ^2	10.901				7.265
P	0.012				0.007

tion of patients. Timely recovery of neurological function is helpful to achieve early rehabilitation of patients [27]. Wu et al. have reported that the rehabilitation nursing can help patients to achieve the recovery of their neurological and limb function [28]. This study shows that rehabilitation nursing can effectively reduce the NIHSS score and improve the FMA score, suggesting that rehabilitation nursing plays an important role in the recovery of nerve function and limb motor function. Li et al. have conducted an observation of 80 stroke patients and found that rehabilitation nursing integrated with humanistic care can improve the patients' psychological state, and enable them to face treatment more actively, improving their prognosis and nursing satisfaction [29]. Using the nursing satisfaction scale, this study has found that the post-nursing satisfaction of the intervention group was significantly better than that of the control group, indicating that rehabilitation nursing can effectively improve patients' nursing satisfaction and treatment compliance.

This study still has some shortcomings as the small sample size may lead to the bias of the results. So the sample size should be increased for further study. The single-center study used in this study may influence the universality of the results, and in the future, we will consider incorporating the results of multi-center studies to obtain more precise conclusions.

In conclusion, rehabilitation nursing for patients with CIS can effectively improve the condition of patients, help patients adjust their psychological state, restore their nerves and limb motor functions, and effectively promote prognosis recovery.

Disclosure of conflict of interest

None.

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